heart

August 4, 2024

```
import pandas as pd
[2]:
     df = pd.read_csv('/home/a3-403a-11/Desktop/33348/Heart.csv')
[4]:
     df
[4]:
           Unnamed: 0
                                Sex
                                         ChestPain
                                                     RestBP
                                                                Chol
                                                                      Fbs
                                                                            {\tt RestECG}
                                                                                      {\tt MaxHR}
                          Age
     0
                         63.0
                                                       145.0
                                                              233.0
                                                                         1
                                                                                   2
                                                                                       150.0
                     1
                                  1
                                           typical
     1
                     2
                         67.0
                                  1
                                     asymptomatic
                                                       160.0
                                                              286.0
                                                                         0
                                                                                   2
                                                                                       108.0
     2
                                                                                   2
                        67.0
                                     asymptomatic
                                                       120.0
                                                              229.0
                                                                         0
                                                                                       129.0
                     3
                                  1
     3
                     4
                         37.0
                                  1
                                        nonanginal
                                                       130.0
                                                               250.0
                                                                         0
                                                                                       187.0
     4
                     5
                        41.0
                                                       130.0
                                                              204.0
                                                                                       172.0
                                        nontypical
     298
                   299
                        45.0
                                           typical
                                                       110.0
                                                              264.0
                                                                         0
                                                                                       132.0
                                  1
     299
                   300
                        68.0
                                     asymptomatic
                                                       144.0
                                                              193.0
                                                                                       141.0
                                  1
                                                                         1
     300
                   301
                         57.0
                                     asymptomatic
                                                       130.0
                                                               131.0
                                                                         0
                                                                                   0
                                                                                      115.0
                                  1
     301
                   302
                        57.0
                                  0
                                        nontypical
                                                       130.0
                                                              236.0
                                                                         0
                                                                                   2
                                                                                      174.0
     302
                   303
                        38.0
                                                       138.0
                                                                                      173.0
                                  1
                                        nonanginal
                                                               175.0
           ExAng
                   Oldpeak
                             Slope
                                      Ca
                                                  Thal
                                                         AHD
     0
               0
                        2.3
                                  3
                                     0.0
                                                 fixed
                                                          No
     1
                                  2
                                     3.0
               1
                        1.5
                                                normal
                                                         Yes
                                  2
     2
               1
                        2.6
                                     2.0
                                           reversable
                                                         Yes
     3
               0
                        3.5
                                  3
                                     0.0
                                                normal
                                                          No
     4
               0
                        1.4
                                     0.0
                                  1
                                                normal
                                                          No
     . .
     298
               0
                        1.2
                                  2
                                     0.0
                                           reversable
                                     2.0
     299
               0
                        3.4
                                  2
                                           reversable
                                                         Yes
     300
                                  2
                                     1.0
               1
                        1.2
                                           reversable
                                                         Yes
     301
               0
                        0.0
                                  2
                                     1.0
                                                normal
                                                         Yes
     302
               0
                        0.0
                                  1
                                     NaN
                                                          No
                                                normal
     [303 rows x 15 columns]
[5]:
    df.head()
```

```
[5]:
        Unnamed: 0
                      Age
                           Sex
                                    ChestPain
                                                RestBP
                                                         Chol
                                                                Fbs
                                                                     RestECG
                                                                               MaxHR
                                                        233.0
                                                                               150.0
     0
                  1
                     63.0
                              1
                                      typical
                                                 145.0
                                                                  1
                                                                            2
     1
                  2
                     67.0
                              1
                                 asymptomatic
                                                 160.0
                                                        286.0
                                                                  0
                                                                            2
                                                                               108.0
     2
                  3
                     67.0
                              1
                                 asymptomatic
                                                 120.0
                                                        229.0
                                                                  0
                                                                            2
                                                                               129.0
                                                 130.0
     3
                  4
                     37.0
                                   nonanginal
                                                        250.0
                                                                            0
                                                                               187.0
                              1
                                                                  0
     4
                  5
                     41.0
                                   nontypical
                                                 130.0
                                                        204.0
                                                                            2
                                                                               172.0
                              0
                                                                  0
        ExAng
               Oldpeak
                        Slope
                                  Ca
                                             Thal
                                                   AHD
     0
                    2.3
                                 0.0
                                                    No
            0
                              3
                                            fixed
                    1.5
                                 3.0
     1
            1
                              2
                                          normal
                                                   Yes
     2
                    2.6
                              2
                                 2.0
            1
                                      reversable
                                                   Yes
     3
            0
                    3.5
                              3
                                 0.0
                                                    No
                                          normal
     4
                    1.4
                                 0.0
            0
                              1
                                          normal
                                                    No
[6]: df.tail()
[6]:
          Unnamed: 0
                        Age
                             Sex
                                      ChestPain RestBP
                                                            Chol
                                                                  Fbs
                                                                       RestECG
                                                                                 MaxHR
     298
                  299
                       45.0
                                                           264.0
                                                                    0
                                                                                 132.0
                                1
                                        typical
                                                   110.0
                                                                              0
     299
                  300
                       68.0
                                   asymptomatic
                                                   144.0
                                                           193.0
                                                                    1
                                                                              0
                                                                                 141.0
                                1
     300
                  301
                       57.0
                                                           131.0
                                                                    0
                                                                              0 115.0
                                1
                                   asymptomatic
                                                   130.0
     301
                  302
                       57.0
                                     nontypical
                                                   130.0
                                                           236.0
                                                                    0
                                                                              2 174.0
                                0
     302
                  303
                       38.0
                                1
                                     nonanginal
                                                   138.0
                                                           175.0
                                                                    0
                                                                                173.0
                                                     AHD
          ExAng
                  Oldpeak Slope
                                    Ca
                                               Thal
     298
              0
                      1.2
                                2
                                   0.0
                                        reversable
                                                     Yes
     299
              0
                      3.4
                                2
                                   2.0
                                        reversable
                                                     Yes
     300
              1
                      1.2
                                2
                                   1.0
                                        reversable
                                                    Yes
     301
              0
                      0.0
                                2
                                   1.0
                                             normal Yes
     302
              0
                      0.0
                                   NaN
                                1
                                             normal
                                                      No
[7]: # Finding shape of the dataset
     shape = df.shape
     print("Shape of the dataset- ",shape)
    Shape of the dataset- (303, 15)
[8]: pivot_table = df.pivot_table(index='ChestPain', columns='Sex', values='Chol', __
      →aggfunc='mean')
     print("Pivoted Data:")
     print(pivot_table)
    Pivoted Data:
    Sex
                             0
                                          1
    ChestPain
    asymptomatic
                   268.475000
                                243.605769
    nonanginal
                   262.294118
                                232.235294
    nontypical
                                241.031250
                   251.444444
    typical
                   247.000000
                                235.052632
```

```
[9]: df.shape
 [9]: (303, 15)
[10]: df_stacked = df.stack()
      df_stacked
[10]: 0
           Unnamed: 0
           Age
                             63.0
           Sex
           ChestPain
                          typical
           RestBP
                            145.0
      302 ExAng
                                0
           Oldpeak
                              0.0
           Slope
                                1
           Thal
                           normal
           AHD
      Length: 4535, dtype: object
[11]: df.isnull().sum().sum()
[11]: 10
[12]: # Find missing values
      missing_values = df.isnull().sum()
      print("Missing values:\n", missing_values)
     Missing values:
      Unnamed: 0
                     0
                    0
     Age
     Sex
                    0
     {\tt ChestPain}
                    0
     RestBP
                    1
     Chol
                    1
     Fbs
                    0
     RestECG
     MaxHR
                    1
     ExAng
                    0
     Oldpeak
                    0
     Slope
                    0
                    5
     Ca
     Thal
                    2
     AHD
     dtype: int64
```

```
df.dtypes
[13]: Unnamed: 0
                      int64
                    float64
      Age
      Sex
                      int64
      ChestPain
                     object
      RestBP
                    float64
      Chol
                    float64
      Fbs
                      int64
      RestECG
                      int64
      MaxHR
                    float64
      ExAng
                      int64
      Oldpeak
                    float64
      Slope
                      int64
      Ca
                    float64
      Thal
                     object
      AHD
                     object
      dtype: object
[14]: # Sort by Age in ascending order
      sorted df age = df.sort values(by='Age')
      print("Sorted by Age:")
      sorted_df_age
     Sorted by Age:
[14]:
           Unnamed: 0
                        Age
                             Sex
                                      ChestPain RestBP
                                                          Chol Fbs
                                                                      RestECG
                                                                               MaxHR \
                  133 29.0
                                                         204.0
                                                                            2
                                                                               202.0
      132
                                1
                                     nontypical
                                                  130.0
                                                                   0
      101
                  102 34.0
                                        typical
                                                  118.0 182.0
                                                                            2 174.0
                                1
                                                                   0
      225
                  226 34.0
                                     nontypical
                                                  118.0
                                                         210.0
                                                                            0 192.0
      283
                  284 35.0
                                     nontypical
                                                  122.0
                                                         192.0
                                                                   0
                                                                            0 174.0
      117
                  118 35.0
                                   asymptomatic
                                                  138.0
                                                         183.0
                                                                               182.0
      . .
      42
                   43 71.0
                                     nontypical
                                                         302.0
                                                                   0
                                                                            0 162.0
                               0
                                                  160.0
      273
                  274 71.0
                                   asymptomatic
                                                                            0 125.0
                                0
                                                  112.0 149.0
                                                                   0
      233
                  234 74.0
                                     nontypical
                                                                            2 121.0
                                0
                                                  120.0
                                                         269.0
                                                                   0
      257
                  258 76.0
                                                  140.0
                                                         197.0
                                                                            1 116.0
                                     nonanginal
                  162 77.0
      161
                                   asymptomatic
                                                  125.0
                                                         304.0
                                                                   0
                                                                            2 162.0
           ExAng
                  Oldpeak Slope
                                   Ca
                                          Thal
                                                AHD
      132
               0
                      0.0
                                  0.0
                                      normal
                                                 No
                                1
      101
               0
                      0.0
                                  0.0
                                1
                                        normal
                                                 No
      225
               0
                      0.7
                                  0.0 normal
                                1
                                                 No
      283
               0
                      0.0
                                1
                                  0.0 normal
                                                 No
      117
               0
                      1.4
                                  0.0 normal
                                                 No
```

[13]: # Finding datatypes of each column

```
42
                      0.4
                               1 2.0 normal
               0
                                                 No
      273
               0
                      1.6
                               2 0.0 normal
                                                 No
      233
                      0.2
                               1 1.0 normal
                                                 No
      257
                      1.1
                               2 0.0 normal
               0
                                                 No
      161
               1
                      0.0
                               1 3.0 normal
                                               Yes
      [303 rows x 15 columns]
[15]: # Finding out zero's
      (df==0).sum().sum()
[15]: 985
[16]: # Zero's in each row
      (df==0).sum()
[16]: Unnamed: 0
                      0
      Age
                      0
      Sex
                     97
      ChestPain
                      0
      RestBP
                      0
      Chol
                      0
      Fbs
                    258
      RestECG
                    151
     MaxHR
                      0
     ExAng
                    204
      Oldpeak
                     99
      Slope
                      0
      Ca
                    176
      Thal
                      0
      AHD
                      0
      dtype: int64
[17]: # finding mean of age
      print("Mean of all the ages - ")
      age_mean = df['Age'].mean()
      age_mean
     Mean of all the ages -
[17]: 54.51162790697675
[18]: df["Age"].fillna(age_mean, inplace=True)
```

[19]: df.isnull().sum()

```
[19]: Unnamed: 0
                     0
      Age
                     0
      Sex
                     0
      ChestPain
                     0
      RestBP
                     1
      Chol
                     1
      Fbs
                     0
      RestECG
                     0
      MaxHR
                     1
      ExAng
                     0
      Oldpeak
                     0
      Slope
                     0
      Ca
                     5
      Thal
                     2
      AHD
                     0
      dtype: int64
[20]: ChestPain_mode = df['ChestPain'].mode()[0]
[21]: ChestPain_mode
[21]: 'asymptomatic'
[22]: df["ChestPain"].fillna(ChestPain_mode, inplace=True)
[23]: df.isnull().sum()
[23]: Unnamed: 0
                     0
      Age
                     0
      Sex
                     0
      ChestPain
                     0
      RestBP
                     1
      Chol
                     1
      Fbs
                     0
      RestECG
                     0
      MaxHR
                     1
      ExAng
                     0
      Oldpeak
                     0
      Slope
                     0
      Ca
                     5
      Thal
                     2
      AHD
      dtype: int64
[24]: element = df.iloc[55, 3]
[25]:
      element
```

```
[25]: 'asymptomatic'
[26]: df.to_csv('/home/a3-403a-11/Desktop/33348/Heart.csv', index=False)
[27]: df selected = df[['Age', 'Sex', 'ChestPain', 'RestBP', 'Chol']]
      df selected
           Age Sex
[27]:
                         ChestPain RestBP
                                             Chol
          63.0
                          typical
                                    145.0 233.0
                  1
          67.0
                  1 asymptomatic
      1
                                    160.0 286.0
      2
          67.0
                  1 asymptomatic
                                    120.0 229.0
      3
          37.0
                  1 nonanginal
                                    130.0 250.0
      4
          41.0
                       nontypical
                  0
                                    130.0 204.0
           ... ...
                                     •••
      298 45.0
                                     110.0 264.0
                  1
                          typical
     299 68.0
                  1 asymptomatic
                                    144.0 193.0
      300 57.0
                  1 asymptomatic
                                    130.0 131.0
      301 57.0
                  0
                       nontypical
                                    130.0 236.0
      302 38.0
                  1
                       nonanginal
                                     138.0 175.0
      [303 rows x 5 columns]
[28]: from sklearn.model_selection import train_test_split
[29]: # Splitting dataset into training (80%) and testing (20%)
      train_df, test_df = train_test_split(df_selected, test_size=0.2,__
       →random_state=42)
[30]: # The random_state parameter in train_test_split function is used to control_
      → the random number generator
      #for splitting the data into training and testing sets.
[31]: train_df.to_csv('/home/a3-403a-11/Desktop/33348/train_dataset.csv', index=False)
      test_df.to_csv('/home/a3-403a-11/Desktop/33348/test_dataset.csv', index=False)
[32]: # Splitting data into test data and train data using - 1) Leave one out 2) k-fold
[61]: # Leave One out ->>
      from sklearn.model selection import LeaveOneOut
[62]: loo = LeaveOneOut()
[86]: X = df[:10]
      for train_index, test_index in loo.split(X):
         X_train, X_test = X.iloc[train_index], X.iloc[test_index]
          print(f"Train index: {train_index[0]}, Test index: {test_index[0]}")
          #Y_train, Y_test = Y.iloc[train_index], Y.iloc[test_index]
```

```
Train index: 1, Test index: 0
     Train index: 0, Test index: 1
     Train index: 0, Test index: 2
     Train index: 0, Test index: 3
     Train index: 0, Test index: 4
     Train index: 0, Test index: 5
     Train index: 0, Test index: 6
     Train index: 0, Test index: 7
     Train index: 0, Test index: 8
     Train index: 0, Test index: 9
[87]: for train_index, test_index in loo.split(X):
         X_train, X_test = X.iloc[train_index], X.iloc[test_index]
         print(f"Train Data: {X_train}")
         print (f"Test data: {X_test}")
       oprint("-----
     Train Data:
                  Unnamed: 0
                               Age Sex
                                           ChestPain RestBP
                                                              Chol Fbs RestECG
     MaxHR \
                                                                  2 108.0
                2 67.0
                          1 asymptomatic
                                           160.0 286.0
                                                          0
                                           120.0 229.0
     2
                3 67.0
                          1 asymptomatic
                                                                  2 129.0
     3
                4 37.0
                               nonanginal
                                           130.0 250.0
                                                          0
                                                                  0 187.0
                          1
                                           130.0 204.0
                5 41.0
     4
                          0
                              nontypical
                                                          0
                                                                  2 172.0
     5
                6 56.0
                               nontypical
                                           120.0 236.0
                                                          0
                                                                  0 178.0
                          1
     6
                7 62.0
                          0 asymptomatic
                                           140.0 268.0
                                                          0
                                                                 2 160.0
     7
                8 57.0
                          0 asymptomatic
                                           120.0 354.0
                                                                 0 163.0
                                                          0
                          1 asymptomatic
                                                                 2 147.0
     8
                9 63.0
                                           130.0 254.0
                                                          0
     9
               10 53.0
                          1 asymptomatic
                                           140.0 203.0
                                                                  2 155.0
                                                          1
       ExAng
              Oldpeak Slope
                              Ca
                                       Thal AHD
                  1.5
                          2 3.0
                                     normal Yes
     1
           1
     2
                  2.6
                          2 2.0 reversable Yes
           1
     3
                 3.5
           0
                          3 0.0
                                     normal
                                             No
     4
           0
                 1.4
                          1 0.0
                                     normal
                                              No
     5
                 0.8
                         1 0.0
                                     normal
                                             No
     6
                 3.6
                          3 2.0
           0
                                     normal Yes
     7
                 0.6
                          1 0.0
           1
                                     normal
                                            No
     8
           0
                 1.4
                          2 1.0 reversable Yes
           1
                 3.1
                          3 0.0 reversable Yes
     Test data:
                 Unnamed: 0
                              Age Sex ChestPain RestBP
                                                         Chol Fbs RestECG
     MaxHR ExAng \
                1 63.0
                              typical
                                       145.0 233.0
                                                               2 150.0
                          1
                                                      1
       Oldpeak Slope
                       Ca
                            Thal AHD
           2.3
                   3 0.0 fixed No
```

8

```
Train Data:
              Unnamed: 0
                           Age Sex
                                        ChestPain RestBP
                                                            Chol Fbs RestECG
MaxHR \
                                                                 2 150.0
0
           1 63.0
                              typical
                                        145.0
                                               233.0
                      1
                                                        1
2
           3 67.0
                         asymptomatic
                                        120.0
                                               229.0
                                                        0
                                                                 2
                                                                   129.0
                      1
3
              37.0
                           nonanginal
                                        130.0 250.0
                                                                    187.0
           4
                      1
                                                        0
                                                                 0
4
              41.0
                           nontypical
                                        130.0
                                               204.0
                                                                   172.0
           5
                                                        0
5
           6 56.0
                      1
                           nontypical
                                        120.0 236.0
                                                        0
                                                                    178.0
6
           7
              62.0
                      0
                         asymptomatic
                                        140.0 268.0
                                                        0
                                                                 2 160.0
7
              57.0
                         asymptomatic
                                        120.0 354.0
                                                                 0 163.0
           8
                      0
                                                        0
8
           9
              63.0
                      1 asymptomatic
                                        130.0 254.0
                                                        0
                                                                 2 147.0
9
          10 53.0
                                        140.0 203.0
                                                                 2 155.0
                         asymptomatic
                                                        1
                                    Thal AHD
         Oldpeak Slope
                          Ca
   ExAng
0
             2.3
                         0.0
                                   fixed
                                           No
      0
                      3
2
             2.6
                      2
                         2.0
       1
                              reversable
                                          Yes
3
       0
             3.5
                      3
                         0.0
                                           No
                                  normal
4
       0
             1.4
                      1
                         0.0
                                  normal
                                           No
5
       0
             0.8
                      1
                         0.0
                                           No
                                  normal
6
       0
             3.6
                      3
                         2.0
                                  normal Yes
7
       1
             0.6
                      1
                         0.0
                                  normal
                                           No
8
       0
             1.4
                      2
                         1.0
                              reversable Yes
9
       1
             3.1
                      3
                              reversable Yes
                         0.0
                                       ChestPain RestBP
Test data:
             Unnamed: 0
                          Age Sex
                                                           Chol Fbs RestECG
MaxHR \
1
           2 67.0
                      1 asymptomatic
                                        160.0 286.0
                                                        0
                                                                 2 108.0
                                      AHD
  ExAng Oldpeak Slope
                          Ca
                                Thal
1
             1.5
                      2 3.0 normal
                                      Yes
_____
Train Data:
              Unnamed: 0
                           Age Sex
                                        ChestPain RestBP
                                                            Chol Fbs RestECG
MaxHR \
                                                                 2 150.0
0
           1 63.0
                      1
                              typical
                                        145.0 233.0
                                                        1
1
           2 67.0
                         asymptomatic
                                        160.0
                                               286.0
                                                        0
                                                                 2
                                                                   108.0
                      1
3
           4 37.0
                           nonanginal
                                               250.0
                                                                    187.0
                                        130.0
                                                        0
                      1
                                                                 0
           5 41.0
4
                      0
                           nontypical
                                        130.0
                                               204.0
                                                        0
                                                                 2 172.0
5
           6 56.0
                           nontypical
                                        120.0 236.0
                                                        0
                                                                 0 178.0
6
           7
              62.0
                         asymptomatic
                                        140.0
                                               268.0
                                                        0
                                                                 2 160.0
                      0
7
           8 57.0
                         asymptomatic
                                        120.0 354.0
                                                        0
                                                                 0 163.0
                      0
              63.0
                         asymptomatic
                                        130.0 254.0
                                                                 2 147.0
8
           9
                      1
                                                        0
9
          10 53.0
                         asymptomatic
                                        140.0
                                               203.0
                                                        1
                                                                 2 155.0
                      1
         Oldpeak Slope
                          Ca
                                    Thal
                                          AHD
   ExAng
             2.3
                      3
                         0.0
                                           No
0
       0
                                   fixed
             1.5
                      2
1
       1
                         3.0
                                  normal
                                          Yes
3
       0
             3.5
                      3 0.0
                                  normal
                                           No
4
       0
             1.4
                      1 0.0
                                  normal
                                           No
5
       0
             0.8
                      1
                         0.0
                                  normal
                                           No
```

```
normal Yes
6
           3.6
                   3 2.0
7
           0.6
                  1 0.0
      1
                            normal No
8
           1.4
                   2 1.0 reversable Yes
9
           3.1
                   3 0.0 reversable Yes
      1
                      Age Sex
                                                  Chol Fbs RestECG
Test data:
          Unnamed: 0
                                 ChestPain RestBP
MaxHR \
          3 67.0
                   1 asymptomatic 120.0 229.0 0
                                                        2 129.0
  ExAng Oldpeak Slope Ca
                               Thal AHD
           2.6
                   2 2.0 reversable Yes
Train Data:
                      Age Sex
                                  ChestPain RestBP
                                                   Chol Fbs RestECG
            Unnamed: 0
MaxHR \
0
          1 63.0
                                                        2 150.0
                   1
                         typical
                                  145.0 233.0
                                                1
1
          2 67.0
                   1 asymptomatic
                                  160.0 286.0
                                                0
                                                        2 108.0
2
          3 67.0
                   1 asymptomatic
                                  120.0 229.0
                                                0
                                                       2 129.0
          5 41.0
4
                   0 nontypical
                                  130.0 204.0
                                                0
                                                      2 172.0
5
          6 56.0
                   1 nontypical
                                  120.0 236.0
                                                0
                                                      0 178.0
                                  140.0 268.0
6
          7 62.0
                   0 asymptomatic
                                                0
                                                      2 160.0
7
          8 57.0
                   0 asymptomatic
                                  120.0 354.0
                                                0
                                                      0 163.0
8
          9 63.0
                   1 asymptomatic
                                  130.0 254.0 0
                                                      2 147.0
9
         10 53.0
                   1 asymptomatic
                                  140.0 203.0 1
                                                      2 155.0
  ExAng Oldpeak Slope Ca
                              Thal AHD
     0
           2.3
                   3 0.0
0
                             fixed
                                     No
           1.5
                   2 3.0
1
      1
                             normal Yes
2
                  2 2.0 reversable Yes
     1
           2.6
4
           1.4
                  1 0.0
                             normal
5
           0.8
                  1 0.0
                             normal
6
     0
           3.6
                   3 2.0
                             normal Yes
                  1 0.0
7
     1
           0.6
                             normal
                                    No
8
     0
           1.4
                   2 1.0 reversable Yes
      1
           3.1
                   3 0.0 reversable Yes
           Unnamed: O Age Sex ChestPain RestBP
                                                 Chol Fbs RestECG
Test data:
MaxHR \
         4 37.0 1 nonanginal
                                130.0 250.0 0 0 187.0
  ExAng Oldpeak Slope Ca
                           Thal AHD
           3.5
                3 0.0 normal No
_____
Train Data:
            Unnamed: O Age Sex ChestPain RestBP
                                                   Chol Fbs RestECG
MaxHR \
         1 63.0
                                                        2 150.0
                   1
                      typical
                                  145.0 233.0
                                                1
1
          2 67.0
                   1 asymptomatic
                                  160.0 286.0
                                                0
                                                      2 108.0
2
          3 67.0
                   1 asymptomatic
                                  120.0 229.0
                                                0
                                                      2 129.0
3
          4 37.0
                   1 nonanginal 130.0 250.0 0
                                                      0 187.0
```

```
5
           6 56.0
                          nontypical
                                       120.0 236.0
                                                              0 178.0
                     1
                                                      0
6
           7 62.0
                        asymptomatic
                                       140.0 268.0
                                                              2 160.0
                                                      0
7
           8 57.0
                                       120.0 354.0
                        asymptomatic
                                                      0
                                                              0 163.0
8
           9 63.0
                        asymptomatic
                                       130.0
                                             254.0
                                                      0
                                                              2 147.0
9
              53.0
                        asymptomatic
                                       140.0 203.0
                                                              2 155.0
          10
                                                      1
  ExAng
         Oldpeak Slope
                         Ca
                                   Thal
                                        AHD
      0
             2.3
0
                        0.0
                                  fixed
                                         No
1
      1
             1.5
                     2
                        3.0
                                 normal Yes
2
             2.6
      1
                     2
                        2.0 reversable Yes
3
      0
             3.5
                     3 0.0
                                 normal
                                         No
5
      0
             0.8
                        0.0
                                         No
                     1
                                 normal
6
             3.6
                        2.0
      0
                     3
                                 normal Yes
7
             0.6
                     1
                        0.0
                                         No
      1
                                 normal
8
             1.4
                     2
                        1.0
                            reversable Yes
      0
9
      1
             3.1
                     3
                        0.0
                             reversable
                                       Yes
Test data:
             Unnamed: 0
                         Age Sex
                                    ChestPain RestBP
                                                       Chol Fbs RestECG
MaxHR \
                                                            2 172.0
4
           5 41.0
                     0 nontypical
                                     130.0 204.0
                                                    0
  ExAng Oldpeak Slope
                         Ca
                               Thal AHD
      0
             1.4
                     1 0.0 normal No
4
______
Train Data:
              Unnamed: 0
                          Age Sex
                                      ChestPain RestBP
                                                         Chol Fbs RestECG
MaxHR \
           1 63.0
                                                                150.0
0
                                       145.0
                                             233.0
                                                              2
                             typical
                                                      1
1
           2 67.0
                        asymptomatic
                                             286.0
                                                              2 108.0
                                       160.0
                                                      0
2
           3 67.0
                                                              2 129.0
                        asymptomatic
                                       120.0
                                             229.0
                                                      0
3
           4 37.0
                     1
                          nonanginal
                                       130.0 250.0
                                                      0
                                                                187.0
4
           5 41.0
                          nontypical
                                      130.0 204.0
                                                      0
                                                              2 172.0
                     0
                                             268.0
6
           7 62.0
                     0 asymptomatic
                                       140.0
                                                      0
                                                              2 160.0
7
           8 57.0
                                       120.0 354.0
                        asymptomatic
                                                      0
                                                              0 163.0
8
           9
              63.0
                        asymptomatic
                                       130.0
                                             254.0
                                                      0
                                                              2 147.0
9
          10 53.0
                        asymptomatic
                                       140.0
                                             203.0
                                                      1
                                                              2 155.0
         Oldpeak Slope
                                   Thal AHD
  ExAng
                         Ca
0
      0
             2.3
                        0.0
                                  fixed
                                         No
1
      1
             1.5
                     2
                        3.0
                                 normal Yes
2
             2.6
                        2.0 reversable Yes
      1
                     2
3
      0
             3.5
                     3 0.0
                                 normal
                                         No
4
      0
             1.4
                        0.0
                                         No
                     1
                                 normal
6
      0
             3.6
                     3
                        2.0
                                 normal Yes
7
      1
             0.6
                        0.0
                                         No
                     1
                                 normal
8
             1.4
      0
                     2
                        1.0 reversable
                                        Yes
                     3
9
      1
             3.1
                        0.0
                             reversable
                                        Yes
Test data:
             Unnamed: 0
                                                      Chol Fbs RestECG
                         Age Sex
                                    ChestPain RestBP
MaxHR \
```

ExAng Oldpeak Slope Ca Thal AHD 5 0 0.8 1 0.0 normal No

Train MaxHR	Data:	Un	named:	0	Age	Sex	Chest	Pain	RestBP	Chol	F	bs RestECG
0		1 63	0	1	+	ypical	145.0	233	.0 1		2	150.0
1		2 67		1		omatic					2	108.0
2		3 67		1		omatic					2	129.0
3		3 37 1 37		1		nginal					0	187.0
4		5 41				•	130.0				2	172.0
5		5 56			nontypical						0	178.0
7		3 57		0	asymptomatic						0	163.0
8		9 63		1			130.0				2	147.0
9	10			1			140.0				2	155.0
Ü	1	, 00	• •	-	abymp	Jomadic	110.0	200	. 0 1		_	100.0
Ex	Ang Olo	dpeak	Slope	е	Ca	Tl	hal AHD					
0	0	2.3	;	3	0.0	fi	xed No					
1	1	1.5		2	3.0	nor	nal Yes					
2	1	2.6		2	2.0 r	reversal	ole Yes					
3	0	3.5	;	3	0.0	nor	nal No					
4	0	1.4		1	0.0	nor	nal No					
5	0	0.8		1	0.0	nor	nal No					
7	1	0.6		1	0.0	nor	mal No					
8	0	1.4	:	2	1.0 r	reversal	ole Yes					
9	1	3.1	;	3	0.0 r	reversal	ole Yes					
Test data:		Unn	amed: (0	Age	Sex	ChestPa	ain 1	RestBP	Chol	Fb	s RestECG
${\tt MaxHR}$	\											
6	•	7 62	.0	0	asympt	omatic	140.0	268	.0 0		2	160.0
Ex	Ang Olo	dpeak	Slope	е	Ca	Thal	AHD					
6	0	3.6	_			ormal	Yes					
0												bs RestECG
MaxHR	\		_								_	
0		1 63		1		ypical	145.0	233			2	150.0
1		2 67		1		omatic	160.0				2	108.0
2		3 67		1	asymptomatic		120.0	229			2	129.0
3		1 37		1	nonanginal		130.0	250			0	187.0
4		5 41		0	nontypical		130.0	204			2	172.0
5		5 56		1		ypical	120.0	236			0	178.0
6		7 62		0		omatic	140.0	268			2	160.0
8		63		1		omatic	130.0	254			2	147.0
9	10	53	.0	1	asympt	omatic	140.0	203	.0 1		2	155.0

```
Thal AHD
  ExAng Oldpeak Slope Ca
0
            2.3
      0
                    3 0.0
                              fixed
                                     No
1
      1
            1.5
                    2 3.0
                              normal Yes
2
            2.6
                    2 2.0 reversable Yes
      1
3
      0
            3.5
                    3 0.0
                              normal No
4
            1.4
                    1 0.0
      0
                              normal
                                      No
5
           0.8
                   1 0.0
                              normal
6
      0
           3.6
                   3 2.0
                              normal Yes
8
           1.4
                    2 1.0 reversable Yes
      0
9
      1
            3.1
                    3 0.0 reversable Yes
Test data:
            Unnamed: 0 Age Sex
                                ChestPain RestBP
                                                    Chol Fbs RestECG
MaxHR \
7
          8 57.0 0 asymptomatic 120.0 354.0 0
                                                          0 163.0
  ExAng Oldpeak Slope
                      Ca
                             Thal AHD
7
            0.6 1 0.0 normal No
Train Data: Unnamed: 0
                       Age Sex
                                   ChestPain RestBP
                                                     Chol Fbs RestECG
MaxHR \
0
          1 63.0
                          typical
                                    145.0 233.0
                                                          2 150.0
1
          2 67.0
                    1 asymptomatic
                                    160.0 286.0
                                                          2 108.0
                                                  0
2
          3 67.0
                   1 asymptomatic
                                   120.0 229.0
                                                  0
                                                          2 129.0
3
          4 37.0
                    1 nonanginal
                                   130.0 250.0
                                                          0 187.0
                                                  0
4
          5 41.0
                    0 nontypical 130.0 204.0
                                                  0
                                                        2 172.0
5
          6 56.0
                                   120.0 236.0
                                                         0 178.0
                   1 nontypical
                                                  0
          7 62.0
6
                    O asymptomatic
                                   140.0 268.0
                                                          2 160.0
                                                  0
7
                    O asymptomatic
          8 57.0
                                    120.0 354.0
                                                  0
                                                        0 163.0
9
         10 53.0
                    1 asymptomatic
                                    140.0 203.0
                                               1
                                                        2 155.0
  ExAng Oldpeak Slope
                      Ca
                                Thal AHD
0
      0
            2.3
                    3 0.0
                              fixed
                                      No
                    2 3.0
1
      1
            1.5
                              normal Yes
2
            2.6
                    2 2.0 reversable Yes
      1
3
      0
            3.5
                    3 0.0
                              normal
4
      0
            1.4
                   1 0.0
                              normal
5
                   1 0.0
           0.8
                              normal No
6
      0
            3.6
                    3 2.0
                              normal Yes
7
           0.6
                   1 0.0
      1
                              normal
                                      No
                    3 0.0 reversable Yes
      1
            3.1
Test data:
            Unnamed: 0
                       Age Sex
                                ChestPain RestBP Chol Fbs RestECG
MaxHR \
                    1 asymptomatic 130.0 254.0 0
          9 63.0
                                                          2 147.0
  ExAng Oldpeak Slope
                       Ca
                                Thal AHD
                    2 1.0 reversable Yes
```

```
MaxHR \
                 1 63.0
                                                                      2 150.0
      0
                                    typical
                                              145.0 233.0
                                                             1
      1
                 2 67.0
                               asymptomatic
                                              160.0 286.0
                                                             0
                                                                      2 108.0
      2
                 3 67.0
                               asymptomatic
                                              120.0 229.0
                                                                      2 129.0
      3
                 4 37.0
                                 nonanginal
                                              130.0 250.0
                                                                      0 187.0
                                                             0
      4
                 5 41.0
                                 nontypical
                                              130.0 204.0
                                                                      2 172.0
                 6 56.0
      5
                            1
                                 nontypical
                                              120.0 236.0
                                                             0
                                                                      0 178.0
      6
                 7 62.0
                            0 asymptomatic
                                              140.0 268.0
                                                                      2 160.0
                                                             0
                 8 57.0
                            0 asymptomatic
                                                                      0 163.0
      7
                                              120.0 354.0
                                                             0
      8
                 9 63.0
                            1 asymptomatic
                                              130.0 254.0
                                                                      2 147.0
                                                             0
               Oldpeak Slope
                                Ca
                                          Thal AHD
         ExAng
      0
                   2.3
                            3 0.0
                                         fixed
                                                No
            0
                   1.5
                            2 3.0
      1
             1
                                        normal
                                               Yes
      2
             1
                   2.6
                            2 2.0 reversable Yes
      3
             0
                   3.5
                            3 0.0
                                        normal
                                                No
      4
            0
                   1.4
                            1 0.0
                                        normal
                                                No
      5
            0
                   0.8
                            1 0.0
                                        normal
                                                No
      6
            0
                   3.6
                            3 2.0
                                        normal Yes
      7
                            1 0.0
             1
                   0.6
                                        normal
                                                No
      8
                   1.4
                            2 1.0 reversable Yes
      Test data:
                   Unnamed: 0
                              Age Sex
                                            ChestPain RestBP
                                                                Chol Fbs RestECG
      MaxHR \
                            1 asymptomatic 140.0 203.0
      9
                10 53.0
                                                           1
                                                                      2 155.0
         ExAng Oldpeak Slope
                                Ca
                                          Thal AHD
      9
                   3.1
                            3 0.0 reversable
[89]: for i, (train_index, test_index) in enumerate(loo.split(X)):
          X_train, X_test = X.iloc[train_index], X.iloc[test_index]
          train_filename = f'train_{i+1}.csv'
          test_filename = f'test_{i+1}.csv'
          X_train.to_csv(train_filename, index=False)
          X_test.to_csv(test_filename, index=False)
[90]: \# k \text{ fold splitting} -
[93]: from sklearn.model_selection import KFold
      kf = KFold(n_splits = 10, shuffle = True, random_state = 42)
[101]: for i, (train_index, test_index) in enumerate(kf.split(df)):
          print(f"Fold {i+1}:")
          print(f" Train: index={len(train_index)}")
          print(f" Test: index={len(test index)}")
```

Train Data:

Unnamed: 0

Age Sex

ChestPain RestBP

Chol Fbs RestECG

```
df_train = df.iloc[train_index]
    df_test = df.iloc[test_index]
    train_filename = f"training_fold{i+1}.csv"
    test_filename = f"testing_fold{i+1}.csv"
    df_train.to_csv(train_filename, index = False)
    df_test.to_csv(test_filename, index = False)
   Ш
 oprint("_______
Fold 1:
 Train: index=272
 Test: index=31
Fold 2:
 Train: index=272
 Test: index=31
 _____
Fold 3:
 Train: index=272
 Test: index=31
Fold 4:
 Train: index=273
 Test: index=30
Fold 5:
 Train: index=273
 Test: index=30
Fold 6:
 Train: index=273
 Test: index=30
Fold 7:
 Train: index=273
 Test: index=30
```

```
Fold 8:
      Train: index=273
      Test: index=30
     -----
      Train: index=273
      Test: index=30
    Fold 10:
      Train: index=273
      Test: index=30
[98]: for i, (train_index, test_index) in enumerate(kf.split(df)):
        print(f"Fold {i}:")
        print(f" Train: index={train_index}")
        print(f" Test: index={test_index}")
      Fold 0:
      Train: index=[ 0 1 2 3 4 6 7 8 10 11 12 13 14 15 16 17
    18 19
      20 21 22 23 24 26 27 28 29 30 31 32 34 35 36 37 38 39
      40 41 42 43 44 47 48 49 50 51 52 53 54 55 56 57 58
                               68 69 70 71 72 74 75 76 77 78
      61 62 63 64 65 66 67
      80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
      98 99 100 102 103 104 105 106 107 108 110 112 113 114 115 116 117 120
     121 122 123 124 126 127 128 129 130 131 132 133 134 135 136 137 138 140
     141 142 143 144 145 147 148 149 150 151 153 154 155 156 157 158 159 160
     161 162 163 164 165 166 167 168 169 170 171 172 173 174 176 177 178 180
     181 182 183 184 185 186 187 188 189 190 191 193 194 195 196 197 198 199
     200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217
     218 219 220 221 222 224 225 226 227 229 230 232 233 234 235 236 237 238
     239 240 241 242 243 244 245 247 248 249 250 251 252 253 255 256 257 258
     259 260 261 262 263 264 265 266 267 270 271 273 274 275 276 277 278 280
     281 282 284 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
     301 302]
      Test: index=[ 5 9 25 33 45 46 60 73 101 109 111 118 119 125 139 146
    152 175
     179 192 223 228 231 246 254 268 269 272 279 283 285]
    Fold 1:
```

16

```
Train: index=[ 0 1 2 3 4 5 6 8 9 10 11 12 13 14 15 16
18 19
 20 21 22 23 25 26 27 28 29 30 31 32 33 34 35 36 37 38
 39 40 41 43 44 45 46 47 48 49
                                     50 51 52 53 54 55 56 58
 59 60 61 62 64 65 66 67 68 69
                                    70 71 72 73 74 75 79 80
 81 83 84 85 86 87 88 89 91 93 94 95 96 97 98 99 100 101
102 103 105 106 107 108 109 110 111 112 113 114 115 117 118 119 120 121
122 123 124 125 126 127 128 129 130 131 133 134 135 136 138 139 140 141
142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
160 161 162 163 164 165 166 167 169 170 171 172 173 174 175 176 177 178
179 180 181 182 183 185 186 187 188 189 190 191 192 194 195 196 197 199
200 201 202 203 205 206 207 208 209 210 211 212 213 214 215 216 217 218
220 221 222 223 224 225 226 227 228 229 230 231 233 234 235 237 238 239
240 241 242 243 244 245 246 247 248 250 252 253 254 256 257 258 259 260
261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278
279 280 282 283 285 286 287 288 289 290 291 293 294 295 296 297 298 299
301 302]
 Test: index=[ 7 17 24 42 57 63 76 77 78 82 90 92 104 116 132 137
168 184
193 198 204 219 232 236 249 251 255 281 284 292 300]
______
Fold 2:
 Train: index=[ 0 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
17 18
 20 21 23 24 25 26 27 28 29 31 32 33 34 35 36 37 38 39
 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 57 58
 60 61 62 63 64 65 67 68 69 70 71 73 74 76 77 78 80 81
 82 83 85 86 87 88 89 90 91 92 94 95 96 97 98 99 100 101
102 103 104 105 106 107 108 109 110 111 112 115 116 117 118 119 120 121
122 123 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140
141 142 145 146 147 148 149 150 151 152 153 154 155 156 157 159 160 161
162 163 165 166 168 169 170 171 172 173 174 175 178 179 180 181 182 183
184 185 186 187 188 189 190 191 192 193 194 195 198 199 200 201 203 204
205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222
223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
241 243 245 246 247 248 249 251 252 253 254 255 256 257 259 260 261 262
263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280
281 283 284 285 286 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302]
 Test: index=[ 6 19 22 30 56 59 66 72 75 79 84 93 113 114 124 143
144 158
164 167 176 177 196 197 202 242 244 250 258 282 287]
 Train: index=[ 0 1 2 3 4 5 6 7 8 9 11 12 13 14 17 19 \,
20 21
```

```
26 27 28
                           29 30 32 33 34 35 36 38 39 40 41
 22 23
         24 25
 42 43 44 45
                46 47 48 49 50 51 52 53 54 55 56 57 58 59
 60 61
                   65 66 70 71 72 73 74 75 76 77 78 79 80
         62 63 64
         83 84 85 87 88 89 90 91 92 93 94 95 98 99 100 101
 81 82
102 103 104 105 106 107 109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 127 128 129 130 131 132 133 134 135 136 137 138 139
140 141 142 143 144 145 146 147 149 150 151 152 153 156 157 158 159 160
161 162 164 165 166 167 168 169 170 171 172 173 174 175 176 177 179 180
181 182 184 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 207 208 209 210 211 212 213 214 215 216 217 218 219
220 221 222 223 224 225 226 227 228 231 232 233 234 235 236 237 238 239
240 241 242 243 244 245 246 247 248 249 250 251 252 254 255 256 257 258
259 260 261 262 263 264 265 266 267 268 269 270 271 272 274 275 276 277
278 279 280 281 282 283 284 285 286 287 290 292 293 294 296 297 298 299
300 301 302]
 Test: index=[ 10 15 16 18 31 37 67 68 69 86 96 97 108 126 148 154
155 163
178 183 185 206 229 230 253 273 288 289 291 295]
Fold 4:
 Train: index=[ 0 1 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18
 19 20 21 22 23 24 25 26 27 28 30 31 32 33 34 35 36 37
 39 40 41 42 43 44 45 46 47
                                 48 49 50 51 52 53 54 56 57
 58 59
         60 61 62 63 64
                           65 66 67 68
                                         69 70 71 72 73 75 76
 77 78 79 80
                81 82 83 84 85 86 87 88 89 90 91 92 93 94
 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 113
114 116 118 119 121 122 123 124 125 126 128 130 131 132 133 134 135 136
137 138 139 141 142 143 144 145 146 148 149 150 151 152 153 154 155 156
157 158 159 160 161 162 163 164 166 167 168 169 171 174 175 176 177 178
179 183 184 185 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 212 213 214 216 217 218 219 220 221
222 223 224 225 226 227 228 229 230 231 232 233 235 236 237 238 240 241
242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259
260 261 263 264 265 266 267 268 269 270 271 272 273 275 276 277 278 279
281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 299
300 301 302]
 Test: index=[ 2 29 38 55 74 112 115 117 120 127 129 140 147 165 170 172
173 180
181 182 186 210 211 215 234 239 262 274 280 298]
Fold 5:
 Train: index=[ 0 1 2 3 4 5 6 7 8 9 10 11 13 14 15 16
17 18
 19 20 21 22 23 24 25 27 29
                                  30 31 32 33 34 36 37 38
                                                                39
 40 42 43 44 45 46 47 48 49 50 52 53 54 55 56 57 58 59
```

```
60 61 62 63 64 66 67 68 69 70 71 72 73 74 75 76 77 78
 79 80 81 82 84 86 87 88 90 91 92 93 94 96 97 98 99 100
101 102 103 104 105 106 108 109 110 111 112 113 114 115 116 117 118 119
120 121 122 123 124 125 126 127 128 129 130 132 134 135 137 138 139 140
141 143 144 145 146 147 148 149 150 151 152 153 154 155 156 158 160 161
162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179
180 181 182 183 184 185 186 187 188 189 190 191 192 193 196 197 198 199
200 201 202 204 205 206 207 209 210 211 212 214 215 216 217 219 220 223
224 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243
244 245 246 247 249 250 251 252 253 254 255 256 257 258 259 260 261 262
263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280
281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 297 298 299
300 301 302]
 Test: index=[ 12 26 28 35 41 51 65 83 85 89 95 107 131 133 136 142
157 159
194 195 203 208 213 218 221 222 225 226 248 296]
Fold 6:
 Train: index=[ 1 2 3 5 6 7 8 9 10 12 13 14 15 16 17 18
19 20
 21 22 23 24 25 26 28 29 30 31 33 34 35 37 38 39 40 41
 42 43 44 45 46 47 48 49 50
                                  51 52 53 54 55 56 57
 60 62 63 64 65 66 67 68 69
                                  70 71 72 73 74 75
                                                        76 77
 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96
 97 99 101 102 104 105 106 107 108 109 110 111 112 113 114 115 116 117
118 119 120 121 123 124 125 126 127 128 129 130 131 132 133 134 135 136
137 139 140 142 143 144 145 146 147 148 149 151 152 153 154 155 156 157
158 159 160 161 163 164 165 166 167 168 169 170 172 173 174 175 176 177
178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195
196 197 198 199 201 202 203 204 205 206 207 208 210 211 212 213 214 215
216 217 218 219 220 221 222 223 225 226 227 228 229 230 231 232 234 235
236 239 240 241 242 243 244 245 246 248 249 250 251 252 253 254 255 256
257 258 260 262 263 264 266 267 268 269 270 272 273 274 276 278 279 280
281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298
300 301 302]
 Test: index=[ 0 4 11 27 32 36 61 98 100 103 122 138 141 150 162 171
200 209
224 233 237 238 247 259 261 265 271 275 277 299]
Fold 7:
 Train: index=[ 0 1 2 3 4 5 6 7 9 10 11 12 13 15 16 17
18 19
 20 21 22 24 25 26 27
                           28 29
                                  30
                                      31
                                         32 33 34 35 36 37
                                                                38
 41 42 43 45 46
                   48
                       49
                           50 51
                                  52
                                      53
                                          54
                                             55 56 57
                                                        58 59
 61 63 65 66 67 68 69 71 72 73 74 75 76 77 78 79 80
 83 84 85 86 87 88 89 90 91 92 93 95 96 97 98 99 100 101
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102 103 104 105 106 107 108 109 111 112 113 114 115 116 117 118 119 120
121 122 124 125 126 127 129 130 131 132 133 134 136 137 138 139 140 141
142 143 144 145 146 147 148 149 150 151 152 154 155 157 158 159 160 161
162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179
180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197
198 200 201 202 203 204 205 206 208 209 210 211 213 214 215 217 218 219
220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237
238 239 241 242 243 244 246 247 248 249 250 251 252 253 254 255 256 257
258 259 261 262 264 265 266 268 269 270 271 272 273 274 275 276 277 279
280 281 282 283 284 285 286 287 288 289 290 291 292 295 296 297 298 299
300 301 302]
 Test: index=[ 8 14 23 39 40 44 47 62 64 70 81 94 110 123 128 135
153 156
199 207 212 216 240 245 260 263 267 278 293 294]
Fold 8:
 Train: index=[ 0 2 4 5 6 7 8 9 10 11 12 14 15 16 17 18
19 20
 21 22 23 24 25 26 27 28 29 30 31 32 33 35 36 37 38 39
 40 41 42 44 45 46
                      47
                          48 50
                                 51 54 55 56 57 58 59 60 61
 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
 81 82 83 84 85 86 87 89 90 92 93 94 95 96 97 98 99 100
101 102 103 104 106 107 108 109 110 111 112 113 114 115 116 117 118 119
120 121 122 123 124 125 126 127 128 129 130 131 132 133 135 136 137 138
139 140 141 142 143 144 146 147 148 149 150 151 152 153 154 155 156 157
158 159 160 162 163 164 165 167 168 169 170 171 172 173 174 175 176 177
178 179 180 181 182 183 184 185 186 187 188 189 191 192 193 194 195 196
197 198 199 200 202 203 204 206 207 208 209 210 211 212 213 214 215 216
218 219 221 222 223 224 225 226 228 229 230 231 232 233 234 235 236 237
238 239 240 242 244 245 246 247 248 249 250 251 252 253 254 255 257 258
259 260 261 262 263 265 267 268 269 270 271 272 273 274 275 276 277 278
279 280 281 282 283 284 285 287 288 289 291 292 293 294 295 296 298 299
300 301 302]
 Test: index=[ 1 3 13 34 43 49 52 53 80 88 91 105 134 145 161 166
190 201
205 217 220 227 241 243 256 264 266 286 290 297]
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Fold 9:
 Train: index=[ 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17
 18 19 22 23 24 25 26
                          27 28 29 30 31 32 33 34 35 36
                                                               37
                                        51 52 53 55 56 57 59
 38 39 40 41 42 43 44
                          45 46 47
                                     49
 60 61 62 63 64 65 66
                          67
                             68
                                     70 72 73 74 75 76 77
                                  69
 79 80 81 82 83 84 85 86 88 89 90 91 92 93 94 95 96 97
 98 100 101 103 104 105 107 108 109 110 111 112 113 114 115 116 117 118
119 120 122 123 124 125 126 127 128 129 131 132 133 134 135 136 137 138
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139 140 141 142 143 144 145 146 147 148 150 152 153 154 155 156 157 158
 159 161 162 163 164 165 166 167 168 170 171 172 173 175 176 177 178 179
 180 181 182 183 184 185 186 190 192 193 194 195 196 197 198 199 200 201
202 203 204 205 206 207 208 209 210 211 212 213 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230 231 232 233 234 236 237 238 239
 240 241 242 243 244 245 246 247 248 249 250 251 253 254 255 256 258 259
260 261 262 263 264 265 266 267 268 269 271 272 273 274 275 277 278 279
280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297
298 299 300]
 Test: index=[ 20  21  48  50  54  58  71  87  99  102  106  121  130  149  151  160
169 174
187 188 189 191 214 235 252 257 270 276 301 302]
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