dataframe= pd.read\_csv("F:\\vivek DS\\forestfires.csv")

print("Head:", dataframe.head())

Head: month day FFMC DMC ... monthnov monthoct monthsep size\_category

0 3 5 86.2 26.2 ... 0 0 0 small

1 10 2 90.6 35.4 ... 0 1 0 small

2 10 6 90.6 43.7 ... 0 1 0 small

3 3 5 91.7 33.3 ... 0 0 0 small

4 3 7 89.3 51.3 ... 0 0 0 small

[5 rows x 31 columns]

print("Statistical Description:", dataframe.describe())

Statistical Description: month day FFMC ... monthnov monthoct monthsep

count 517.000000 517.000000 517.000000 ... 517.000000 517.000000 517.000000

mean 7.475822 4.259188 90.644681 ... 0.001934 0.029014 0.332689

std 2.275990 2.072929 5.520111 ... 0.043980 0.168007 0.471632

min 1.000000 1.000000 18.700000 ... 0.000000 0.000000 0.000000

25% 7.000000 2.000000 90.200000 ... 0.000000 0.000000 0.000000

50% 8.000000 5.000000 91.600000 ... 0.000000 0.000000 0.000000

75% 9.000000 6.000000 92.900000 ... 0.000000 0.000000 1.000000

max 12.000000 7.000000 96.200000 ... 1.000000 1.000000 1.000000

[8 rows x 30 columns]

print("Shape:", dataframe.shape)

Shape: (517, 31)

print("Data Types:", dataframe.dtypes)

Data Types: month int64

day int64

FFMC float64

DMC float64

DC float64

ISI float64

temp float64

RH int64

wind float64

rain float64

area float64

dayfri int64

daymon int64

daysat int64

daysun int64

daythu int64

daytue int64

daywed int64

monthapr int64

monthaug int64

monthdec int64

monthfeb int64

monthjan int64

monthjul int64

monthjun int64

monthmar int64

monthmay int64

monthnov int64

monthoct int64

monthsep int64

size\_category object

dtype: object

print("Correlation:", dataframe.corr(method='pearson'))

Correlation: month day FFMC ... monthnov monthoct monthsep

month 1.000000 -0.050837 0.291477 ... 0.068231 0.191895 0.473304

day -0.050837 1.000000 -0.041068 ... -0.048025 -0.032764 -0.022955

FFMC 0.291477 -0.041068 1.000000 ... -0.088964 -0.005998 0.076609

DMC 0.466645 0.062870 0.382619 ... -0.074218 -0.187632 0.110907

DC 0.868698 0.000105 0.330512 ... -0.078380 0.093279 0.531857

ISI 0.186597 0.032909 0.531805 ... -0.076559 -0.071154 -0.068877

temp 0.368842 0.052190 0.431532 ... -0.053798 -0.053513 0.088006

RH -0.095280 0.092151 -0.300995 ... -0.035885 -0.072334 -0.062596

wind -0.086368 0.032478 -0.028485 ... 0.011864 -0.053850 -0.181476

rain 0.013438 -0.048340 0.056702 ... -0.003225 -0.012665 -0.051733

area 0.056496 0.023226 0.040122 ... -0.008893

-0.016878 0.056573

dayfri -0.028562 0.158676 0.019306 ... -0.019527 -0.045585 0.107671

daymon -0.002941 -0.643220 -0.059396 ... -0.017992 0.060975 0.039632

daysat -0.057580 0.370240 -0.019637 ... -0.019390 0.017584 -0.032783

daysun -0.009232 0.627944 -0.089517 ... -0.020887 0.007252 -0.048817

daythu 0.028940 -0.045775 0.071730 ... -0.016101 -0.063223 0.008984

daytue 0.053072 -0.410043 0.011225 ... 0.117121 0.005008 -0.028570

daywed 0.031445 -0.207650 0.093908 ... -0.015034 0.016325 -0.053222

monthapr -0.203468 0.040473 -0.117199 ... -0.005860 -0.023008 -0.093982

monthaug 0.171362 0.049373 0.228103 ... -0.032724 -0.128493 -0.524858

monthdec 0.264837 -0.095214 -0.137044 ... -0.005860 -0.023008 -0.093982

monthfeb -0.483099 0.028170 -0.281535 ... -0.008831 -0.034676 -0.141642

monthjan -0.177483 0.067430 -0.454771 ... -0.002743 -0.010772 -0.044001

monthjul -0.053753 -0.005016 0.031833 ... -0.011308 -0.044402 -0.181367

monthjun -0.119681 0.013585 -0.040634 ... -0.008117 -0.031874 -0.130195

monthmar -0.672248 -0.036634 -0.074327 ... -0.015034 -0.059034 -0.241135

monthmay -0.067855 0.037338 -0.037230 ... -0.002743 -0.010772 -0.044001

monthnov 0.068231 -0.048025 -0.088964 ... 1.000000 -0.007610 -0.031083

monthoct 0.191895 -0.032764 -0.005998 ... -0.007610 1.000000 -0.122053

monthsep 0.473304 -0.022955 0.076609 ... -0.031083 -0.122053 1.000000

[30 rows x 30 columns]

print("Number of Features: ", fit.n\_features\_)

Number of Features: 3

print("Selected Features: ", fit.support\_)

Selected Features: [False True False False False False False False False False True True]

print("Feature Ranking: ", fit.ranking\_)

Feature Ranking: [10 1 8 9 7 6 5 4 3 2 1 1]

plt.hist((dataframe.area))

Out[50]:

(array([508., 6., 1., 0., 0., 0., 1., 0., 0., 1.]),

array([ 0. , 109.084, 218.168, 327.252, 436.336, 545.42 ,

654.504, 763.588, 872.672, 981.756, 1090.84 ]),

<BarContainer object of 10 artists>)



Most of the dataset's samples fall between 0 and 200 of 'Area' output class, with majority being less than 100

dataframe.hist()

Out[51]:

array([[<AxesSubplot:title={'center':'month'}>,

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<AxesSubplot:title={'center':'monthoct'}>,

<AxesSubplot:title={'center':'monthsep'}>]], dtype=object)



'Temp' has a near Guassian Distribution. There are a mixture of positive skews and negative skews among the other attributes.

array([[<matplotlib.axes.\_subplots.AxesSubplot object at 0x7fdd52064a58>,

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<matplotlib.axes.\_subplots.AxesSubplot object at 0x7fdd4aac2fd0>]], dtype=object)



X AxesSubplot(0.125,0.71587;0.168478x0.16413)

Y AxesSubplot(0.327174,0.71587;0.168478x0.16413)

month AxesSubplot(0.529348,0.71587;0.168478x0.16413)

day AxesSubplot(0.731522,0.71587;0.168478x0.16413)

FFMC AxesSubplot(0.125,0.518913;0.168478x0.16413)

DMC AxesSubplot(0.327174,0.518913;0.168478x0.16413)

DC AxesSubplot(0.529348,0.518913;0.168478x0.16413)

ISI AxesSubplot(0.731522,0.518913;0.168478x0.16413)

temp AxesSubplot(0.125,0.321957;0.168478x0.16413)

RH AxesSubplot(0.327174,0.321957;0.168478x0.16413)

wind AxesSubplot(0.529348,0.321957;0.168478x0.16413)

rain AxesSubplot(0.731522,0.321957;0.168478x0.16413)

area AxesSubplot(0.125,0.125;0.168478x0.16413)

dtype: object



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<AxesSubplot:xlabel='monthoct', ylabel='monthsep'>,

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[64]: ax.set\_xticks(ticks)

Out[64]:

[<matplotlib.axis.XTick at 0xa8135d5940>,

<matplotlib.axis.XTick at 0xa8135d5310>,

<matplotlib.axis.XTick at 0xa813557ac0>,

<matplotlib.axis.XTick at 0xa80e40dc40>,

<matplotlib.axis.XTick at 0xa8139e18b0>,

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<matplotlib.axis.XTick at 0xa8139fff70>,

<matplotlib.axis.XTick at 0xa8135577f0>,

<matplotlib.axis.XTick at 0xa80e382790>,

<matplotlib.axis.XTick at 0xa8139f2d00>,

<matplotlib.axis.XTick at 0xa8139f2d60>,

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<matplotlib.axis.XTick at 0xa80fde6fa0>,

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<matplotlib.axis.XTick at 0xa80fe56610>,

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<matplotlib.axis.XTick at 0xa81353cca0>,

<matplotlib.axis.XTick at 0xa8139c41c0>,

<matplotlib.axis.XTick at 0xa8139b4a90>,

<matplotlib.axis.XTick at 0xa8139b41f0>,

<matplotlib.axis.XTick at 0xa80fa1bfa0>,

<matplotlib.axis.XTick at 0xa8139978e0>,

<matplotlib.axis.XTick at 0xa813997040>,

<matplotlib.axis.XTick at 0xa813997910>,

<matplotlib.axis.XTick at 0xa8139b4a30>,

<matplotlib.axis.XTick at 0xa80e382430>,

<matplotlib.axis.XTick at 0xa80e8b3490>]

ax.set\_yticks(ticks)

Out[65]:

[<matplotlib.axis.YTick at 0xa80d83df10>,

<matplotlib.axis.YTick at 0xa8135ca4c0>,

<matplotlib.axis.YTick at 0xa80d7a2d00>,

<matplotlib.axis.YTick at 0xa81368ed00>,

<matplotlib.axis.YTick at 0xa80dab44f0>,

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<matplotlib.axis.YTick at 0xa80e7cea60>,

<matplotlib.axis.YTick at 0xa80e895f70>,

<matplotlib.axis.YTick at 0xa80f9af850>,

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<matplotlib.axis.YTick at 0xa8135f2040>,

<matplotlib.axis.YTick at 0xa80e5b2940>,

<matplotlib.axis.YTick at 0xa80d7d22b0>,

<matplotlib.axis.YTick at 0xa809ebf7f0>,

<matplotlib.axis.YTick at 0xa809c2d310>,

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<matplotlib.axis.YTick at 0xa8764c89a0>,

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<matplotlib.axis.YTick at 0xa809f23040>,

<matplotlib.axis.YTick at 0xa80f8ddf70>,

<matplotlib.axis.YTick at 0xa80d84a9d0>,

<matplotlib.axis.YTick at 0xa813910ee0>]

ax.set\_xticklabels(dataframe.columns)

Out[66]:

[Text(0, 1, 'month'),

Text(1, 1, 'day'),

Text(2, 1, 'FFMC'),

Text(3, 1, 'DMC'),

Text(4, 1, 'DC'),

Text(5, 1, 'ISI'),

Text(6, 1, 'temp'),

Text(7, 1, 'RH'),

Text(8, 1, 'wind'),

Text(9, 1, 'rain'),

Text(10, 1, 'area'),

Text(11, 1, 'dayfri'),

Text(12, 1, 'daymon'),

Text(13, 1, 'daysat'),

Text(14, 1, 'daysun'),

Text(15, 1, 'daythu'),

Text(16, 1, 'daytue'),

Text(17, 1, 'daywed'),

Text(18, 1, 'monthapr'),

Text(19, 1, 'monthaug'),

Text(20, 1, 'monthdec'),

Text(21, 1, 'monthfeb'),

Text(22, 1, 'monthjan'),

Text(23, 1, 'monthjul'),

Text(24, 1, 'monthjun'),

Text(25, 1, 'monthmar'),

Text(26, 1, 'monthmay'),

Text(27, 1, 'monthnov'),

Text(28, 1, 'monthoct'),

Text(29, 1, 'monthsep'),

Text(30, 1, 'size\_category')]

ax.set\_yticklabels(dataframe.columns)

Out[67]:

[Text(0, 0, 'month'),

Text(0, 1, 'day'),

Text(0, 2, 'FFMC'),

Text(0, 3, 'DMC'),

Text(0, 4, 'DC'),

Text(0, 5, 'ISI'),

Text(0, 6, 'temp'),

Text(0, 7, 'RH'),

Text(0, 8, 'wind'),

Text(0, 9, 'rain'),

Text(0, 10, 'area'),

Text(0, 11, 'dayfri'),

Text(0, 12, 'daymon'),

Text(0, 13, 'daysat'),

Text(0, 14, 'daysun'),

Text(0, 15, 'daythu'),

Text(0, 16, 'daytue'),

Text(0, 17, 'daywed'),

Text(0, 18, 'monthapr'),

Text(0, 19, 'monthaug'),

Text(0, 20, 'monthdec'),

Text(0, 21, 'monthfeb'),

Text(0, 22, 'monthjan'),

Text(0, 23, 'monthjul'),

Text(0, 24, 'monthjun'),

Text(0, 25, 'monthmar'),

Text(0, 26, 'monthmay'),

Text(0, 27, 'monthnov'),

Text(0, 28, 'monthoct'),

Text(0, 29, 'monthsep'),

Text(0, 30, 'size\_category')]



'cement' has the highest positive corelation as expected'

# print("%s: %.2f%%" % (model.metrics\_names[1], scores[1]\*100))

results.append(mae)

names.append(name)

msg = "%s: %f (%f)" % (name, score, mae)

print(msg)

SVM: 0.007164 (0.213090)

LiR: 0.023975 (19.309939)

Ridge: 0.023975 (19.307816)

Lasso: 0.023297 (19.054901)

ElasticNet: 0.023187 (19.055855)

Bag\_Re: 0.847118 (8.047959)

RandomForest: 0.786759 (9.067032)

ExtraTreesRegressor: 0.999897 (0.096441)

KNN: 0.273047 (15.507250)

CART: 0.999897 (0.096441)

SVM: 0.005783 (11.987317)

ExtraTreesRegressor' and 'DecisionTreeRegressor' are the best estimators/models for this dataset, followed by 'BaggingRegressor', ey can be further explored and their hyperparameters tuned

Results: -0.00 (0.01) MSE