

taskA_DONE

October 3, 2019

```
[2]: %matplotlib inline
import numpy as np
import matplotlib.pyplot as plt
%load_ext autoreload
%autoreload 2
```

1 Data Generation

```
[3]: num_samples, num_features = 10, 5
```

```
[4]: np.random.seed(10)
data = np.random.rand(num_samples, num_features)
```

2 Solution

```
[5]: print(data)
```

```
[[0.77132064 0.02075195 0.63364823 0.74880388 0.49850701]
 [0.22479665 0.19806286 0.76053071 0.16911084 0.08833981]
 [0.68535982 0.95339335 0.00394827 0.51219226 0.81262096]
 [0.61252607 0.72175532 0.29187607 0.91777412 0.71457578]
 [0.54254437 0.14217005 0.37334076 0.67413362 0.44183317]
 [0.43401399 0.61776698 0.51313824 0.65039718 0.60103895]
 [0.8052232  0.52164715 0.90864888 0.31923609 0.09045935]
 [0.30070006 0.11398436 0.82868133 0.04689632 0.62628715]
 [0.54758616 0.819287  0.19894754 0.8568503  0.35165264]
 [0.75464769 0.29596171 0.88393648 0.32551164 0.1650159 ]]
```

```
[12]: def standardize(x):
        ''' Standardize matrix x by feature (column)
        '''
        zero_mean = x - np.mean(x, axis = 0)
        unit_variance = zero_mean / np.std(zero_mean, axis = 0)
        return unit_variance
```

```
std_data = standardize(data)
print("The mean is %.2f"%np.mean(std_data))
print("The std. deviation is %.2f"%np.std(std_data))
```

The mean is 0.00

The std. deviation is 1.00

```
[13]: print(std_data, "\n\n", np.mean(std_data, axis=0), "\n\n", np.std(std_data,
→axis=0))
```

```
[[ 1.0775774  -1.34411605  0.31525355  0.80665878  0.24128662]
 [-1.81711634 -0.77630186  0.74088404 -1.25592235 -1.42276759]
 [ 0.62228127  1.64254169 -1.797091   -0.03521894  1.51565143]
 [ 0.23651339  0.90075228 -0.83122987  1.40786459  1.11788073]
 [-0.13414844 -0.95529104 -0.55795449  0.54097769  0.01136005]
 [-0.70898541  0.56774371 -0.08900028  0.45652209  0.65726018]
 [ 1.2571441   0.25993298  1.23775021 -0.72176808 -1.4141686 ]
 [-1.41508984 -1.04555188  0.96949701 -1.69076861  0.75969247]
 [-0.10744434  1.21308427 -1.14296098  1.19109415 -0.35450368]
 [ 0.98926822 -0.46279408  1.15485183 -0.69943932 -1.11169162]]

[-1.88737914e-16  5.55111512e-17 -2.22044605e-17  1.11022302e-17
 2.44249065e-16]

[1.  1.  1.  1.  1.]
```

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[ ]:
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