```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
df = pd.read csv('forestfires.csv');
df.head()
  X Y month day FFMC
                                  DC
                         DMC
                                      ISI
                                           temp
                                                 RH
                                                    wind
                                                           rain
                                                                area
  7
     5
              fri
                   86.2
                         26.2
                                94.3
                                      5.1
                                            8.2
                                                 51
                                                      6.7
                                                            0.0
                                                                  0.0
         mar
  7
                         35.4
                                           18.0
                                                            0.0
1
     4
              tue 90.6
                               669.1
                                      6.7
                                                 33
                                                      0.9
                                                                  0.0
         oct
2
  7
     4
         oct
              sat 90.6
                         43.7
                               686.9
                                     6.7
                                           14.6 33
                                                      1.3
                                                            0.0
                                                                  0.0
3
  8
     6
              fri 91.7
                         33.3
                               77.5
                                      9.0
                                            8.3
                                                 97
                                                      4.0
                                                            0.2
                                                                  0.0
         mar
4 8
              sun 89.3 51.3 102.2 9.6
                                          11.4 99
     6
         mar
                                                      1.8
                                                            0.0
                                                                  0.0
def classify area(area):
   if area == 0.0:
        return 'NotAffected'
   elif area <= 10.0:
       return 'PartiallyAffected'
   else:
        return 'MostlyAffected'
df['class'] = df['area'].apply(classify area)
# Create subsets
not affected = df[df['class'] == 'NotAffected']
partially_affected = df[df['class'] == 'PartiallyAffected']
mostly affected = df[df['class'] == 'MostlyAffected']
not affected.head()
  X Y month day FFMC
                          DMC
                                  DC
                                     ISI temp
                                                RH wind
                                                           rain
                                                                area
         mar fri 86.2 26.2
  7 5
                              94.3 5.1
                                            8.2
                                                 51
                                                      6.7
                                                            0.0
                                                                  0.0
  7 4
         oct tue 90.6 35.4 669.1 6.7 18.0
                                                33
                                                      0.9
                                                            0.0
                                                                 0.0
1
  7 4
         oct sat 90.6 43.7 686.9 6.7 14.6 33
                                                            0.0
                                                                 0.0
                                                      1.3
              fri 91.7
                                                                  0.0
                         33.3
                                77.5 9.0
                                            8.3
                                                 97
                                                      4.0
                                                            0.2
     6
         mar
4 8 6
             sun 89.3 51.3 102.2 9.6 11.4
                                                 99
                                                      1.8
                                                            0.0
                                                                  0.0
         mar
         class
  NotAffected
  NotAffected
1
2 NotAffected
```

```
3 NotAffected
4 NotAffected
partially affected.head()
                            DMC
    X Y month day FFMC
                                   DC
                                        ISI
                                             temp
                                                  RH wind
                                                            rain
area \
           jul tue 85.8
                                        3.9
                                             18.0
                                                  42
                                                             0.0
138 9 9
                           48.3 313.4
                                                       2.7
0.36
           sep tue 91.0 129.5 692.6
                                        7.0
                                                  38
                                                             0.0
139 1 4
                                             21.7
                                                       2.2
0.43
                                        7.0
               mon 90.9 126.5
                                686.5
                                                  39
                                                             0.0
140 2 5
           sep
                                             21.9
                                                       1.8
0.47
141 1 2
               wed 95.5
                           99.9 513.3 13.2
                                             23.3
                                                  31
                                                       4.5
                                                             0.0
           aug
0.55
                                                             0.0
142 8 6
           aug fri 90.1 108.0 529.8 12.5
                                             21.2 51
                                                       8.9
0.61
               class
    PartiallyAffected
138
    PartiallyAffected
139
140 PartiallyAffected
    PartiallvAffected
141
142 PartiallyAffected
mostly affected.head()
    X Y month day FFMC
                            DMC
                                        ISI temp
                               DC
                                                  RH wind
                                                            rain
area \
                                                  22
194 2 2
           aug
               tue 94.8 108.3 647.1
                                       17.0
                                             24.6
                                                       4.5
                                                             0.0
10.01
195 2 5
           aug
              fri 93.9 135.7 586.7
                                       15.1 23.5
                                                  36
                                                       5.4
                                                             0.0
10.02
           apr thu 81.5
196 6 5
                            9.1
                                 55.2
                                        2.7
                                              5.8
                                                  54
                                                       5.8
                                                             0.0
10.93
           sep thu 92.9 137.0 706.4
                                        9.2
                                                             0.0
197 4
       5
                                             21.5
                                                  15
                                                       0.9
11.06
198 3 4
           sep tue 91.0 129.5 692.6 7.0
                                             13.9 59
                                                       6.3
                                                             0.0
11.24
             class
194
    MostlyAffected
    MostlyAffected
195
196
    MostlyAffected
    MostlyAffected
197
    MostlyAffected
198
merged df = pd.concat([not affected, partially affected],
ignore index=True)
merged df.head()
```

```
X Y month day FFMC
                         DMC
                                 DC
                                    ISI
                                         temp
                                               RH
                                                   wind
                                                         rain
                                                              area
  7 5
         mar
              fri 86.2
                        26.2
                               94.3
                                    5.1
                                          8.2
                                               51
                                                    6.7
                                                          0.0
                                                               0.0
  7 4
              tue 90.6
                        35.4
                              669.1
                                    6.7 18.0
                                               33
                                                    0.9
                                                          0.0
                                                               0.0
1
         oct
  7 4
              sat 90.6
                        43.7
                              686.9 6.7
                                         14.6
                                               33
                                                          0.0
                                                               0.0
         oct
                                                    1.3
              fri 91.7
                        33.3
                               77.5
                                    9.0
                                          8.3
                                               97
                                                    4.0
                                                          0.2
                                                               0.0
  8
         mar
4 8 6
              sun 89.3 51.3
                              102.2 9.6 11.4
                                               99
                                                          0.0
                                                               0.0
         mar
                                                    1.8
        class
  NotAffected
  NotAffected
1
2
  NotAffected
3
  NotAffected
4 NotAffected
sorted df = df.sort values(by=['temp', 'wind', 'area'],
ascending=[True, True, True])
sorted df.head()
    X Y month day FFMC
                           DMC
                                   DC ISI
                                           temp
                                                 RH
                                                     wind
                                                           rain
area
           dec fri 84.7 26.7
                                352.6
                                                 59
280 4 6
                                      4.1
                                            2.2
                                                      4.9
                                                           0.0
9.27
282 6 3
           feb
               sun 84.9 27.5
                               353.5
                                      3.4
                                            4.2
                                                 51
                                                      4.0
                                                           0.0
0.00
465
    2
       2
           feb
              sat 79.5
                           3.6
                                15.3 1.8
                                            4.6
                                                 59
                                                      0.9
                                                           0.0
6.84
463 6
                   75.1
                                 16.2 1.9
                                            4.6
                                                 82
                                                      6.3
                                                            0.0
       5
           feb
                tue
                           4.4
5.39
                mon 85.4 25.4 349.7 2.6
                                            4.6 21
279 4
       4
           dec
                                                      8.5
                                                           0.0
9.77
                class
280
    PartiallyAffected
282
          NotAffected
465
    PartiallyAffected
    PartiallyAffected
463
279
    PartiallyAffected
transposed df = df.T
transposed df.head()
             1 2 3 4 5 6 7 8
                                                          9 ...
507 \
```

```
Χ
          7
                 7
                       7
                              8
                                    8
                                           8
                                                 8
                                                        8
                                                              8
                                                                     7 ...
2
Υ
           5
                 4
                       4
                              6
                                    6
                                           6
                                                 6
                                                        6
                                                              6
                                                                     5
4
month
        mar
               oct
                     oct
                            mar
                                  mar
                                         aug
                                               aug
                                                      aug
                                                            sep
                                                                   sep
aug
                            fri
day
        fri
               tue
                     sat
                                   sun
                                         sun
                                               mon
                                                      mon
                                                            tue
                                                                   sat
fri
              90.6
FFMC
       86.2
                    90.6
                           91.7 89.3
                                        92.3
                                              92.3
                                                           91.0
                                                     91.5
                                                                  92.5
91.0
        508
               509
                     510
                            511
                                   512
                                         513
                                               514
                                                      515
                                                            516
Χ
           1
                 5
                        6
                              8
                                    4
                                           2
                                                 7
                                                        1
                                                               6
Υ
                                     3
           2
                 4
                        5
                              6
                                           4
                                                 4
                                                        4
                                                               3
month
        aug
               aug
                     aug
                            aug
                                  aug
                                         aug
                                               aug
                                                      aug
                                                            nov
        fri
               fri
                     fri
day
                            sun
                                  sun
                                         sun
                                               sun
                                                      sat
                                                            tue
FFMC
       91.0
              91.0
                    91.0
                           81.6
                                 81.6
                                        81.6
                                              81.6
                                                     94.4
                                                           79.5
[5 rows x 517 columns]
melted_df = pd.melt(df, id_vars=['X', 'Y', 'month', 'day'],
var name='Variable', value name='Value')
melted df.head()
      Y month day Variable Value
   Χ
   7
      5
                fri
                               86.2
0
          mar
                         FFMC
   7
1
      4
                tue
                         FFMC
                               90.6
           oct
   7
      4
           oct
                sat
                         FFMC
                               90.6
3
  8
      6
          mar
                fri
                         FFMC
                               91.7
   8
           mar
                sun
                         FFMC
                               89.3
# First ensure melt has a 'class' column if needed for pivot
wide df = melted df.pivot table(index=['X', 'Y', 'month', 'day'],
                                   columns='Variable',
                                   values='Value',
                                   aggfunc='first').reset index()
wide df.head()
Variable X Y month day
                                DC
                                       DMC
                                            FFMC
                                                    ISI
                                                         RH area
class \
              2
                       fri
                             529.8
                                    108.0
                                                   12.5
                                                         66
                                                             0.0
                  aug
                                            90.1
NotAffected
              2
                             715.1 231.1
                                            93.7
                                                    8.4
                                                         32
                                                             0.0
1
                  aug
                        sat
NotAffected
                             601.4 142.4
                                                         39
                                                             0.0
              2
                  aug
                        sun
                                            91.4
                                                   10.6
NotAffected
              2
                  aug
                       thu
                             661.3
                                    114.3
                                            91.7
                                                    6.3
                                                         45
                                                             0.0
NotAffected
           1
              2
                  aug
                       tue
                             561.6
                                   121.2
                                            91.0
                                                    7.0
                                                         19
                                                             0.0
```

NotAffected

Variable	rain	temp	wind
0	0.0	14.7	2.7
1	0.0	25.9	3.1
2	0.0	19.5	6.3
3	0.0	20.2	3.6
4	0.0	21.6	6.7