

KEY_Practice12_Pandas-Subsetting

August 20, 2019

1 Practice: Subsetting Pandas DataFrames

For this practice, let's use the iris dataset:

```
[4]: # mount Google Drive
from google.colab import drive
drive.mount('/content/gdrive')
path = '/content/gdrive/My Drive/SummerExperience-master/'
```

Drive already mounted at /content/gdrive; to attempt to forcibly remount, call drive.mount("/content/gdrive", force_remount=True).

```
[0]: # import pandas package
import pandas as pd
```

```
[0]: # this is where the file is located
filename = path + 'SampleData/iris.csv'
# load the iris dataset into a DataFrame
iris = pd.read_csv(filename)
```

Refamiliarize yourself with the dataset:

```
[7]: # take a look at the beginning

iris.head()
```

```
[7]:
```

| | sepal_length | sepal_width | petal_length | petal_width | species |
|---|--------------|-------------|--------------|-------------|---------|
| 0 | 5.1 | 3.5 | 1.4 | 0.2 | setosa |
| 1 | 4.9 | 3.0 | 1.4 | 0.2 | setosa |
| 2 | 4.7 | 3.2 | 1.3 | 0.2 | setosa |
| 3 | 4.6 | 3.1 | 1.5 | 0.2 | setosa |
| 4 | 5.0 | 3.6 | 1.4 | 0.2 | setosa |

Try subsetting on columns:

```
[8]: # subset the species column

iris['species']
```

```
[8]: 0      setosa
      1      setosa
      2      setosa
      3      setosa
      4      setosa
      5      setosa
      6      setosa
      7      setosa
      8      setosa
      9      setosa
     10      setosa
     11      setosa
     12      setosa
     13      setosa
     14      setosa
     15      setosa
     16      setosa
     17      setosa
     18      setosa
     19      setosa
     20      setosa
     21      setosa
     22      setosa
     23      setosa
     24      setosa
     25      setosa
     26      setosa
     27      setosa
     28      setosa
     29      setosa

     ...
    120  virginica
    121  virginica
    122  virginica
    123  virginica
    124  virginica
    125  virginica
    126  virginica
    127  virginica
    128  virginica
    129  virginica
    130  virginica
    131  virginica
    132  virginica
    133  virginica
    134  virginica
    135  virginica
```

```
136    virginica
137    virginica
138    virginica
139    virginica
140    virginica
141    virginica
142    virginica
143    virginica
144    virginica
145    virginica
146    virginica
147    virginica
148    virginica
149    virginica
Name: species, Length: 150, dtype: object
```

```
[9]: # subset the sepal_length and sepal_width columns

iris[ ['sepal_length', 'sepal_width']]
```

```
[9]:
```

| | sepal_length | sepal_width |
|----|--------------|-------------|
| 0 | 5.1 | 3.5 |
| 1 | 4.9 | 3.0 |
| 2 | 4.7 | 3.2 |
| 3 | 4.6 | 3.1 |
| 4 | 5.0 | 3.6 |
| 5 | 5.4 | 3.9 |
| 6 | 4.6 | 3.4 |
| 7 | 5.0 | 3.4 |
| 8 | 4.4 | 2.9 |
| 9 | 4.9 | 3.1 |
| 10 | 5.4 | 3.7 |
| 11 | 4.8 | 3.4 |
| 12 | 4.8 | 3.0 |
| 13 | 4.3 | 3.0 |
| 14 | 5.8 | 4.0 |
| 15 | 5.7 | 4.4 |
| 16 | 5.4 | 3.9 |
| 17 | 5.1 | 3.5 |
| 18 | 5.7 | 3.8 |
| 19 | 5.1 | 3.8 |
| 20 | 5.4 | 3.4 |
| 21 | 5.1 | 3.7 |
| 22 | 4.6 | 3.6 |
| 23 | 5.1 | 3.3 |
| 24 | 4.8 | 3.4 |
| 25 | 5.0 | 3.0 |

| | | |
|-----|-----|-----|
| 26 | 5.0 | 3.4 |
| 27 | 5.2 | 3.5 |
| 28 | 5.2 | 3.4 |
| 29 | 4.7 | 3.2 |
| .. | ... | ... |
| 120 | 6.9 | 3.2 |
| 121 | 5.6 | 2.8 |
| 122 | 7.7 | 2.8 |
| 123 | 6.3 | 2.7 |
| 124 | 6.7 | 3.3 |
| 125 | 7.2 | 3.2 |
| 126 | 6.2 | 2.8 |
| 127 | 6.1 | 3.0 |
| 128 | 6.4 | 2.8 |
| 129 | 7.2 | 3.0 |
| 130 | 7.4 | 2.8 |
| 131 | 7.9 | 3.8 |
| 132 | 6.4 | 2.8 |
| 133 | 6.3 | 2.8 |
| 134 | 6.1 | 2.6 |
| 135 | 7.7 | 3.0 |
| 136 | 6.3 | 3.4 |
| 137 | 6.4 | 3.1 |
| 138 | 6.0 | 3.0 |
| 139 | 6.9 | 3.1 |
| 140 | 6.7 | 3.1 |
| 141 | 6.9 | 3.1 |
| 142 | 5.8 | 2.7 |
| 143 | 6.8 | 3.2 |
| 144 | 6.7 | 3.3 |
| 145 | 6.7 | 3.0 |
| 146 | 6.3 | 2.5 |
| 147 | 6.5 | 3.0 |
| 148 | 6.2 | 3.4 |
| 149 | 5.9 | 3.0 |

[150 rows x 2 columns]

Try subsetting on rows:

```
[10]: # subset the 2nd column
iris[iris.columns[1]]
```

```
[10]: 0      3.5
      1      3.0
      2      3.2
```

| | |
|-----|-----|
| 3 | 3.1 |
| 4 | 3.6 |
| 5 | 3.9 |
| 6 | 3.4 |
| 7 | 3.4 |
| 8 | 2.9 |
| 9 | 3.1 |
| 10 | 3.7 |
| 11 | 3.4 |
| 12 | 3.0 |
| 13 | 3.0 |
| 14 | 4.0 |
| 15 | 4.4 |
| 16 | 3.9 |
| 17 | 3.5 |
| 18 | 3.8 |
| 19 | 3.8 |
| 20 | 3.4 |
| 21 | 3.7 |
| 22 | 3.6 |
| 23 | 3.3 |
| 24 | 3.4 |
| 25 | 3.0 |
| 26 | 3.4 |
| 27 | 3.5 |
| 28 | 3.4 |
| 29 | 3.2 |
| ... | |
| 120 | 3.2 |
| 121 | 2.8 |
| 122 | 2.8 |
| 123 | 2.7 |
| 124 | 3.3 |
| 125 | 3.2 |
| 126 | 2.8 |
| 127 | 3.0 |
| 128 | 2.8 |
| 129 | 3.0 |
| 130 | 2.8 |
| 131 | 3.8 |
| 132 | 2.8 |
| 133 | 2.8 |
| 134 | 2.6 |
| 135 | 3.0 |
| 136 | 3.4 |
| 137 | 3.1 |
| 138 | 3.0 |

```

139    3.1
140    3.1
141    3.1
142    2.7
143    3.2
144    3.3
145    3.0
146    2.5
147    3.0
148    3.4
149    3.0
Name: sepal_width, Length: 150, dtype: float64

```

```

[11]: # subset the first 5 rows

iris.loc[:4]

```

```

[11]:   sepal_length  sepal_width  petal_length  petal_width  species
0         5.1         3.5         1.4         0.2   setosa
1         4.9         3.0         1.4         0.2   setosa
2         4.7         3.2         1.3         0.2   setosa
3         4.6         3.1         1.5         0.2   setosa
4         5.0         3.6         1.4         0.2   setosa

```

```

[12]: # subset rows 10 through 20

iris.loc[10:20]

```

```

[12]:   sepal_length  sepal_width  petal_length  petal_width  species
10         5.4         3.7         1.5         0.2   setosa
11         4.8         3.4         1.6         0.2   setosa
12         4.8         3.0         1.4         0.1   setosa
13         4.3         3.0         1.1         0.1   setosa
14         5.8         4.0         1.2         0.2   setosa
15         5.7         4.4         1.5         0.4   setosa
16         5.4         3.9         1.3         0.4   setosa
17         5.1         3.5         1.4         0.3   setosa
18         5.7         3.8         1.7         0.3   setosa
19         5.1         3.8         1.5         0.3   setosa
20         5.4         3.4         1.7         0.2   setosa

```

```

[13]: # subset rows 6, 9, and 12

iris.loc[[6,9,12]]

```

```

[13]:   sepal_length  sepal_width  petal_length  petal_width  species
6         4.6         3.4         1.4         0.3   setosa

```

| | | | | | |
|----|-----|-----|-----|-----|--------|
| 9 | 4.9 | 3.1 | 1.5 | 0.1 | setosa |
| 12 | 4.8 | 3.0 | 1.4 | 0.1 | setosa |

Now do both!

```
[14]: # subset the first 3 rows and the first 3 columns

iris.loc[:2][iris.columns[:3]]
```

```
[14]:   sepal_length  sepal_width  petal_length
0          5.1          3.5          1.4
1          4.9          3.0          1.4
2          4.7          3.2          1.3
```

```
[15]: # subset row 20 and the species column

iris.loc[20]['species']
```

```
[15]: 'setosa'
```

Now let's subset using query:

```
[16]: # subset rows where sepal_width is greater than 4

iris.query('sepal_width > 4')
```

```
[16]:   sepal_length  sepal_width  petal_length  petal_width  species
15          5.7          4.4          1.5          0.4   setosa
32          5.2          4.1          1.5          0.1   setosa
33          5.5          4.2          1.4          0.2   setosa
```

```
[17]: # subset rows where sepal_width is less than 3.5 and the species is `virginica`.

iris.query('sepal_width < 3.5 and species=="virginica"')
```

```
[17]:   sepal_length  sepal_width  petal_length  petal_width  species
100          6.3          3.3          6.0          2.5  virginica
101          5.8          2.7          5.1          1.9  virginica
102          7.1          3.0          5.9          2.1  virginica
103          6.3          2.9          5.6          1.8  virginica
104          6.5          3.0          5.8          2.2  virginica
105          7.6          3.0          6.6          2.1  virginica
106          4.9          2.5          4.5          1.7  virginica
107          7.3          2.9          6.3          1.8  virginica
108          6.7          2.5          5.8          1.8  virginica
110          6.5          3.2          5.1          2.0  virginica
111          6.4          2.7          5.3          1.9  virginica
112          6.8          3.0          5.5          2.1  virginica
```

| | | | | | |
|-----|-----|-----|-----|-----|-----------|
| 113 | 5.7 | 2.5 | 5.0 | 2.0 | virginica |
| 114 | 5.8 | 2.8 | 5.1 | 2.4 | virginica |
| 115 | 6.4 | 3.2 | 5.3 | 2.3 | virginica |
| 116 | 6.5 | 3.0 | 5.5 | 1.8 | virginica |
| 118 | 7.7 | 2.6 | 6.9 | 2.3 | virginica |
| 119 | 6.0 | 2.2 | 5.0 | 1.5 | virginica |
| 120 | 6.9 | 3.2 | 5.7 | 2.3 | virginica |
| 121 | 5.6 | 2.8 | 4.9 | 2.0 | virginica |
| 122 | 7.7 | 2.8 | 6.7 | 2.0 | virginica |
| 123 | 6.3 | 2.7 | 4.9 | 1.8 | virginica |
| 124 | 6.7 | 3.3 | 5.7 | 2.1 | virginica |
| 125 | 7.2 | 3.2 | 6.0 | 1.8 | virginica |
| 126 | 6.2 | 2.8 | 4.8 | 1.8 | virginica |
| 127 | 6.1 | 3.0 | 4.9 | 1.8 | virginica |
| 128 | 6.4 | 2.8 | 5.6 | 2.1 | virginica |
| 129 | 7.2 | 3.0 | 5.8 | 1.6 | virginica |
| 130 | 7.4 | 2.8 | 6.1 | 1.9 | virginica |
| 132 | 6.4 | 2.8 | 5.6 | 2.2 | virginica |
| 133 | 6.3 | 2.8 | 5.1 | 1.5 | virginica |
| 134 | 6.1 | 2.6 | 5.6 | 1.4 | virginica |
| 135 | 7.7 | 3.0 | 6.1 | 2.3 | virginica |
| 136 | 6.3 | 3.4 | 5.6 | 2.4 | virginica |
| 137 | 6.4 | 3.1 | 5.5 | 1.8 | virginica |
| 138 | 6.0 | 3.0 | 4.8 | 1.8 | virginica |
| 139 | 6.9 | 3.1 | 5.4 | 2.1 | virginica |
| 140 | 6.7 | 3.1 | 5.6 | 2.4 | virginica |
| 141 | 6.9 | 3.1 | 5.1 | 2.3 | virginica |
| 142 | 5.8 | 2.7 | 5.1 | 1.9 | virginica |
| 143 | 6.8 | 3.2 | 5.9 | 2.3 | virginica |
| 144 | 6.7 | 3.3 | 5.7 | 2.5 | virginica |
| 145 | 6.7 | 3.0 | 5.2 | 2.3 | virginica |
| 146 | 6.3 | 2.5 | 5.0 | 1.9 | virginica |
| 147 | 6.5 | 3.0 | 5.2 | 2.0 | virginica |
| 148 | 6.2 | 3.4 | 5.4 | 2.3 | virginica |
| 149 | 5.9 | 3.0 | 5.1 | 1.8 | virginica |

```
[18]: # subset rows where the petal width is 0.3 or the species is `versicolor`.
```

```
iris.query( 'petal_width==0.3 or species=="versicolor"' )
```

| [18]: | sepal_length | sepal_width | petal_length | petal_width | species |
|-------|--------------|-------------|--------------|-------------|---------|
| 6 | 4.6 | 3.4 | 1.4 | 0.3 | setosa |
| 17 | 5.1 | 3.5 | 1.4 | 0.3 | setosa |
| 18 | 5.7 | 3.8 | 1.7 | 0.3 | setosa |
| 19 | 5.1 | 3.8 | 1.5 | 0.3 | setosa |
| 40 | 5.0 | 3.5 | 1.3 | 0.3 | setosa |
| 41 | 4.5 | 2.3 | 1.3 | 0.3 | setosa |

| | | | | | |
|----|-----|-----|-----|-----|------------|
| 45 | 4.8 | 3.0 | 1.4 | 0.3 | setosa |
| 50 | 7.0 | 3.2 | 4.7 | 1.4 | versicolor |
| 51 | 6.4 | 3.2 | 4.5 | 1.5 | versicolor |
| 52 | 6.9 | 3.1 | 4.9 | 1.5 | versicolor |
| 53 | 5.5 | 2.3 | 4.0 | 1.3 | versicolor |
| 54 | 6.5 | 2.8 | 4.6 | 1.5 | versicolor |
| 55 | 5.7 | 2.8 | 4.5 | 1.3 | versicolor |
| 56 | 6.3 | 3.3 | 4.7 | 1.6 | versicolor |
| 57 | 4.9 | 2.4 | 3.3 | 1.0 | versicolor |
| 58 | 6.6 | 2.9 | 4.6 | 1.3 | versicolor |
| 59 | 5.2 | 2.7 | 3.9 | 1.4 | versicolor |
| 60 | 5.0 | 2.0 | 3.5 | 1.0 | versicolor |
| 61 | 5.9 | 3.0 | 4.2 | 1.5 | versicolor |
| 62 | 6.0 | 2.2 | 4.0 | 1.0 | versicolor |
| 63 | 6.1 | 2.9 | 4.7 | 1.4 | versicolor |
| 64 | 5.6 | 2.9 | 3.6 | 1.3 | versicolor |
| 65 | 6.7 | 3.1 | 4.4 | 1.4 | versicolor |
| 66 | 5.6 | 3.0 | 4.5 | 1.5 | versicolor |
| 67 | 5.8 | 2.7 | 4.1 | 1.0 | versicolor |
| 68 | 6.2 | 2.2 | 4.5 | 1.5 | versicolor |
| 69 | 5.6 | 2.5 | 3.9 | 1.1 | versicolor |
| 70 | 5.9 | 3.2 | 4.8 | 1.8 | versicolor |
| 71 | 6.1 | 2.8 | 4.0 | 1.3 | versicolor |
| 72 | 6.3 | 2.5 | 4.9 | 1.5 | versicolor |
| 73 | 6.1 | 2.8 | 4.7 | 1.2 | versicolor |
| 74 | 6.4 | 2.9 | 4.3 | 1.3 | versicolor |
| 75 | 6.6 | 3.0 | 4.4 | 1.4 | versicolor |
| 76 | 6.8 | 2.8 | 4.8 | 1.4 | versicolor |
| 77 | 6.7 | 3.0 | 5.0 | 1.7 | versicolor |
| 78 | 6.0 | 2.9 | 4.5 | 1.5 | versicolor |
| 79 | 5.7 | 2.6 | 3.5 | 1.0 | versicolor |
| 80 | 5.5 | 2.4 | 3.8 | 1.1 | versicolor |
| 81 | 5.5 | 2.4 | 3.7 | 1.0 | versicolor |
| 82 | 5.8 | 2.7 | 3.9 | 1.2 | versicolor |
| 83 | 6.0 | 2.7 | 5.1 | 1.6 | versicolor |
| 84 | 5.4 | 3.0 | 4.5 | 1.5 | versicolor |
| 85 | 6.0 | 3.4 | 4.5 | 1.6 | versicolor |
| 86 | 6.7 | 3.1 | 4.7 | 1.5 | versicolor |
| 87 | 6.3 | 2.3 | 4.4 | 1.3 | versicolor |
| 88 | 5.6 | 3.0 | 4.1 | 1.3 | versicolor |
| 89 | 5.5 | 2.5 | 4.0 | 1.3 | versicolor |
| 90 | 5.5 | 2.6 | 4.4 | 1.2 | versicolor |
| 91 | 6.1 | 3.0 | 4.6 | 1.4 | versicolor |
| 92 | 5.8 | 2.6 | 4.0 | 1.2 | versicolor |
| 93 | 5.0 | 2.3 | 3.3 | 1.0 | versicolor |
| 94 | 5.6 | 2.7 | 4.2 | 1.3 | versicolor |
| 95 | 5.7 | 3.0 | 4.2 | 1.2 | versicolor |

| | | | | | |
|----|-----|-----|-----|-----|------------|
| 96 | 5.7 | 2.9 | 4.2 | 1.3 | versicolor |
| 97 | 6.2 | 2.9 | 4.3 | 1.3 | versicolor |
| 98 | 5.1 | 2.5 | 3.0 | 1.1 | versicolor |
| 99 | 5.7 | 2.8 | 4.1 | 1.3 | versicolor |

[0]: