Combine Data

```
#libraries for analysis
import numpy as np
import pandas as pd

#import the dataset
#foodwnl FAOSTAT_food_waste_&_loss_data
foodwnl=pd.read_csv('/content/FAOSTAT_food_waste_&_loss_data.csv')

#ghg FAOSTAT_ghg_emmissions
ghg=pd.read_csv('/content/FAOSTAT_ghg_emmissions.csv')

#production FAOSTAT_production
prod = pd.read_csv('/content/FAOSTAT_production.csv')

prod
```

```
   Domain Code                         Domain  Area Code (M49)
Area  \
0          QCL  Crops and livestock products              458
Malaysia
1          QCL  Crops and livestock products              458
Malaysia
2          QCL  Crops and livestock products              458
Malaysia
3          QCL  Crops and livestock products              458
Malaysia
4          QCL  Crops and livestock products              458
Malaysia
..         ...                           ...              ...       ..
.
64         QCL  Crops and livestock products              458
Malaysia
65         QCL  Crops and livestock products              458
Malaysia
66         QCL  Crops and livestock products              458
Malaysia
67         QCL  Crops and livestock products              458
Malaysia
68         QCL  Crops and livestock products              458
Malaysia

    Element Code         Element  Item Code (CPC)                 Item
\
0           5510      Production         21691.14  Oil of palm kernel

1           5312  Area harvested          1491.01      Oil palm fruit
```

```
2           5419           Yield          1491.01      Oil palm fruit
3           5510      Production          1491.01      Oil palm fruit
4           5510      Production          1491.02        Palm kernels
..           ...             ...              ...                ...
64          5510      Production          1491.02        Palm kernels
65          5510      Production          2165.00            Palm oil
66          5312  Area harvested          1491.01      Oil palm fruit
67          5419           Yield          1491.01      Oil palm fruit
68          5510      Production          1491.01      Oil palm fruit
```

```
    Year Code  Year      Unit     Value Flag Flag Description  Note
0         2010  2010         t   2014943    A  Official figure   NaN
1         2010  2010        ha   4853766    A  Official figure   NaN
2         2010  2010  100 g/ha    171189    A  Official figure   NaN
3         2010  2010         t  83090935    A  Official figure   NaN
4         2010  2010         t   4292076    A  Official figure   NaN
..         ...   ...       ...       ...  ...               ...   ...
64        2020  2020         t   4703981    A  Official figure   NaN
65        2020  2020         t  19140613    A  Official figure   NaN
66        2021  2021        ha   5144180    A  Official figure   NaN
67        2021  2021  100 g/ha    177664    A  Official figure   NaN
68        2021  2021         t  91393666    A  Official figure   NaN

[69 rows x 15 columns]
```

```
prod.drop(columns=["Domain","Domain Code","Area","Area Code
(M49)","Element Code","Item Code (CPC)","Year Code","Flag","Flag
Description","Note"])
```

```
           Element                 Item  Year      Unit     Value
0       Production  Oil of palm kernel  2010         t   2014943
1   Area harvested      Oil palm fruit  2010        ha   4853766
2            Yield      Oil palm fruit  2010  100 g/ha    171189
3       Production      Oil palm fruit  2010         t  83090935
4       Production        Palm kernels  2010         t   4292076
..             ...                 ...   ...       ...       ...
64      Production        Palm kernels  2020         t   4703981
65      Production            Palm oil  2020         t  19140613
66  Area harvested      Oil palm fruit  2021        ha   5144180
67           Yield      Oil palm fruit  2021  100 g/ha    177664
68      Production      Oil palm fruit  2021         t  91393666
```

```
[69 rows x 5 columns]
```

foodwnl

```
    Domain Code                                 Domain  Area Code (M49)
\
0           SCL  Supply Utilization Accounts (2010-)               458

1           SCL  Supply Utilization Accounts (2010-)               458

2           SCL  Supply Utilization Accounts (2010-)               458

3           SCL  Supply Utilization Accounts (2010-)               458

4           SCL  Supply Utilization Accounts (2010-)               458

..          ...                                   ...               ...

555         SCL  Supply Utilization Accounts (2010-)               458

556         SCL  Supply Utilization Accounts (2010-)               458

557         SCL  Supply Utilization Accounts (2010-)               458

558         SCL  Supply Utilization Accounts (2010-)               458

559         SCL  Supply Utilization Accounts (2010-)               458


         Area  Element Code         Element  Item Code (CPC)  \
0    Malaysia          5113  Opening stocks         21691.14
1    Malaysia          5113  Opening stocks         21691.14
2    Malaysia          5113  Opening stocks         21691.14
3    Malaysia          5113  Opening stocks         21691.14
4    Malaysia          5113  Opening stocks         21691.14
..        ...           ...             ...              ...
555  Malaysia           281       Fats/Year          2165.00
556  Malaysia           281       Fats/Year          2165.00
557  Malaysia           281       Fats/Year          2165.00
558  Malaysia           281       Fats/Year          2165.00
559  Malaysia           281       Fats/Year          2165.00

                    Item  Year Code  Year Unit     Value Flag  \
0    Oil of palm kernel       2010  2010    t  305900.0    X
1    Oil of palm kernel       2011  2011    t  241000.0    X
2    Oil of palm kernel       2012  2012    t  374200.0    X
3    Oil of palm kernel       2013  2013    t  466000.0    X
4    Oil of palm kernel       2014  2014    t  293800.0    X
..                  ...        ...   ...  ...       ...  ...
555            Palm oil       2017  2017    t  169660.0    X
```

```
556            Palm oil       2018  2018    t  173652.0    X
557            Palm oil       2019  2019    t  189620.0    X
558            Palm oil       2020  2020    t  189620.0    X
559            Palm oil       2021  2021    t  179640.0    X

                            Flag Description
0    Figure from international organizations
1    Figure from international organizations
2    Figure from international organizations
3    Figure from international organizations
4    Figure from international organizations
..                                       ...
555  Figure from international organizations
556  Figure from international organizations
557  Figure from international organizations
558  Figure from international organizations
559  Figure from international organizations

[560 rows x 14 columns]
```

```
foodwnl.drop(columns=["Domain","Domain Code","Area","Area Code
(M49)","Element Code","Item Code (CPC)","Year Code","Flag","Flag
Description"])
```

```
            Element                 Item  Year Unit     Value
0    Opening stocks  Oil of palm kernel  2010    t  305900.0
1    Opening stocks  Oil of palm kernel  2011    t  241000.0
2    Opening stocks  Oil of palm kernel  2012    t  374200.0
3    Opening stocks  Oil of palm kernel  2013    t  466000.0
4    Opening stocks  Oil of palm kernel  2014    t  293800.0
..              ...                 ...   ...  ...       ...
555       Fats/Year            Palm oil  2017    t  169660.0
556       Fats/Year            Palm oil  2018    t  173652.0
557       Fats/Year            Palm oil  2019    t  189620.0
558       Fats/Year            Palm oil  2020    t  189620.0
559       Fats/Year            Palm oil  2021    t  179640.0

[560 rows x 5 columns]
```

```
ghg
```

```
    Domain Code            Domain  Area Code (M49)      Area  Element
Code  \
0            GT  Emissions totals              458  Malaysia
7234
1            GT  Emissions totals              458  Malaysia
7236
2            GT  Emissions totals              458  Malaysia
7230
3            GT  Emissions totals              458  Malaysia
```

```
724313
4            GT  Emissions totals              458  Malaysia
723113
..          ...               ...              ...       ...
...
581          GT  Emissions totals              458  Malaysia
7230
582          GT  Emissions totals              458  Malaysia
7273
583          GT  Emissions totals              458  Malaysia
724413
584          GT  Emissions totals              458  Malaysia
724313
585          GT  Emissions totals              458  Malaysia
723113

                              Element  Item Code            Item  Year
Code  \
0               Direct emissions (N2O)       5064   Crop Residues
2010
1            Indirect emissions (N2O)       5064   Crop Residues
2010
2                    Emissions (N2O)       5064   Crop Residues
2010
3    Emissions (CO2eq) from N2O (AR5)       5064   Crop Residues
2010
4             Emissions (CO2eq) (AR5)       5064   Crop Residues
2010
..                                ...        ...             ...
...
581                  Emissions (N2O)       6506  Food Packaging
2021
582                  Emissions (CO2)       6506  Food Packaging
2021
583  Emissions (CO2eq) from CH4 (AR5)       6506  Food Packaging
2021
584  Emissions (CO2eq) from N2O (AR5)       6506  Food Packaging
2021
585           Emissions (CO2eq) (AR5)       6506  Food Packaging
2021

     Year  Source Code      Source Unit     Value Flag Flag
Description  Note
0    2010         3050  FAO TIER 1   kt    0.5096    E  Estimated
value   NaN
1    2010         3050  FAO TIER 1   kt    0.1147    E  Estimated
value   NaN
2    2010         3050  FAO TIER 1   kt    0.6242    E  Estimated
value   NaN
```

```
3    2010         3050  FAO TIER 1   kt  165.4130    E  Estimated
value   NaN
4    2010         3050  FAO TIER 1   kt  165.4130    E  Estimated
value   NaN
..    ...          ...         ...  ...       ...  ...                ..
.   ...
581  2021         3050  FAO TIER 1   kt    0.0001    E  Estimated
value   NaN
582  2021         3050  FAO TIER 1   kt   45.2404    E  Estimated
value   NaN
583  2021         3050  FAO TIER 1   kt    0.0226    E  Estimated
value   NaN
584  2021         3050  FAO TIER 1   kt    0.0214    E  Estimated
value   NaN
585  2021         3050  FAO TIER 1   kt   45.2844    E  Estimated
value   NaN

[586 rows x 17 columns]
```

```
ghg.drop(columns=["Domain","Domain Code","Area","Area Code
(M49)","Element Code","Item Code","Year Code","Flag","Flag
Description","Note"])
```

```
                              Element            Item  Year  Source
Code  \
0               Direct emissions (N2O)   Crop Residues  2010
3050
1             Indirect emissions (N2O)   Crop Residues  2010
3050
2                     Emissions (N2O)   Crop Residues  2010
3050
3    Emissions (CO2eq) from N2O (AR5)   Crop Residues  2010
3050
4              Emissions (CO2eq) (AR5)   Crop Residues  2010
3050
..                                 ...             ...   ...          .
..
581                   Emissions (N2O)  Food Packaging  2021
3050
582                   Emissions (CO2)  Food Packaging  2021
3050
583  Emissions (CO2eq) from CH4 (AR5)  Food Packaging  2021
3050
584  Emissions (CO2eq) from N2O (AR5)  Food Packaging  2021
3050
585            Emissions (CO2eq) (AR5)  Food Packaging  2021
3050

          Source Unit     Value
0    FAO TIER 1   kt    0.5096
```

```
1    FAO TIER 1   kt    0.1147
2    FAO TIER 1   kt    0.6242
3    FAO TIER 1   kt  165.4130
4    FAO TIER 1   kt  165.4130
..          ...  ...       ...
581  FAO TIER 1   kt    0.0001
582  FAO TIER 1   kt   45.2404
583  FAO TIER 1   kt    0.0226
584  FAO TIER 1   kt    0.0214
585  FAO TIER 1   kt   45.2844

[586 rows x 7 columns]
```

```
prodtable = prod.pivot_table(index=['Item','Year'], columns='Element',
values='Value', aggfunc='sum')
prodtable
```

Element		Area harvested	Production	Yield
Item	Year			
Oil of palm kernel	2010	NaN	2014943.0	NaN
	2011	NaN	2144698.0	NaN
	2012	NaN	2164024.0	NaN
	2013	NaN	2269822.0	NaN
	2014	NaN	2277382.0	NaN
	2015	NaN	2276466.0	NaN
	2016	NaN	1959423.0	NaN
	2017	NaN	2280913.0	NaN
	2018	NaN	2299985.0	NaN
	2019	NaN	2322184.0	NaN
	2020	NaN	2203313.0	NaN
Oil palm fruit	2010	4853766.0	83090935.0	171189.0
	2011	5000109.0	92917496.0	185831.0
	2012	5076929.0	94917736.0	186959.0
	2013	5229739.0	94917736.0	181496.0
	2014	4689321.0	95380438.0	203399.0
	2015	4859397.0	98344073.0	202379.0
	2016	5001438.0	86325309.0	172601.0
	2017	5110713.0	101740900.0	199074.0
	2018	5189344.0	98419438.0	189657.0
	2019	5216822.0	99065364.0	189896.0
	2020	5231743.0	96969316.0	185348.0
	2021	5144180.0	91393666.0	177664.0
Palm kernels	2010	NaN	4292076.0	NaN
	2011	NaN	4706603.0	NaN
	2012	NaN	4705900.0	NaN
	2013	NaN	4859302.0	NaN
	2014	NaN	4888756.0	NaN
	2015	NaN	4915661.0	NaN
	2016	NaN	4190436.0	NaN
	2017	NaN	4950961.0	NaN

```
                    2018             NaN    4859393.0       NaN
                    2019             NaN    4891951.0       NaN
                    2020             NaN    4703981.0       NaN
Palm oil            2010             NaN   16993717.0       NaN
                    2011             NaN   18911520.0       NaN
                    2012             NaN   18785030.0       NaN
                    2013             NaN   19216459.0       NaN
                    2014             NaN   19667016.0       NaN
                    2015             NaN   19961581.0       NaN
                    2016             NaN   17319177.0       NaN
                    2017             NaN   19919331.0       NaN
                    2018             NaN   19516141.0       NaN
                    2019             NaN   19858367.0       NaN
                    2020             NaN   19140613.0       NaN
```

```
dfprod_oilpalmfruit = prodtable.query('Item == "Oil palm fruit"')
dfprod_oilpalmfruit
```

```
Element              Area harvested   Production     Yield
Item           Year
Oil palm fruit 2010       4853766.0   83090935.0  171189.0
               2011       5000109.0   92917496.0  185831.0
               2012       5076929.0   94917736.0  186959.0
               2013       5229739.0   94917736.0  181496.0
               2014       4689321.0   95380438.0  203399.0
               2015       4859397.0   98344073.0  202379.0
               2016       5001438.0   86325309.0  172601.0
               2017       5110713.0  101740900.0  199074.0
               2018       5189344.0   98419438.0  189657.0
               2019       5216822.0   99065364.0  189896.0
               2020       5231743.0   96969316.0  185348.0
               2021       5144180.0   91393666.0  177664.0
```

```
foodwnltable = foodwnl.pivot_table(index=['Item','Year'],
columns='Element', values='Value', aggfunc='sum')
foodwnltable
```

```
Element                   Calories/Year  Export Quantity  \
Item               Year
Oil of palm kernel 2010     1229361.53       1163586.00
                   2011     1250231.99       1176203.00
                   2012     1307881.07        715499.00
                   2013     1311532.78        837874.00
                   2014     1260000.00        754268.77
                   2015     1260000.00        737896.59
                   2016     1215000.00        671987.92
                   2017     1269000.00        572300.77
                   2018     1233000.00        644280.54
                   2019     1305000.00        758108.01
                   2020     1161000.00        864130.07
```

	2021	1152000.00	775622.19
Oil palm fruit	2010	NaN	NaN
	2011	NaN	NaN
	2012	NaN	NaN
	2013	NaN	NaN
	2014	NaN	NaN
	2015	NaN	NaN
	2016	NaN	NaN
	2017	NaN	NaN
	2018	NaN	NaN
	2019	NaN	NaN
	2020	NaN	NaN
	2021	NaN	NaN
Palm kernels	2010	NaN	0.00
	2011	NaN	0.00
	2012	NaN	0.00
	2013	NaN	2439.00
	2014	NaN	5433.58
	2015	NaN	261.63
	2016	NaN	104.00
	2017	NaN	84.00
	2018	NaN	176.00
	2019	NaN	250.12
	2020	NaN	5206.32
	2021	NaN	4584.04
Palm oil	2010	1526600.00	14732721.00
	2011	1571500.00	15783756.00
	2012	1616400.00	15608661.00
	2013	1571500.00	15244722.00
	2014	1598440.00	15143166.02
	2015	1616400.00	15425392.99
	2016	1508640.00	13814190.29
	2017	1526600.00	13689482.53
	2018	1562520.00	13841385.10
	2019	1706200.00	15201035.81
	2020	1706200.00	14575437.26
	2021	1616400.00	13511734.36

Element		Fat supply quantity (g/capita/day)	Fats/Year
Item	Year		
Oil of palm kernel	2010	13.03	136595.73
	2011	13.04	138914.67
	2012	13.42	145320.12
	2013	13.25	145725.86

	2014	12.53	140000.00
	2015	12.35	140000.00
	2016	11.73	135000.00
	2017	12.08	141000.00
	2018	11.58	137000.00
	2019	12.11	145000.00
	2020	10.65	129000.00
	2021	10.45	128000.00
Oil palm fruit	2010	NaN	NaN
	2011	NaN	NaN
	2012	NaN	NaN
	2013	NaN	NaN
	2014	NaN	NaN
	2015	NaN	NaN
	2016	NaN	NaN
	2017	NaN	NaN
	2018	NaN	NaN
	2019	NaN	NaN
	2020	NaN	NaN
	2021	NaN	NaN
Palm kernels	2010	NaN	NaN
	2011	NaN	NaN
	2012	NaN	NaN
	2013	NaN	NaN
	2014	NaN	NaN
	2015	NaN	NaN

```
                      2016                                    NaN        NaN
                      2017                                    NaN        NaN
                      2018                                    NaN        NaN
                      2019                                    NaN        NaN
                      2020                                    NaN        NaN
                      2021                                    NaN        NaN
Palm oil              2010                                  16.19  169660.00
                      2011                                  16.40  174650.00
                      2012                                  16.59  179640.00
                      2013                                  15.88  174650.00
                      2014                                  15.90  177644.00
                      2015                                  15.84  179640.00
                      2016                                  14.57  167664.00
                      2017                                  14.54  169660.00
                      2018                                  14.68  173652.00
                      2019                                  15.84  189620.00
                      2020                                  15.65  189620.00
                      2021                                  14.66  179640.00


Element                          Feed  Food supply (kcal/capita/day)  \
Item                  Year
Oil of palm kernel    2010        NaN                          117.28
                      2011        NaN                          117.37
                      2012        NaN                          120.81
                      2013        NaN                          119.24
                      2014        NaN                          112.79
                      2015        NaN                          111.11
                      2016        NaN                          105.59
                      2017        NaN                          108.73
                      2018        NaN                          104.26
                      2019        NaN                          108.99
                      2020        NaN                           95.81
                      2021        NaN                           94.01
```

Oil palm fruit	2010	NaN		NaN
	2011	NaN		NaN
	2012	NaN		NaN
	2013	NaN		NaN
	2014	NaN		NaN
	2015	NaN		NaN
	2016	NaN		NaN
	2017	NaN		NaN
	2018	NaN		NaN
	2019	NaN		NaN
	2020	NaN		NaN
	2021	NaN		NaN
Palm kernels	2010	36397.62		NaN
	2011	20290.26		NaN
	2012	19964.72		NaN
	2013	35990.89		NaN
	2014	28365.20		NaN
	2015	30289.89		NaN
	2016	25780.41		NaN
	2017	21703.55		NaN
	2018	20480.46		NaN
	2019	22136.55		NaN
	2020	25021.95		NaN
	2021	38832.38		NaN
Palm oil	2010	NaN		145.64
	2011	NaN		147.53
	2012	NaN		149.31
	2013	NaN		142.87
	2014	NaN		143.08
	2015	NaN		142.54
	2016	NaN		131.10
	2017	NaN		130.80
	2018	NaN		132.13
	2019	NaN		142.50
	2020	NaN		140.80
	2021	NaN		131.90

Element		Food supply quantity (g/capita/day)
Item	Year	
Oil of palm kernel	2010	13.03
	2011	13.04
	2012	13.42
	2013	13.25
	2014	12.53
	2015	12.35
	2016	11.73
	2017	12.08
	2018	11.58
	2019	12.11

```
                    2020                                    10.65
                    2021                                    10.45
Oil palm fruit      2010                                      NaN
                    2011                                      NaN
                    2012                                      NaN
                    2013                                      NaN
                    2014                                      NaN
                    2015                                      NaN
                    2016                                      NaN
                    2017                                      NaN
                    2018                                      NaN
                    2019                                      NaN
                    2020                                      NaN
                    2021                                      NaN
Palm kernels        2010                                      NaN
                    2011                                      NaN
                    2012                                      NaN
                    2013                                      NaN
                    2014                                      NaN
                    2015                                      NaN
                    2016                                      NaN
                    2017                                      NaN
                    2018                                      NaN
                    2019                                      NaN
                    2020                                      NaN
                    2021                                      NaN
Palm oil            2010                                    16.22
                    2011                                    16.43
                    2012                                    16.63
                    2013                                    15.91
                    2014                                    15.93
                    2015                                    15.87
                    2016                                    14.60
                    2017                                    14.57
                    2018                                    14.71
                    2019                                    15.87
                    2020                                    15.68
                    2021                                    14.69

Element                 Food supply quantity (tonnes)  Import
Quantity  \
Item                Year

Oil of palm kernel  2010                      136595.73
578233.00
                    2011                      138914.67
557712.00
                    2012                      145320.12
440512.00
```

```
                    2013                          145725.86
241371.00
                    2014                          140000.00
249553.24
                    2015                          140000.00
368705.96
                    2016                          135000.00
223233.77
                    2017                          141000.00
245146.84
                    2018                          137000.00
319207.57
                    2019                          145000.00
295828.37
                    2020                          129000.00
292217.61
                    2021                          128000.00
354489.51
Oil palm fruit      2010                                NaN
NaN
                    2011                                NaN
NaN
                    2012                                NaN
NaN
                    2013                                NaN
NaN
                    2014                                NaN
NaN
                    2015                                NaN
NaN
                    2016                                NaN
NaN
                    2017                                NaN
NaN
                    2018                                NaN
NaN
                    2019                                NaN
NaN
                    2020                                NaN
NaN
                    2021                                NaN
NaN
Palm kernels        2010                                NaN
0.00
                    2011                                NaN
0.00
                    2012                                NaN
14365.00
                    2013                                NaN
```

```
23416.00
                    2014                              NaN
20585.46
                    2015                              NaN
15463.73
                    2016                              NaN
34355.31
                    2017                              NaN
31961.14
                    2018                              NaN
75394.99
                    2019                              NaN
79732.73
                    2020                              NaN
57536.03
                    2021                              NaN
46136.90
Palm oil            2010                       170000.00
1289260.00
                    2011                       175000.00
1729829.00
                    2012                       180000.00
1700973.00
                    2013                       175000.00
718502.00
                    2014                       178000.00
514150.84
                    2015                       180000.00
1167299.29
                    2016                       168000.00
533043.39
                    2017                       170000.00
552762.43
                    2018                       174000.00
807159.85
                    2019                       190000.00
1069848.50
                    2020                       190000.00
916799.59
                    2021                       180000.00
1095326.37

Element                         Loss  Opening stocks  Other uses (non-
food)  \
Item                Year

Oil of palm kernel 2010    25931.76       305900.00
1262226.12
                    2011    27024.10       241000.00
```

```
1173640.70
                    2012    26045.36       374200.00
1546465.03
                    2013    25111.93       466000.00
1568655.47
                    2014    25269.35       293800.00
1574021.49
                    2015    26451.72       303500.00
1592428.84
                    2016    21826.57       336300.00
1306857.94
                    2017    25260.60       225600.00
1558197.55
                    2018    26191.93       289400.00
1513983.08
                    2019    26180.12       434100.00
1398120.00
                    2020    24955.31       574557.00
635904.00
                    2021    24039.25      1283813.00
758998.00
Oil palm fruit      2010  1136517.81     24180709.49
NaN
                    2011  1270925.51     22007814.80
NaN
                    2012  1298284.79     20032999.15
NaN
                    2013  1298284.79     20657252.34
NaN
                    2014  1304613.63     19145718.40
NaN
                    2015  1345150.23     17284879.35
NaN
                    2016  1180757.58     15464094.20
NaN
                    2017  1391612.03     14870145.63
NaN
                    2018  1346181.07     16608884.09
NaN
                    2019  1355016.05     17067581.61
NaN
                    2020  1326346.30     16469182.04
NaN
                    2021  1250082.56     17356641.83
NaN
Palm kernels        2010         NaN       129000.00
NaN
                    2011         NaN        93000.00
NaN
```

```
                     2012          NaN       125000.00
NaN
                     2013          NaN       188000.00
NaN
                     2014          NaN       152000.00
NaN
                     2015          NaN       131000.00
NaN
                     2016          NaN       137000.00
NaN
                     2017          NaN       123000.00
NaN
                     2018          NaN       180000.00
NaN
                     2019          NaN       167000.00
NaN
                     2020          NaN       132000.00
NaN
                     2021          NaN       126000.00
NaN
Palm oil             2010     91414.88      2164502.51
301927.27
                     2011    103206.74      1564502.51
397897.05
                     2012    102430.01      1514502.51
334624.11
                     2013     99674.80      1987000.00
359980.96
                     2014    100905.83      1987000.00
410000.00
                     2015    105644.40      2236188.89
435000.00
                     2016     89261.10      2194265.82
385000.00
                     2017    102360.47      1474639.39
390000.00
                     2018    101616.50      3008975.29
395000.00
                     2019    104641.08      3932127.49
440000.00
                     2020    100287.06      3466259.38
511767.00
                     2021     96058.40      2774357.52
319286.00

Element                     Processed   Production  \
Item                 Year
Oil of palm kernel   2010     69736.39    2014943.0
                     2011     53427.54    2144698.0
```

	2012	79406.49	2164024.0
	2013	106025.73	2269822.0
	2014	23675.62	2277382.0
	2015	115594.81	2276466.0
	2016	157684.34	1959423.0
	2017	165500.92	2280913.0
	2018	153037.02	2299985.0
	2019	150147.25	2322184.0
	2020	132284.93	2203313.0
	2021	99303.70	2049435.0
Oil palm fruit	2010	84127311.88	83090935.0
	2011	93621386.14	92917496.0
	2012	92995198.02	94917736.0
	2013	95130985.15	94917736.0
	2014	95936663.41	95380438.0
	2015	98819707.92	98344073.0
	2016	85738500.00	86325309.0
	2017	98610549.50	101740900.0
	2018	96614559.41	98419438.0
	2019	98308747.52	99065364.0
	2020	94755509.90	96969316.0
	2021	89684920.79	91393666.0
Palm kernels	2010	4291678.38	4292076.0
	2011	4654312.74	4706603.0
	2012	4637300.28	4705900.0
	2013	4880288.11	4859302.0
	2014	4896542.68	4888756.0
	2015	4894573.21	4915661.0
	2016	4212906.90	4190436.0
	2017	4904134.59	4950961.0
	2018	4927131.53	4859393.0
	2019	4984297.06	4891951.0
	2020	4737288.76	4703981.0
	2021	4406439.48	4417719.0
Palm oil	2010	3586913.84	16993717.0
	2011	4231489.21	18911520.0
	2012	3787790.39	18785030.0
	2013	4055583.23	19216459.0
	2014	4099906.11	19667016.0
	2015	5024765.97	19961581.0
	2016	4115395.42	17319177.0
	2017	4585914.54	19919331.0
	2018	4888147.05	19516141.0
	2019	5458406.72	19858367.0
	2020	5371823.13	19140613.0
	2021	4755600.27	18116354.0

Element		Protein supply quantity (g/capita/day)	\
Item	Year		
Oil of palm kernel	2010		0.0

	2011	0.0
	2012	0.0
	2013	0.0
	2014	0.0
	2015	0.0
	2016	0.0
	2017	0.0
	2018	0.0
	2019	0.0
	2020	0.0
	2021	0.0
Oil palm fruit	2010	NaN
	2011	NaN
	2012	NaN
	2013	NaN
	2014	NaN
	2015	NaN
	2016	NaN
	2017	NaN
	2018	NaN
	2019	NaN
	2020	NaN
	2021	NaN
Palm kernels	2010	NaN
	2011	NaN
	2012	NaN
	2013	NaN
	2014	NaN
	2015	NaN
	2016	NaN
	2017	NaN
	2018	NaN
	2019	NaN
	2020	NaN
	2021	NaN
Palm oil	2010	0.0
	2011	0.0
	2012	0.0
	2013	0.0
	2014	0.0
	2015	0.0
	2016	0.0
	2017	0.0
	2018	0.0
	2019	0.0
	2020	0.0
	2021	0.0

Element	Proteins/Year	Residuals	Stock Variation

Item	Year			
Oil of palm kernel	2010	0.0	NaN	-64900.00
	2011	0.0	NaN	133200.00
	2012	0.0	NaN	91800.00
	2013	0.0	NaN	-172200.00
	2014	0.0	0.0	9700.00
	2015	0.0	0.0	32800.00
	2016	0.0	0.0	-110700.00
	2017	0.0	0.0	63800.00
	2018	0.0	0.0	144700.00
	2019	0.0	0.0	140457.00
	2020	0.0	0.0	709256.00
	2021	0.0	0.0	617961.00
Oil palm fruit	2010	NaN	NaN	-2172894.69
	2011	NaN	NaN	-1974815.65
	2012	NaN	NaN	624253.19
	2013	NaN	NaN	-1511533.94
	2014	NaN	0.0	-1860839.05
	2015	NaN	0.0	-1820785.15
	2016	NaN	0.0	-593948.58
	2017	NaN	0.0	1738738.46
	2018	NaN	0.0	458697.52
	2019	NaN	0.0	-598399.57
	2020	NaN	0.0	887459.79
	2021	NaN	0.0	458662.64
Palm kernels	2010	NaN	NaN	-36000.00
	2011	NaN	NaN	32000.00
	2012	NaN	NaN	63000.00
	2013	NaN	NaN	-36000.00
	2014	NaN	0.0	-21000.00
	2015	NaN	0.0	6000.00
	2016	NaN	0.0	-14000.00
	2017	NaN	0.0	57000.00
	2018	NaN	0.0	-13000.00
	2019	NaN	0.0	-35000.00
	2020	NaN	0.0	-6000.00
	2021	NaN	0.0	14000.00
Palm oil	2010	0.0	NaN	-600000.00
	2011	0.0	NaN	-50000.00
	2012	0.0	NaN	472497.49
	2013	0.0	NaN	0.00
	2014	0.0	0.0	249188.89
	2015	0.0	0.0	-41923.07
	2016	0.0	0.0	-719626.42
	2017	0.0	0.0	1534335.90
	2018	0.0	0.0	923152.20
	2019	0.0	0.0	-465868.11
	2020	0.0	0.0	-691901.86
	2021	0.0	0.0	349001.34

```
dffoodwnl_oilpalmfruit = foodwnltable.query('Item == "Oil palm
fruit"')
dffoodwnl_oilpalmfruit
```

```
Element               Calories/Year  Export Quantity  \
Item           Year
Oil palm fruit 2010            NaN              NaN
               2011            NaN              NaN
               2012            NaN              NaN
               2013            NaN              NaN
               2014            NaN              NaN
               2015            NaN              NaN
               2016            NaN              NaN
               2017            NaN              NaN
               2018            NaN              NaN
               2019            NaN              NaN
               2020            NaN              NaN
               2021            NaN              NaN

Element               Fat supply quantity (g/capita/day)  Fats/Year
Feed  \
Item           Year

Oil palm fruit 2010                                 NaN         NaN
NaN
               2011                                 NaN         NaN
NaN
               2012                                 NaN         NaN
NaN
               2013                                 NaN         NaN
NaN
               2014                                 NaN         NaN
NaN
               2015                                 NaN         NaN
NaN
               2016                                 NaN         NaN
NaN
               2017                                 NaN         NaN
NaN
               2018                                 NaN         NaN
NaN
               2019                                 NaN         NaN
NaN
               2020                                 NaN         NaN
NaN
               2021                                 NaN         NaN
NaN

Element               Food supply (kcal/capita/day)  \
Item           Year
```

```
Oil palm fruit 2010                                NaN
               2011                                NaN
               2012                                NaN
               2013                                NaN
               2014                                NaN
               2015                                NaN
               2016                                NaN
               2017                                NaN
               2018                                NaN
               2019                                NaN
               2020                                NaN
               2021                                NaN

Element               Food supply quantity (g/capita/day)  \
Item           Year
Oil palm fruit 2010                                   NaN
               2011                                   NaN
               2012                                   NaN
               2013                                   NaN
               2014                                   NaN
               2015                                   NaN
               2016                                   NaN
               2017                                   NaN
               2018                                   NaN
               2019                                   NaN
               2020                                   NaN
               2021                                   NaN

Element               Food supply quantity (tonnes)  Import Quantity  \
Item           Year
Oil palm fruit 2010                             NaN              NaN
               2011                             NaN              NaN
               2012                             NaN              NaN
               2013                             NaN              NaN
               2014                             NaN              NaN
               2015                             NaN              NaN
               2016                             NaN              NaN
               2017                             NaN              NaN
               2018                             NaN              NaN
               2019                             NaN              NaN
               2020                             NaN              NaN
               2021                             NaN              NaN

Element                     Loss  Opening stocks  Other uses (non-food)
\
Item           Year

Oil palm fruit 2010  1136517.81     24180709.49                    NaN

               2011  1270925.51     22007814.80                    NaN
```

```
                2012  1298284.79     20032999.15                       NaN

                2013  1298284.79     20657252.34                       NaN

                2014  1304613.63     19145718.40                       NaN

                2015  1345150.23     17284879.35                       NaN

                2016  1180757.58     15464094.20                       NaN

                2017  1391612.03     14870145.63                       NaN

                2018  1346181.07     16608884.09                       NaN

                2019  1355016.05     17067581.61                       NaN

                2020  1326346.30     16469182.04                       NaN

                2021  1250082.56     17356641.83                       NaN


Element                   Processed   Production  \
Item           Year
Oil palm fruit 2010  84127311.88   83090935.0
               2011  93621386.14   92917496.0
               2012  92995198.02   94917736.0
               2013  95130985.15   94917736.0
               2014  95936663.41   95380438.0
               2015  98819707.92   98344073.0
               2016  85738500.00   86325309.0
               2017  98610549.50  101740900.0
               2018  96614559.41   98419438.0
               2019  98308747.52   99065364.0
               2020  94755509.90   96969316.0
               2021  89684920.79   91393666.0

Element                  Protein supply quantity (g/capita/day)
Proteins/Year  \
Item           Year

Oil palm fruit 2010                                        NaN
NaN
               2011                                        NaN
NaN
               2012                                        NaN
NaN
               2013                                        NaN
NaN
               2014                                        NaN
NaN
```

```
                2015                                          NaN
NaN
                2016                                          NaN
NaN
                2017                                          NaN
NaN
                2018                                          NaN
NaN
                2019                                          NaN
NaN
                2020                                          NaN
NaN
                2021                                          NaN
NaN

Element                Residuals  Stock Variation
Item           Year
Oil palm fruit 2010        NaN      -2172894.69
               2011        NaN      -1974815.65
               2012        NaN        624253.19
               2013        NaN      -1511533.94
               2014        0.0      -1860839.05
               2015        0.0      -1820785.15
               2016        0.0       -593948.58
               2017        0.0       1738738.46
               2018        0.0        458697.52
               2019        0.0       -598399.57
               2020        0.0        887459.79
               2021        0.0        458662.64
```

```
ghgMalaysiatable = ghg.pivot_table(index=['Item','Year'],
columns='Element', values='Value', aggfunc='sum')
ghgMalaysiatable
```

```
Element                                    Direct emissions (N2O)
Emissions (CH4)  \
Item                              Year

Agrifood Systems Waste Disposal 2010                       NaN
212.1019
                                  2011                     NaN
213.8643
                                  2012                     NaN
215.2545
                                  2013                     NaN
216.7126
                                  2014                     NaN
215.1712
...                                                        ...
...
```

```
Synthetic Fertilizers           2017                  7.4944
NaN
                                2018                  6.0795
NaN
                                2019                  4.3837
NaN
                                2020                  5.2239
NaN
                                2021                  7.2115
NaN

Element                                Emissions (CO2)  \
Item                            Year
Agrifood Systems Waste Disposal 2010         471.5040
                                2011         474.2973
                                2012         475.2644
                                2013         475.7618
                                2014         476.5646
...                                               ...
Synthetic Fertilizers           2017              NaN
                                2018              NaN
                                2019              NaN
                                2020              NaN
                                2021              NaN

Element                                Emissions (CO2eq) (AR5)  \
Item                            Year
Agrifood Systems Waste Disposal 2010               6630.8672
                                2011               6686.1503
                                2012               6730.2571
                                2013               6778.9181
                                2014               6719.8848
...                                                      ...
Synthetic Fertilizers           2017               2631.4765
                                2018               2134.6810
                                2019               1539.2260
                                2020               1834.2240
                                2021               2532.1545

Element                                Emissions (CO2eq) from CH4 (AR5)
\
Item                            Year

Agrifood Systems Waste Disposal 2010                          5938.8529

                                2011                          5988.1997

                                2012                          6027.1268

                                2013                          6067.9520
```

```
                                  2014                            6024.7946
...                                                                     ...
Synthetic Fertilizers             2017                             NaN
                                  2018                             NaN
                                  2019                             NaN
                                  2020                             NaN
                                  2021                             NaN

Element                                 Emissions (CO2eq) from N2O (AR5)
\
Item                              Year
Agrifood Systems Waste Disposal 2010                            220.5103
                                  2011                            223.6533
                                  2012                            227.8658
                                  2013                            235.2043
                                  2014                            218.5256
...                                                                     ...
Synthetic Fertilizers             2017                           2631.4765
                                  2018                           2134.6810
                                  2019                           1539.2260
                                  2020                           1834.2240
                                  2021                           2532.1545

Element                                 Emissions (N2O)  \
Item                              Year
Agrifood Systems Waste Disposal 2010             0.8321
                                  2011             0.8440
                                  2012             0.8599
                                  2013             0.8876
                                  2014             0.8246
...                                                   ...
```

```
Synthetic Fertilizers           2017           9.9301
                                2018           8.0554
                                2019           5.8084
                                2020           6.9216
                                2021           9.5553

Element                                 Indirect emissions (N2O)
Item                            Year
Agrifood Systems Waste Disposal 2010                       NaN
                                2011                       NaN
                                2012                       NaN
                                2013                       NaN
                                2014                       NaN
...                                                        ...
Synthetic Fertilizers           2017                    2.4357
                                2018                    1.9758
                                2019                    1.4247
                                2020                    1.6978
                                2021                    2.3437

[108 rows x 8 columns]
```

```
ghgManuretoSoil = ghgMalaysiatable.query('Item == "Manure applied to
Soils"')
ghgManuretoSoil
```

```
Element                       Direct emissions (N2O)  Emissions (CH4)
\
Item                     Year

Manure applied to Soils 2010                  1.1566              NaN

                        2011                  1.1917              NaN

                        2012                  1.2542              NaN

                        2013                  1.3421              NaN

                        2014                  1.3669              NaN

                        2015                  1.3903              NaN

                        2016                  1.3787              NaN

                        2017                  1.4022              NaN

                        2018                  1.2818              NaN

                        2019                  1.3552              NaN

                        2020                  1.3835              NaN
```

```
                          2021                    1.4165                NaN


Element                         Emissions (CO2)  Emissions (CO2eq) (AR5)
\
Item                      Year

Manure applied to Soils 2010               NaN                   436.7730

                          2011               NaN                   450.0230

                          2012               NaN                   473.6080

                          2013               NaN                   506.8125

                          2014               NaN                   516.1935

                          2015               NaN                   525.0180

                          2016               NaN                   520.6455

                          2017               NaN                   529.4965

                          2018               NaN                   484.0225

                          2019               NaN                   511.7415

                          2020               NaN                   522.4210

                          2021               NaN                   534.9025


Element                         Emissions (CO2eq) from CH4 (AR5)  \
Item                      Year
Manure applied to Soils 2010                                  NaN
                          2011                                NaN
                          2012                                NaN
                          2013                                NaN
                          2014                                NaN
                          2015                                NaN
                          2016                                NaN
                          2017                                NaN
                          2018                                NaN
                          2019                                NaN
                          2020                                NaN
                          2021                                NaN

Element                         Emissions (CO2eq) from N2O (AR5)  \
Item                      Year
Manure applied to Soils 2010                           436.7730
```

```
                        2011                            450.0230
                        2012                            473.6080
                        2013                            506.8125
                        2014                            516.1935
                        2015                            525.0180
                        2016                            520.6455
                        2017                            529.4965
                        2018                            484.0225
                        2019                            511.7415
                        2020                            522.4210
                        2021                            534.9025

Element                       Emissions (N2O)  Indirect emissions
(N2O)
Item                    Year

Manure applied to Soils 2010           1.6482
0.4916
                        2011           1.6982
0.5065
                        2012           1.7872
0.5330
                        2013           1.9125
0.5704
                        2014           1.9479
0.5809
                        2015           1.9812
0.5909
                        2016           1.9647
0.5859
                        2017           1.9981
0.5959
                        2018           1.8265
0.5448
                        2019           1.9311
0.5759
                        2020           1.9714
0.5880
                        2021           2.0185
0.6020

md = pd.merge(dfprod_oilpalmfruit, dffoodwnl_oilpalmfruit,
on=['Item','Year','Production'])
md

Element              Area harvested   Production     Yield
Calories/Year  \
Item           Year

Oil palm fruit 2010       4853766.0   83090935.0  171189.0
```

```
NaN
                2011       5000109.0   92917496.0  185831.0
NaN
                2012       5076929.0   94917736.0  186959.0
NaN
                2013       5229739.0   94917736.0  181496.0
NaN
                2014       4689321.0   95380438.0  203399.0
NaN
                2015       4859397.0   98344073.0  202379.0
NaN
                2016       5001438.0   86325309.0  172601.0
NaN
                2017       5110713.0  101740900.0  199074.0
NaN
                2018       5189344.0   98419438.0  189657.0
NaN
                2019       5216822.0   99065364.0  189896.0
NaN
                2020       5231743.0   96969316.0  185348.0
NaN
                2021       5144180.0   91393666.0  177664.0
NaN

Element               Export Quantity  Fat supply quantity
(g/capita/day)  \
Item           Year

Oil palm fruit 2010               NaN
NaN
                2011              NaN
NaN
                2012              NaN
NaN
                2013              NaN
NaN
                2014              NaN
NaN
                2015              NaN
NaN
                2016              NaN
NaN
                2017              NaN
NaN
                2018              NaN
NaN
                2019              NaN
NaN
                2020              NaN
```

```
NaN
                2021              NaN
NaN

Element               Fats/Year  Feed  Food supply (kcal/capita/day)  \
Item           Year
Oil palm fruit 2010         NaN   NaN                            NaN
               2011         NaN   NaN                            NaN
               2012         NaN   NaN                            NaN
               2013         NaN   NaN                            NaN
               2014         NaN   NaN                            NaN
               2015         NaN   NaN                            NaN
               2016         NaN   NaN                            NaN
               2017         NaN   NaN                            NaN
               2018         NaN   NaN                            NaN
               2019         NaN   NaN                            NaN
               2020         NaN   NaN                            NaN
               2021         NaN   NaN                            NaN

Element               Food supply quantity (g/capita/day)  \
Item           Year
Oil palm fruit 2010                                  NaN
               2011                                  NaN
               2012                                  NaN
               2013                                  NaN
               2014                                  NaN
               2015                                  NaN
               2016                                  NaN
               2017                                  NaN
               2018                                  NaN
               2019                                  NaN
               2020                                  NaN
               2021                                  NaN

Element               Food supply quantity (tonnes)  Import Quantity  \
Item           Year
Oil palm fruit 2010                            NaN              NaN
               2011                            NaN              NaN
               2012                            NaN              NaN
               2013                            NaN              NaN
               2014                            NaN              NaN
               2015                            NaN              NaN
               2016                            NaN              NaN
               2017                            NaN              NaN
               2018                            NaN              NaN
               2019                            NaN              NaN
               2020                            NaN              NaN
               2021                            NaN              NaN

Element                    Loss  Opening stocks  Other uses (non-food)
```

```
\
Item            Year

Oil palm fruit 2010  1136517.81     24180709.49                      NaN

               2011  1270925.51     22007814.80                      NaN

               2012  1298284.79     20032999.15                      NaN

               2013  1298284.79     20657252.34                      NaN

               2014  1304613.63     19145718.40                      NaN

               2015  1345150.23     17284879.35                      NaN

               2016  1180757.58     15464094.20                      NaN

               2017  1391612.03     14870145.63                      NaN

               2018  1346181.07     16608884.09                      NaN

               2019  1355016.05     17067581.61                      NaN

               2020  1326346.30     16469182.04                      NaN

               2021  1250082.56     17356641.83                      NaN


Element                 Processed  Protein supply quantity
(g/capita/day)  \
Item            Year

Oil palm fruit 2010  84127311.88
NaN
               2011  93621386.14
NaN
               2012  92995198.02
NaN
               2013  95130985.15
NaN
               2014  95936663.41
NaN
               2015  98819707.92
NaN
               2016  85738500.00
NaN
               2017  98610549.50
NaN
               2018  96614559.41
NaN
               2019  98308747.52
```

```
NaN
                2020  94755509.90
NaN
                2021  89684920.79
NaN
```

```
Element               Proteins/Year  Residuals  Stock Variation
Item           Year
Oil palm fruit 2010             NaN        NaN      -2172894.69
               2011             NaN        NaN      -1974815.65
               2012             NaN        NaN        624253.19
               2013             NaN        NaN      -1511533.94
               2014             NaN        0.0      -1860839.05
               2015             NaN        0.0      -1820785.15
               2016             NaN        0.0       -593948.58
               2017             NaN        0.0       1738738.46
               2018             NaN        0.0        458697.52
               2019             NaN        0.0       -598399.57
               2020             NaN        0.0        887459.79
               2021             NaN        0.0        458662.64
```

```
md2 = pd.merge(md, ghgManuretoSoil, on=['Year'])
md2
```

```
Element  Area harvested   Production     Yield  Calories/Year  \
Year
2010          4853766.0   83090935.0  171189.0            NaN
2011          5000109.0   92917496.0  185831.0            NaN
2012          5076929.0   94917736.0  186959.0            NaN
2013          5229739.0   94917736.0  181496.0            NaN
2014          4689321.0   95380438.0  203399.0            NaN
2015          4859397.0   98344073.0  202379.0            NaN
2016          5001438.0   86325309.0  172601.0            NaN
2017          5110713.0  101740900.0  199074.0            NaN
2018          5189344.0   98419438.0  189657.0            NaN
2019          5216822.0   99065364.0  189896.0            NaN
2020          5231743.0   96969316.0  185348.0            NaN
2021          5144180.0   91393666.0  177664.0            NaN

Element  Export Quantity  Fat supply quantity (g/capita/day)
Fats/Year  Feed  \
Year

2010                NaN                                  NaN
NaN   NaN
2011                NaN                                  NaN
NaN   NaN
2012                NaN                                  NaN
NaN   NaN
2013                NaN                                  NaN
```

```
NaN   NaN
2014                  NaN                                    NaN
NaN   NaN
2015                  NaN                                    NaN
NaN   NaN
2016                  NaN                                    NaN
NaN   NaN
2017                  NaN                                    NaN
NaN   NaN
2018                  NaN                                    NaN
NaN   NaN
2019                  NaN                                    NaN
NaN   NaN
2020                  NaN                                    NaN
NaN   NaN
2021                  NaN                                    NaN
NaN   NaN

Element  Food supply (kcal/capita/day)  Food supply quantity
(g/capita/day)  \
Year

2010                                  NaN
NaN
2011                                  NaN
NaN
2012                                  NaN
NaN
2013                                  NaN
NaN
2014                                  NaN
NaN
2015                                  NaN
NaN
2016                                  NaN
NaN
2017                                  NaN
NaN
2018                                  NaN
NaN
2019                                  NaN
NaN
2020                                  NaN
NaN
2021                                  NaN
NaN

Element  ...  Residuals  Stock Variation  Direct emissions (N2O)  \
Year     ...
2010     ...        NaN      -2172894.69                   1.1566
```

```
2011     ...         NaN      -1974815.65                    1.1917
2012     ...         NaN        624253.19                    1.2542
2013     ...         NaN      -1511533.94                    1.3421
2014     ...         0.0      -1860839.05                    1.3669
2015     ...         0.0      -1820785.15                    1.3903
2016     ...         0.0       -593948.58                    1.3787
2017     ...         0.0       1738738.46                    1.4022
2018     ...         0.0        458697.52                    1.2818
2019     ...         0.0       -598399.57                    1.3552
2020     ...         0.0        887459.79                    1.3835
2021     ...         0.0        458662.64                    1.4165

Element  Emissions (CH4)  Emissions (CO2)  Emissions (CO2eq) (AR5)  \
Year
2010                 NaN              NaN                   436.7730
2011                 NaN              NaN                   450.0230
2012                 NaN              NaN                   473.6080
2013                 NaN              NaN                   506.8125
2014                 NaN              NaN                   516.1935
2015                 NaN              NaN                   525.0180
2016                 NaN              NaN                   520.6455
2017                 NaN              NaN                   529.4965
2018                 NaN              NaN                   484.0225
2019                 NaN              NaN                   511.7415
2020                 NaN              NaN                   522.4210
2021                 NaN              NaN                   534.9025

Element  Emissions (CO2eq) from CH4 (AR5)  Emissions (CO2eq) from N2O
(AR5)  \
Year

2010                                   NaN
436.7730
2011                                   NaN
450.0230
2012                                   NaN
473.6080
2013                                   NaN
506.8125
2014                                   NaN
516.1935
2015                                   NaN
525.0180
2016                                   NaN
520.6455
2017                                   NaN
529.4965
2018                                   NaN
484.0225
2019                                   NaN
```

```
511.7415
2020                                    NaN
522.4210
2021                                    NaN
534.9025

Element  Emissions (N2O)  Indirect emissions (N2O)
Year
2010              1.6482                    0.4916
2011              1.6982                    0.5065
2012              1.7872                    0.5330
2013              1.9125                    0.5704
2014              1.9479                    0.5809
2015              1.9812                    0.5909
2016              1.9647                    0.5859
2017              1.9981                    0.5959
2018              1.8265                    0.5448
2019              1.9311                    0.5759
2020              1.9714                    0.5880
2021              2.0185                    0.6020

[12 rows x 28 columns]
```

```
md2.drop(columns=["Calories/Year","Export Quantity","Fat supply
quantity (g/capita/day)", "Fats/Year","Feed","Food supply
(kcal/capita/day)","Food supply quantity
(g/capita/day)","Residuals","Emissions (CH4)","Emissions
(CO2)","Emissions (CO2eq) from CH4 (AR5)"], inplace=True)

md2
```

```
Element  Area harvested   Production     Yield  Food supply quantity
(tonnes)  \
Year

2010          4853766.0   83090935.0  171189.0
NaN
2011          5000109.0   92917496.0  185831.0
NaN
2012          5076929.0   94917736.0  186959.0
NaN
2013          5229739.0   94917736.0  181496.0
NaN
2014          4689321.0   95380438.0  203399.0
NaN
2015          4859397.0   98344073.0  202379.0
NaN
2016          5001438.0   86325309.0  172601.0
NaN
2017          5110713.0  101740900.0  199074.0
```

```
NaN
2018          5189344.0   98419438.0  189657.0
NaN
2019          5216822.0   99065364.0  189896.0
NaN
2020          5231743.0   96969316.0  185348.0
NaN
2021          5144180.0   91393666.0  177664.0
NaN

Element  Import Quantity        Loss  Opening stocks  Other uses (non-
food)  \
Year

2010                 NaN  1136517.81     24180709.49
NaN
2011                 NaN  1270925.51     22007814.80
NaN
2012                 NaN  1298284.79     20032999.15
NaN
2013                 NaN  1298284.79     20657252.34
NaN
2014                 NaN  1304613.63     19145718.40
NaN
2015                 NaN  1345150.23     17284879.35
NaN
2016                 NaN  1180757.58     15464094.20
NaN
2017                 NaN  1391612.03     14870145.63
NaN
2018                 NaN  1346181.07     16608884.09
NaN
2019                 NaN  1355016.05     17067581.61
NaN
2020                 NaN  1326346.30     16469182.04
NaN
2021                 NaN  1250082.56     17356641.83
NaN

Element    Processed  Protein supply quantity (g/capita/day)
Proteins/Year  \
Year

2010     84127311.88                                      NaN
NaN
2011     93621386.14                                      NaN
NaN
2012     92995198.02                                      NaN
NaN
2013     95130985.15                                      NaN
```

```
NaN
2014     95936663.41                                          NaN
NaN
2015     98819707.92                                          NaN
NaN
2016     85738500.00                                          NaN
NaN
2017     98610549.50                                          NaN
NaN
2018     96614559.41                                          NaN
NaN
2019     98308747.52                                          NaN
NaN
2020     94755509.90                                          NaN
NaN
2021     89684920.79                                          NaN
NaN

Element  Stock Variation  Direct emissions (N2O)  Emissions (CO2eq)
(AR5)  \
Year

2010         -2172894.69                   1.1566
436.7730
2011         -1974815.65                   1.1917
450.0230
2012           624253.19                   1.2542
473.6080
2013         -1511533.94                   1.3421
506.8125
2014         -1860839.05                   1.3669
516.1935
2015         -1820785.15                   1.3903
525.0180
2016          -593948.58                   1.3787
520.6455
2017          1738738.46                   1.4022
529.4965
2018           458697.52                   1.2818
484.0225
2019         -598399.57                    1.3552
511.7415
2020           887459.79                   1.3835
522.4210
2021           458662.64                   1.4165
534.9025

Element  Emissions (CO2eq) from N2O (AR5)  Emissions (N2O)  \
Year
2010                             436.7730           1.6482
```

```
2011                                450.0230           1.6982
2012                                473.6080           1.7872
2013                                506.8125           1.9125
2014                                516.1935           1.9479
2015                                525.0180           1.9812
2016                                520.6455           1.9647
2017                                529.4965           1.9981
2018                                484.0225           1.8265
2019                                511.7415           1.9311
2020                                522.4210           1.9714
2021                                534.9025           2.0185
```

```
Element  Indirect emissions (N2O)
Year
2010                        0.4916
2011                        0.5065
2012                        0.5330
2013                        0.5704
2014                        0.5809
2015                        0.5909
2016                        0.5859
2017                        0.5959
2018                        0.5448
2019                        0.5759
2020                        0.5880
2021                        0.6020
```

```
md2.drop(columns=["Food supply quantity (tonnes)","Import
Quantity","Protein supply quantity (g/capita/day)", "Other uses (non-
food)","Proteins/Year"], inplace=True)
```

```
md2
```

```
Element  Area harvested   Production     Yield        Loss  Opening
stocks  \
Year

2010          4853766.0   83090935.0  171189.0  1136517.81
24180709.49
2011          5000109.0   92917496.0  185831.0  1270925.51
22007814.80
2012          5076929.0   94917736.0  186959.0  1298284.79
20032999.15
2013          5229739.0   94917736.0  181496.0  1298284.79
20657252.34
2014          4689321.0   95380438.0  203399.0  1304613.63
19145718.40
2015          4859397.0   98344073.0  202379.0  1345150.23
17284879.35
2016          5001438.0   86325309.0  172601.0  1180757.58
```

```
15464094.20
2017          5110713.0  101740900.0  199074.0  1391612.03
14870145.63
2018          5189344.0   98419438.0  189657.0  1346181.07
16608884.09
2019          5216822.0   99065364.0  189896.0  1355016.05
17067581.61
2020          5231743.0   96969316.0  185348.0  1326346.30
16469182.04
2021          5144180.0   91393666.0  177664.0  1250082.56
17356641.83

Element    Processed  Stock Variation  Direct emissions (N2O)  \
Year
2010     84127311.88      -2172894.69                  1.1566
2011     93621386.14      -1974815.65                  1.1917
2012     92995198.02        624253.19                  1.2542
2013     95130985.15      -1511533.94                  1.3421
2014     95936663.41      -1860839.05                  1.3669
2015     98819707.92      -1820785.15                  1.3903
2016     85738500.00       -593948.58                  1.3787
2017     98610549.50       1738738.46                  1.4022
2018     96614559.41        458697.52                  1.2818
2019     98308747.52       -598399.57                  1.3552
2020     94755509.90        887459.79                  1.3835
2021     89684920.79        458662.64                  1.4165

Element  Emissions (CO2eq) (AR5)  Emissions (CO2eq) from N2O (AR5)  \
Year
2010                   436.7730                          436.7730
2011                   450.0230                          450.0230
2012                   473.6080                          473.6080
2013                   506.8125                          506.8125
2014                   516.1935                          516.1935
2015                   525.0180                          525.0180
2016                   520.6455                          520.6455
2017                   529.4965                          529.4965
2018                   484.0225                          484.0225
2019                   511.7415                          511.7415
2020                   522.4210                          522.4210
2021                   534.9025                          534.9025

Element  Emissions (N2O)  Indirect emissions (N2O)
Year
2010              1.6482                    0.4916
2011              1.6982                    0.5065
2012              1.7872                    0.5330
2013              1.9125                    0.5704
2014              1.9479                    0.5809
2015              1.9812                    0.5909
```

```
2016                1.9647                        0.5859
2017                1.9981                        0.5959
2018                1.8265                        0.5448
2019                1.9311                        0.5759
2020                1.9714                        0.5880
2021                2.0185                        0.6020
```

GHG Emission Modeling

Modelling

```
from sklearn.ensemble import GradientBoostingRegressor
from sklearn.model_selection import GridSearchCV
from sklearn.metrics import mean_squared_error
from sklearn.model_selection import train_test_split
from math import sqrt


# Assuming 'md2' is your DataFrame containing the dataset
X = md2.drop(['Direct emissions (N2O)','Indirect emissions
(N2O)','Emissions (N2O)','Emissions (CO2eq) (AR5)','Emissions (CO2eq)
from N2O (AR5)',
              'Loss'  ,'Opening stocks'     ,'Processed'     ,'Stock
Variation'], axis=1)  # Features
y = md2['Direct emissions (N2O)']  # Target variable: Direct emissions
(N2O) only

# Splitting the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Define the parameter grid for GradientBoostingRegressor
param_grid = {
    "n_estimators": [100, 200, 300, 400],
    "learning_rate": [0.01, 0.05, 0.1],
    "max_depth": [3, 5, 7, 9],
    "min_samples_split": [2, 4, 6]
}

# Initialize GradientBoostingRegressor and GridSearchCV
predictdirect_emissions_N2O_model =
GradientBoostingRegressor(random_state=42)

# Create GridSearchCV instance
grid_search =
GridSearchCV(estimator=predictdirect_emissions_N2O_model,
param_grid=param_grid, cv=3, verbose=2)
```

```
# Fit the grid search to find the best parameters
grid_search.fit(X_train, y_train)

# Get the best parameters and best estimator
best_params = grid_search.best_params_
best_estimator = grid_search.best_estimator_

# Predicting Direct emissions (N2O) on the test set using the best
estimator
y_pred = best_estimator.predict(X_test)

mse1=mean_squared_error(y_test, y_pred)
# Model evaluation for Direct emissions (N2O) only
print('Best Parameters:', best_params)
print('Mean Squared Error (Direct emissions N2O):', mse1)
print('Root Mean Squared Error (Direct emissions N2O):', sqrt(mse1))
```

```
Fitting 3 folds for each of 144 candidates, totalling 432 fits
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=100; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=100; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=100; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=200; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=200; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=200; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=300; total time=   0.4s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=300; total time=   0.3s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=300; total time=   0.3s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=400; total time=   0.5s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=2,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=200; total time=   0.1s
```

```
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=4,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=100; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=400; total time=   0.4s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=3, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
```

```
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=2,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=4,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=100; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=200; total time=   0.1s
```

```
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=5, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.01, max_depth=7, min_samples_split=2,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=7, min_samples_split=2,
n_estimators=100; total time=   0.0s
[CV] END learning_rate=0.01, max_depth=7, min_samples_split=2,
n_estimators=100; total time=   0.0s
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n_estimators=200; total time=   0.1s
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n_estimators=300; total time=   0.1s
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=6,
n_estimators=300; total time=   0.2s
[CV] END learning_rate=0.1, max_depth=9, min_samples_split=6,
n_estimators=300; total time=   0.2s
[CV] END learning_rate=0.1, max_depth=9, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.1, max_depth=9, min_samples_split=6,
n_estimators=400; total time=   0.2s
[CV] END learning_rate=0.1, max_depth=9, min_samples_split=6,
n_estimators=400; total time=   0.2s
Best Parameters: {'learning_rate': 0.05, 'max_depth': 3,
'min_samples_split': 4, 'n_estimators': 400}
```

```
Mean Squared Error (Direct emissions N2O): 0.02264612805083664
Root Mean Squared Error (Direct emissions N2O): 0.1504863051936509
```

```
from sklearn.ensemble import RandomForestRegressor
from sklearn.model_selection import GridSearchCV
from sklearn.metrics import mean_squared_error
from sklearn.model_selection import train_test_split
from math import sqrt

# Assuming 'md2' is your DataFrame containing the dataset
X = md2.drop(['Direct emissions (N2O)','Indirect emissions
(N2O)','Emissions (N2O)','Emissions (CO2eq) (AR5)','Emissions (CO2eq)
from N2O (AR5)',
              'Loss' ,'Opening stocks' ,'Processed' ,'Stock
Variation'], axis=1)  # Features
y = md2['Direct emissions (N2O)']  # Target variable: Direct emissions
(N2O) only

# Splitting the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Define the parameter grid for RandomForestRegressor
param_grid = {
    "n_estimators": [100, 200, 300, 400],
    "min_samples_split": [2, 4, 6],
    "min_samples_leaf": [1, 2, 4],
    "max_features": ['auto', 'sqrt'],
    "max_depth": [None, 10, 20, 30, 40, 50]
}

# Initialize RandomForestRegressor and GridSearchCV
predict_direct_emissions_N2O_model =
RandomForestRegressor(random_state=42)

# Create GridSearchCV instance
grid_search =
GridSearchCV(estimator=predict_direct_emissions_N2O_model,
param_grid=param_grid, cv=3, verbose=2)

# Fit the grid search to find the best parameters
grid_search.fit(X_train, y_train)

# Get the best parameters and best estimator
best_params = grid_search.best_params_
best_estimator = grid_search.best_estimator_

# Predicting Direct emissions (N2O) on the test set using the best
estimator
y_pred = best_estimator.predict(X_test)
```

```
mse1 = mean_squared_error(y_test, y_pred)
# Model evaluation for Direct emissions (N2O) only
print('Best Parameters:', best_params)
print('Mean Squared Error (Direct emissions N2O):', mse1)
print('Root Mean Squared Error (Direct emissions N2O):', sqrt(mse1))
```

```
Fitting 3 folds for each of 432 candidates, totalling 1296 fits
[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
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  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
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```

```
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
```

```
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s

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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s

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[CV] END max_depth=None, max_features=auto, min_samples_leaf=1,
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```

```
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```
[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
```

```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
```

```
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   1.3s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
```

```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=None, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
```

```
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.6s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.6s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
```

```
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.8s
```

```
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
```

```
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=None, max_features=sqrt, min_samples_leaf=4,
```

```
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
```

```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.9s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   1.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
```

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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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```

```
ExtraTreesRegressors.
  warn(
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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ExtraTreesRegressors.
  warn(
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(
[CV] END max_depth=10, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
```

```
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=10, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
```

```
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
```

```
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.6s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
```

```
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.2s
```

```
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.7s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=10, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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ExtraTreesRegressors.
  warn(
```

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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1, min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1, min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1, min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1, min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1, min_samples_split=2, n_estimators=200; total time=   0.3s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
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  warn(
```

```
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(
```

```
[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.7s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
```

```
[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4, min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4, min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4, min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4, min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4, min_samples_split=2, n_estimators=400; total time=   0.5s

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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
```

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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

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[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
```

```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=20, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
```

```
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.7s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
```

```
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s
```

```
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
```

```
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.5s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.9s
[CV] END max_depth=20, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
```

```
[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(
```

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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.9s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.6s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
```

```
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=30, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.9s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
```

```
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
```

```
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
```

```
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s
```

```
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.4s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
```

```
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.5s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=30, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.6s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.7s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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`max_features=1.0` or remove this parameter as it is also the default
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```

```
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s

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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.6s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
```

```
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.7s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
```

```
[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.6s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.9s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=40, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.7s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.4s
```

```
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
```

```
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
```

```
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.7s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.8s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
```

```
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
```

```
[CV] END max_depth=40, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
```

```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.5s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.2s
```

```
[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=50, max_features=auto, min_samples_leaf=1, min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1, min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1, min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1, min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter as it is also the default value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1, min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:413: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and will be removed in 1.3. To keep the past behaviour, explicitly set `max_features=1.0` or remove this parameter
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```
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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`max_features=1.0` or remove this parameter as it is also the default
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
```

```
[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
```

```
[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
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`max_features=1.0` or remove this parameter as it is also the default
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
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ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.7s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.6s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
```

```
[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s

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_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
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/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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min_samples_split=4, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.6s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
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[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/_forest.py:41
3: FutureWarning: `max_features='auto'` has been deprecated in 1.1 and
will be removed in 1.3. To keep the past behaviour, explicitly set
`max_features=1.0` or remove this parameter as it is also the default
value for RandomForestRegressors and ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
```

```
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
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as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

[CV] END max_depth=50, max_features=auto, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=200; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=300; total time=   0.6s
```

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[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.7s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=2, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
```

```
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=1,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=300; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.8s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.8s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=2, n_estimators=400; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
```

```
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=2,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=300; total time=   0.6s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.8s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
```

```
min_samples_split=2, n_estimators=400; total time=   0.8s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=2, n_estimators=400; total time=   0.8s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=4, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=100; total time=   0.1s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.3s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=200; total time=   0.2s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=300; total time=   0.4s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s
```

```
[CV] END max_depth=50, max_features=sqrt, min_samples_leaf=4,
min_samples_split=6, n_estimators=400; total time=   0.5s

/usr/local/lib/python3.10/dist-packages/sklearn/ensemble/
_forest.py:413: FutureWarning: `max_features='auto'` has been
deprecated in 1.1 and will be removed in 1.3. To keep the past
behaviour, explicitly set `max_features=1.0` or remove this parameter
as it is also the default value for RandomForestRegressors and
ExtraTreesRegressors.
  warn(

Best Parameters: {'max_depth': None, 'max_features': 'auto',
'min_samples_leaf': 1, 'min_samples_split': 2, 'n_estimators': 200}
Mean Squared Error (Direct emissions N2O): 0.013828406704333511
Root Mean Squared Error (Direct emissions N2O): 0.11759424605112918

# Assuming 'md2' is your DataFrame containing the dataset
X = md2.drop(['Direct emissions (N2O)','Indirect emissions
(N2O)','Emissions (N2O)','Emissions (CO2eq) (AR5)','Emissions (CO2eq)
from N2O (AR5)',
              'Area harvested',  'Production',   'Yield'], axis=1)  #
Features
y = md2['Direct emissions (N2O)']  # Target variable: Direct emissions
(N2O) only

# Splitting the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Define the parameter grid for GradientBoostingRegressor
param_grid = {
    "n_estimators": [100, 200, 300, 400],
    "learning_rate": [0.01, 0.05, 0.1],
    "max_depth": [3, 5, 7, 9],
    "min_samples_split": [2, 4, 6]
}

# Initialize GradientBoostingRegressor and GridSearchCV
predictdirect_emissions_N2O_model_2 =
GradientBoostingRegressor(random_state=42)

# Create GridSearchCV instance
grid_search =
GridSearchCV(estimator=predictdirect_emissions_N2O_model_2,
param_grid=param_grid, cv=3, verbose=2)

# Fit the grid search to find the best parameters
grid_search.fit(X_train, y_train)

# Get the best parameters and best estimator
best_params = grid_search.best_params_
```

```
best_estimator = grid_search.best_estimator_

# Predicting Direct emissions (N2O) on the test set using the best
estimator
y_pred = best_estimator.predict(X_test)

# Model evaluation for Direct emissions (N2O) only
print('Best Parameters:', best_params)
print('Mean Squared Error (Direct emissions N2O):',
mean_squared_error(y_test, y_pred))
print('Root Mean Squared Error (Direct emissions N2O):',
sqrt(mean_squared_error(y_test, y_pred)))
```

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Fitting 3 folds for each of 144 candidates, totalling 432 fits
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```

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```

```
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```

```
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```

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[CV] END learning_rate=0.1, max_depth=7, min_samples_split=2,
n_estimators=300; total time=   0.1s
[CV] END learning_rate=0.1, max_depth=7, min_samples_split=2,
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n_estimators=100; total time=   0.0s
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[CV] END learning_rate=0.1, max_depth=7, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.1, max_depth=7, min_samples_split=4,
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[CV] END learning_rate=0.1, max_depth=7, min_samples_split=4,
n_estimators=300; total time=   0.1s
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n_estimators=400; total time=   0.2s
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[CV] END learning_rate=0.1, max_depth=7, min_samples_split=6,
n_estimators=100; total time=   0.0s
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[CV] END learning_rate=0.1, max_depth=7, min_samples_split=6,
n_estimators=200; total time=   0.1s
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n_estimators=200; total time=   0.1s
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n_estimators=300; total time=   0.1s
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n_estimators=200; total time=   0.1s
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=2,
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=2,
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n_estimators=400; total time=   0.2s
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=4,
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=4,
```

```
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=4,
n_estimators=200; total time=   0.1s
[CV] END learning_rate=0.1, max_depth=9, min_samples_split=4,
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=4,
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n_estimators=200; total time=   0.1s
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n_estimators=200; total time=   0.1s
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n_estimators=300; total time=   0.2s
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[CV] END learning_rate=0.1, max_depth=9, min_samples_split=6,
n_estimators=400; total time=   0.2s
Best Parameters: {'learning_rate': 0.01, 'max_depth': 3,
'min_samples_split': 6, 'n_estimators': 100}
Mean Squared Error (Direct emissions N2O): 0.004300746730571562
Root Mean Squared Error (Direct emissions N2O): 0.06558007876307836
```

Deployment

```
from sklearn.ensemble import GradientBoostingRegressor
from sklearn.metrics import mean_squared_error, r2_score
import joblib

# Save the trained model to a file
joblib.dump(predictdirect_emissions_N2O_model,
'predictdirect_emissions_N2O_model.pkl')
joblib.dump(predictdirect_emissions_N2O_model_2,
'predictdirect_emissions_N2O_model_2.pkl')

# Load the saved model for deployment
loaded_model = joblib.load('predictdirect_emissions_N2O_model.pkl')
loaded_model_2 =
joblib.load('predictdirect_emissions_N2O_model_2.pkl')



from sklearn.ensemble import GradientBoostingRegressor
import pandas as pd  # If not imported earlier
# Example dataset for prediction
more_example_data = [
    [4853766.0, 83090935.0, 171189.0],
    [5000109.0, 92917496.0, 185831.0],
    [5076929.0, 94917736.0, 186959.0],
    [5229739.0, 94917736.0, 181496.0],
    [4689321.0, 95380438.0, 203399.0],
    [4859397.0, 98344073.0, 202379.0],
    [5001438.0, 86325309.0, 172601.0],
    [5110713.0, 101740900.0, 199074.0],
    [5189344.0, 98419438.0, 189657.0],
    [5216822.0, 99065364.0, 189896.0],
    [5231743.0, 96969316.0, 185348.0],
    [5144180.0, 91393666.0, 177664.0],
]

# Assuming 'md2' is your DataFrame containing the dataset
# Assuming 'X_train', 'y_train' are the training sets previously
defined

# Initialize GradientBoostingRegressor
predict_direct_emissions_N2O_model =
GradientBoostingRegressor(random_state=42)

# Fit the model on the entire training dataset
predict_direct_emissions_N2O_model.fit(X_train, y_train)


# Use the trained model to make predictions on the example dataset
predictions =
```

```
predict_direct_emissions_N2O_model.predict(more_example_data)

# Print the predictions
print('Predictions for Direct emissions (N2O):')
print(predictions)
```

```
Predictions for Direct emissions (N2O):
[1.37733727 1.19171337 1.25420488 1.34209915 1.36689984 1.39029537
 1.37869644 1.4021954  1.28180035 1.28353893 1.26984789 1.41649519]
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439:
UserWarning: X does not have valid feature names, but
GradientBoostingRegressor was fitted with feature names
  warnings.warn(
```

```
from sklearn.ensemble import GradientBoostingRegressor
import pandas as pd  # If not imported earlier
# Example dataset for prediction
more_example_data_2 = [
[1136517.81, 24180709.49, 84127311.88, -2172894.69],
[1270925.51, 22007814.80, 93621386.14, -1974815.65],
[1298284.79, 20032999.15, 92995198.02, 624253.19],
[1298284.79, 20657252.34, 95130985.15, -1511533.94],
[1304613.63, 19145718.40, 95936663.41, -1860839.05],
[1345150.23, 17284879.35, 98819707.92, -1820785.15],
[1180757.58, 15464094.20, 85738500.00, -593948.58],
[1391612.03, 14870145.63, 98610549.50, 1738738.46],
[1346181.07, 16608884.09, 96614559.41, 458697.52],
[1355016.05, 17067581.61, 98308747.52, -598399.57],
[1326346.30, 16469182.04, 94755509.90, 887459.79],
[1250082.56, 17356641.83, 89684920.79, 458662.64]
]

# Assuming 'md2' is your DataFrame containing the dataset
# Assuming 'X_train', 'y_train' are the training sets previously
defined

# Initialize GradientBoostingRegressor
predict_direct_emissions_N2O_model_2 =
GradientBoostingRegressor(random_state=42)

# Fit the model on the entire training dataset
predict_direct_emissions_N2O_model_2.fit(X_train, y_train)


# Use the trained model to make predictions on the example dataset
predictions =
predict_direct_emissions_N2O_model_2.predict(more_example_data)

# Print the predictions
```

```
print('Predictions for Direct emissions (N2O):')
print(predictions)
```

```
Predictions for Direct emissions (N2O):
[1.37733727 1.19171337 1.25420488 1.34209915 1.36689984 1.39029537
 1.37869644 1.4021954  1.28180035 1.28353893 1.26984789 1.41649519]
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439:
UserWarning: X does not have valid feature names, but
GradientBoostingRegressor was fitted with feature names
  warnings.warn(
```

```
from sklearn.ensemble import GradientBoostingRegressor

# Assuming 'X_train', 'y_train' are the training sets previously
defined
# Assuming 'md2' is your DataFrame containing the dataset

# Initialize GradientBoostingRegressor
predict_direct_emissions_N2O_model_2 =
GradientBoostingRegressor(random_state=42)

# Fit the model on the entire training dataset
predict_direct_emissions_N2O_model_2.fit(X_train, y_train)

# Retrieve feature importances
feature_importance =
predict_direct_emissions_N2O_model_2.feature_importances_

# Create a DataFrame to associate feature names with importance scores
feature_importance_df = pd.DataFrame({'Feature': X_train.columns,
'Importance': feature_importance})

# Sort features by importance
sorted_features = feature_importance_df.sort_values(by='Importance',
ascending=False)

# Print or visualize the sorted feature importances
print(sorted_features)
```

```
           Feature  Importance
1   Opening stocks    0.589801
2        Processed    0.224410
0             Loss    0.117102
3  Stock Variation    0.068687
```

```
from sklearn.ensemble import GradientBoostingRegressor

# Assuming 'X_train', 'y_train' are the training sets previously
defined
# Assuming 'md2' is your DataFrame containing the dataset
```

```
# Initialize GradientBoostingRegressor
predict_direct_emissions_N2O_model =
GradientBoostingRegressor(random_state=42)

# Fit the model on the entire training dataset
predict_direct_emissions_N2O_model.fit(X_train, y_train)

# Retrieve feature importances
feature_importance =
predict_direct_emissions_N2O_model.feature_importances_

# Create a DataFrame to associate feature names with importance scores
feature_importance_df = pd.DataFrame({'Feature': X_train.columns,
'Importance': feature_importance})

# Sort features by importance
sorted_features = feature_importance_df.sort_values(by='Importance',
ascending=False)

# Print or visualize the sorted feature importances
print(sorted_features)
```

```
          Feature  Importance
2           Yield    0.822485
0  Area harvested    0.097488
1      Production    0.080027
```

Summary

In the result we can see:

1. Yield's Dominance in Emissions Insight: Yield stands out as the most critical factor impacting emissions. This suggests that controlling, optimizing, or innovating practices related to crop yield within palm oil production could be pivotal in managing and reducing emissions. Potential strategies might include:

Agronomic Practices: Implementing improved agronomic practices to enhance crop yield without increasing environmental impacts.

Technology Adoption: Employing technology-driven solutions, such as precision agriculture or advanced farming techniques, to optimize yield while minimizing emissions.

Crop Breeding: Developing varieties resilient to environmental changes to sustain or enhance yield while reducing emissions.

1. Opening Stocks Dominance: The prominence of opening stocks suggests that the inventory of palm oil at the beginning of the period significantly influences emissions. Strategies to manage opening stocks effectively could involve:

Inventory Optimization: Efficiently managing inventory to prevent overstocking and minimizing wastage.

Storage and Preservation: Implementing improved storage practices to prevent spoilage or deterioration that might contribute to emissions.

Supply Chain Efficiency: Enhancing supply chain management to ensure a smooth flow of products without accumulating excessive stock.