```
In [1]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
%matploblib inline
```

EDA

Val

```
In [13]: | s1_val=np.load('/data/PublicData/DF2020/val/s1_val.npy')
             plt.subplots(figsize=(12,4))
             for i in range(2):
                   plt.subplot(1,2,i+1)
                  plt.hist(s1_val[:,i,:,:].reshape(-1),bins=30)
                   plt.title('band'+str(i+1))
             plt.show()
                                     band1
                                                                                            band2
                                                                    1.6
              16
              1.4
                                                                    1.2
              1.2
                                                                    1.0
              1.0
                                                                    0.8
              0.8
                                                                    0.6
              0.6
                                                                    0.4
              0.4
                                                                    0.2
              0.2
              0.0
                                                                    0.0
                      -40
                           -30
                                -20
                                     -10
                                                 10
                                                                        -50
                                                                              -40
                                                                                    -30
                                                                                          -20
                                                                                                -10
                                                                                                            10
In [21]: | s1_val=np.load('/data/PublicData/DF2020/val/s2_val.npy')
             plt.subplots(figsize=(20,10))
             for i in range(3):
                  for j in range(5):
                        if 5*i+j<13:
                              plt.subplot(3,5,5*i+j+1)
                              plt.hist(s1_val[:,5*i+j,:,:].reshape(-1),bins=30)
                              plt.title('band'+str(5*i+j+1))
             plt.show()
                                                                                      band4
                                                                                                           band5
                                                                                                  2.5
                                                                                                  2.0
                                                                                                  1.5
             1.5
             1.0
                                                                                                  1.0
             0.5
             0.0
                      3000 4000 5000
band6
                                        5000 10000 15000
band7
                                                              5000 10000
band8
                                                                       15000
                                                                                   5000 10000 15000 200
band9
                                                                                                         5000 10000
band10
                                  1.0
             1.0
                                                        1.0
                                  0.6
                                  0.4
                                                        0.5
                                  0.2
             0.0
                      10000 15000 20000
band11
                                           10000 15000 20000
band12
                                                                10000 15000 20000
band13
                                                                                     10000 15000 20000
                                  1.5
                                                        1.5
                                  1.0
                                                       1.0
             0.5
                         60
                            80
                                                  15000
```

```
In [22]: del s1 val
```

Spring

```
In [19]: s1 spring=np.load('/data/PublicData/DF2020/trn/s1 trn spring.npy')
In [24]: print(s1 spring.shape)
         (40883, 2, 256, 256)
In [25]: plt.subplots(figsize=(12,4))
         for i in range(2):
              plt.subplot(1,2,i+1)
              plt.hist(s1_spring[:,i,:,:].reshape(-1),bins=30)
              plt.title('band'+str(i+1))
         plt.show()
                           band1
                                                                    band2
                                                   5
                                                   3
          2
                  -40
                       -30
                             -20
                                   -10
                                                         -50
                                                              -40
                                                                         -20
                                                                               -10
In [26]: del s1 spring
In [27]: s2 spring=np.load('/data/PublicData/DF2020/trn/s2 trn spring.npy')
In [28]: s2 spring.shape
Out[28]: (40883, 13, 256, 256)
```

```
In [29]:
                plt.subplots(figsize=(20,10))
                 for i in range(3):
                       for j in range(5):
                               if 5*i+j<13:
                                     plt.subplot(3,5,5*i+j+1)
                                     plt.hist(s2_spring[:,5*i+j,:,:].reshape(-1),bins=30)
                                     plt.title('band'+str(5*i+j+1))
                plt.show()
                                                                                                                           1.5
                  1.5
                                                                                                 1.0
                                            1.5
                                                                                                 0.8
                                                                                                                           1.0
                  1.0
                                                                                                 0.6
                                                                                                 0.4
                                                                                                                           0.5
                 0.5
                                                                      0.5
                                            0.5
                                                                                                 0.2
                 0.0
                                                       10000 15000 20000
band7
                           5000 10000
band6
                                                                              5000 10000 15000 20000
band8
                                                                                                        5000 10000 15000 20000
band9
                                                                                                                                  5000 10000 15000 20000
band10
                 1.50
                                                                                                                           1.50
                 1.25
                                            1.0
                                                                                                                          1.25
                                                                                                 0.8
                 1.00
                                            0.8
                                                                                                                          1.00
                                                                                                 0.6
                                                                      0.6
                 0.75
                                                                                                                           0.75
                                                                                                 0.4
                 0.50
                                                                                                                           0.50
                                                                                                 0.2
                                                                                                                           0.25
                       5000 10000 15000 20000 25000
band11
                                                                            5000 10000 15000 20000 25000
band13
                                                     10000 20000
band12
                                                                                                                                   5000
                                                                                                                                        10000 15000
                  2.0
                                                                      0.8
                 1.5
                 1.0
                                                                      0.4
                 0.5
                                            0.2
                                                                      0.2
In [30]: del s2 spring
```

Summer

```
In [31]: s1 summer=np.load('/data/PublicData/DF2020/trn/s1 trn summer.npy')
In [32]: print(s1 summer.shape)
          (45753, 2, 256, 256)
In [33]: plt.subplots(figsize=(12,4))
          for i in range(2):
              plt.subplot(1,2,i+1)
               \verb|plt.hist(s1_summer[:,i,:,:].reshape(-1),bins=30)|\\
               plt.title('band'+str(i+1))
          plt.show()
                            band1
                                                                        band2
           5
           4
           3
                                                      1
                      -40
                                -20
                                      -io
                                                                        -30
                                                                              -<u>2</u>0
                                                                                    -io
In [34]: del s1 summer
```

```
In [35]: s2 summer=np.load('/data/PublicData/DF2020/trn/s2 trn summer.npy')
In [37]: print(s2 summer.shape)
             (45753, 13, 256, 256)
In [38]: plt.subplots(figsize=(20,10))
             for i in range(3):
                   for j in range(5):
                         if 5*i+j<13:
                              plt.subplot(3,5,5*i+j+1)
                              plt.hist(s2_summer[:,5*i+j,:,:].reshape(-1),bins=30)
                              plt.title('band'+str(5*i+j+1))
             plt.show()
                                             band2
                                                                                                             band5
                                                                              1.25
                                   2.0
                                                                                                   1.25
              2.0
                                                         1.5
                                                                              1.00
                                                                                                   1.00
              1.5
                                                                              0.75
                                                                                                   0.75
                                   1.0
              1.0
                                                                              0.50
                                                                                                   0.50
                                   0.5
              0.5
                                                                                                   0.25
              0.0
                                                                                                   0.00
                                                                                                         5000 10000 15000 20000 25000
band 10
                                         5000 10000 15000 20000
band7
                                                                  10000 15000 20000
band8
                                                                                    5000 10000 15000 20000 250
             1.50
                                                         1.0
             1.25
                                                                                                    2.0
                                   1.00
                                                                              0.8
                                                         0.8
             1.00
                                                                                                    1.5
                                   0.75
                                                                              0.6
             0.75
                                                         0.6
                                                                                                    1.0
                                                                              0.4
             0.50
                                                         0.4
                                                                                                    0.5
                                   0.25
                                                                              0.2
             0.00
                     10000 20000
band11
                                           10000 20000
band12
                                                              5000 10000 15000 20000 250
band13
              2.0
                                                         1.2
                                                         1.0
              1.5
                                   0.6
                                                         0.8
              1.0
                                                         0.6
                                                         0.4
In [45]: del s2 summer
             Fall 1
In [39]: s1 fall part1=np.load('/data/PublicData/DF2020/trn/s1 trn fall part1.npy')
In [41]: print(s1 fall part1.shape)
             (30501, 2, 256, 256)
```

```
In [42]:
            plt.subplots(figsize=(12,4))
             for i in range(2):
                  plt.subplot(1,2,i+1)
                  plt.hist(s1_fall_part1[:,i,:,:].reshape(-1),bins=30)
                  plt.title('band'+str(i+1))
             plt.show()
                                     band1
                                                                                           band2
                                                                    3.0
              3.5
                                                                    2.5
              3.0
              2.5
                                                                    2.0
              2.0
              1.5
                                                                    1.0
              1.0
                                                                    0.5
              0.5
              0.0
                                                                    0.0
                             -30
                    -40
                                     -20
                                              -10
                                                                            -40
                                                                                               -20
                                                                                                        -10
                                                                                      -30
In [46]: del s1 fall part1
In [47]: s2 fall part1=np.load('/data/PublicData/DF2020/trn/s2 trn fall part1.npy')
In [48]: print(s2 fall part1.shape)
             (30501, 13, 256, 256)
In [49]: plt.subplots(figsize=(20,10))
             for i in range(3):
                  for j in range(5):
    if 5*i+j<13:</pre>
                              plt.subplot(3,5,5*i+j+1)
                              plt.hist(s2_fall_part1[:,5*i+j,:,:].reshape(-1),bins=30)
                              plt.title('band'+str(5*i+j+1))
            plt.show()
                                                                                                           band5
                                                                             1.0
                                                        0.8
                                                                            0.8
                                                                                                  0.8
             1.00
                                  1.00
                                                        0.6
                                                                            0.6
             0.75
                                                                                                 0.6
                                  0.75
                                                        0.4
                                                                            0.4
                                                                                                  0.4
                                  0.50
                                                                            0.2
                                                                                                  0.2
             0.25
                                  0.25
             0.00
                                                                                    10000 20000
band9
                                                                                                         10000 20000
band10
                    5000 10000 15000 2000
band6
                                          10000 20000
band7
                                                               10000 20000
band8
                                   0.8
              1.0
                                                                                                 0.8
                                                                            0.6
                                                                                                  0.6
              0.6
                                                                            0.4
                                                                                                  0.4
              0.4
                                   0.2
                                                                            0.2
              0.2
                                                                                                 0.2
              0.0
                     10000 20000
band11
                                          10000 20000
band12
                                                               10000 20000
band13
              1.5
                                                        0.6
              1.0
In [50]: del s2 fall part1
```

Fall 2

```
In [51]: s1 fall part2=np.load('/data/PublicData/DF2020/trn/s1 trn fall part2.npy')
In [52]: print(s1 fall part2.shape)
            (31700, 2, 256, 256)
In [53]: plt.subplots(figsize=(12,4))
            for i in range(2):
                  plt.subplot(1,2,i+1)
                  plt.hist(s1_fall_part2[:,i,:,:].reshape(-1),bins=30)
                  plt.title('band'+str(i+1))
            plt.show()
                                   band1
                                                                                        band2
                                                                     1e8
             3.5
                                                                 2.5
             3.0
                                                                 2.0
             2.5
             2.0
                                                                 1.5
                                                                 1.0
             1.0
                                                                 0.5
             0.5
             0.0
                                                                 0.0
                  -50
                         -40
                                -30
                                       -20
                                               -10
                                                                           -40
                                                                                   -30
                                                                                            -20
                                                                                                     -io
In [54]: del s1 fall part2
In [55]: s2 fall part2=np.load('/data/PublicData/DF2020/trn/s2 trn fall part2.npy')
In [56]: print(s2 fall part2.shape)
            (31700, 13, 256, 256)
In [57]: plt.subplots(figsize=(20,10))
            for i in range(3):
                  for j in range(5):
                       if 5*i+j<13:
                            plt.subplot(3,5,5*i+j+1)
                            plt.hist(s2 fall part2[:,5*i+j,:,:].reshape(-1),bins=30)
                            plt.title('band'+str(5*i+j+1))
            plt.show()
                                                                                  hand4
                                                                                                       hand5
                                                                          1.0
                                  1.0
                                                                                              1.0
                                                                          0.8
             0.8
                                                     0.8
                                                                                              0.8
                                 0.8
                                                                          0.6
                                 0.6
                                                     0.6
             0.4
                                                                          0.4
                                                                                              0.4
                                 0.4
                                                     0.2
                                                                                              0.2
             0.0
                                 0.0
                                                                                              0.0
                  2500 5000 7500 10000
band6
                                        10000 20000
band7
                                                            10000 20000
band8
                                                                                 10000 20000
band9
                                                                                                     10000 20000
band10
             1.0
                                                     0.8
                                                                                              0.8
                                 0.8
                                                                                              0.6
                                                                          0.6
             0.6
                                                                                              0.4
                                                                          0.4
                                 0.2
                                                                                              0.2
                                                                          0.2
             0.2
             0.0
                                                                                              0.0
                                                            10000 20000
band13
                                                                                                   2500 5000 7500 10000 12500
                    10000 20000
band11
                                         10000 20000
band12
             1.50
             1.25
             1.00
                                                     0.4
             0.75
                                                     0.2
             0.25
             0.00
```

```
In [59]: del s2 fall part2
```

Winter

```
In [60]: s1 winter=np.load('/data/PublicData/DF2020/trn/s1 trn winter.npy')
In [61]: print(s1 winter.shape)
          (31825, 2, 256, 256)
In [62]: plt.subplots(figsize=(12,4))
          for i in range(2):
              plt.subplot(1,2,i+1)
              plt.hist(s1_winter[:,i,:,:].reshape(-1),bins=30)
              plt.title('band'+str(i+1))
          plt.show()
                            band1
                                                                       band2
          3.5
                                                    2.5
          3.0
                                                    2.0
          2.5
          2.0
                                                    1.5
          1.5
                                                    1.0
          1.0
                                                    0.5
          0.5
                                                     0.0
                                                                                 -10
             -50
                   -40
                         -30
                                -20
                                      -10
                                                                           -20
In [63]: del s1 winter
In [64]: s2 winter=np.load('/data/PublicData/DF2020/trn/s2 trn winter.npy')
In [65]: print(s2 winter.shape)
          (31825, 13, 256, 256)
```

```
In [66]:
                 plt.subplots(figsize=(20,10))
                 for i in range(3):
    for j in range(5):
        if 5*i+j<13:</pre>
                                       plt.subplot(3,5,5*i+j+1)
                                       plt.hist(s2_winter[:,5*i+j,:,:].reshape(-1),bins=30)
                                       plt.title('band'+str(5*i+j+1))
                 plt.show()
                 1.0
                                             1.25
                                                                                                                                 0.8
                                                                         0.8
                                                                                                     0.6
                 0.8
                                             1.00
                                                                         0.6
                 0.6
                                             0.75
                                                                                                     0.4
                                                                                                                                 0.4
                                                                         0.4
                                             0.50
                 0.4
                                                                                                     0.2
                                                                         0.2
                                                                                                                                 0.2
                 0.2
                                             0.25
                 0.0
                                             0.00
                                                       10000 20000
band7
                             5000 7500 10000
band6
                                                                                                                                           10000 20000
band10
                 1.0
                                                                                                     0.8
                 0.8
                                             0.6
                                                                         0.6
                                                                                                     0.6
                                                                                                                                 0.6
                                                                         0.4
                                                                                                                                 0.4
                                                                         0.2
                                             0.2
                                                                                                     0.2
                                                                                                                                 0.2
                 0.2
                 0.0
                           10000 20000
band11
                                                       10000 20000
band12
                                                                                   10000 20000
band13
                 1.5
                                             0.6
                                                                         0.6
                 1.0
                                             0.4
                                             0.2
                                                                         0.2
```