linreg

April 30, 2018

1 1. Linear Regression

1.0.1 Implement linear regression on the housing dataset (house price prediction with 2-dim features(square feet and number of bedrooms))

2D Housing Data

- Features (x1 -> square feet, x2 -> number of bedrooms)
- Price (y -> Selling price)

In [4]:
```
import numpy as np
from math import *
import matplotlib.pyplot as plt
from matplotlib import cm
from mpl_toolkits.mplot3d import Axes3D
import csv

# this allows plots to appear directly in the notebook
%matplotlib inline
%config IPCompleter.greedy=True
# load data using numpy
data = np.loadtxt('housing_prices.txt', delimiter=',')
X1 = data[:, 0]
X2 = data[:, 1]
Y  = data[:, 2]
tests_count = 10      # Test count
total_count = len(Y)
train_count = len(Y) - tests_count

# Training Set
x1_train = X1[np.arange(0,train_count)]
x2_train = X2[np.arange(0,train_count)]
y_train  =  Y[np.arange(0,train_count)]

# Test Set
x1_tests = X1[np.arange(train_count,total_count)]
x2_tests = X2[np.arange(train_count,total_count)]
y_tests  =  Y[np.arange(train_count,total_count)]
```

```
        print('Total\t: ', total_count)
        print('Test \t: ', len(y_tests))
        print('Train\t: ', len(y_train))
```

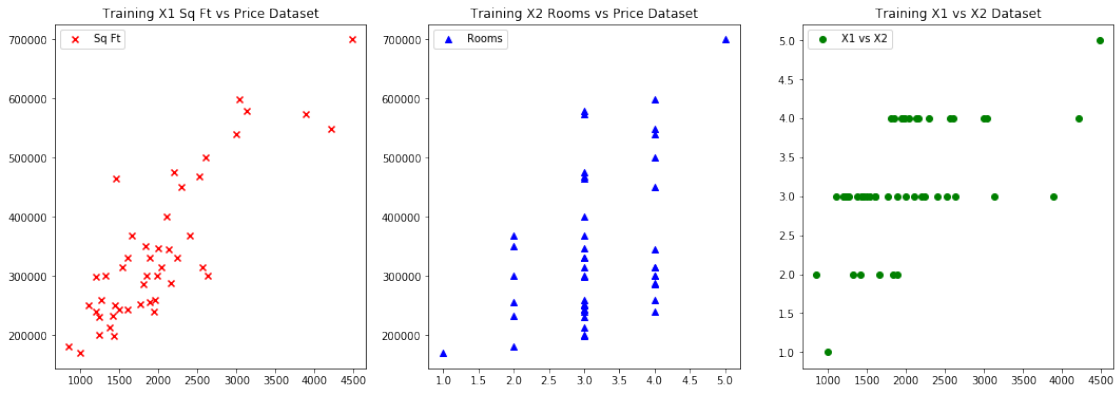
```
Total       :  47
Test        :  10
Train       :  37
```

(a) Visualize Data

- 2D plots of each dimension

```
In [5]: # Plot X1,X2 vs Y
        fig,(ax1,ax2, ax3) = plt.subplots(1,3,figsize=(18,6))
        ax1.scatter(X1, Y, color = 'r',marker='x', label = 'Sq Ft')
        ax1.set_title('Training X1 Sq Ft vs Price Dataset')
        ax1.legend()
        ax2.scatter(X2, Y, color = 'b',marker='^', label = 'Rooms')
        ax2.set_title('Training X2 Rooms vs Price Dataset')
        ax2.legend()
        ax3.scatter(X1, X2, color = 'g',marker='o', label = 'X1 vs X2')
        ax3.set_title('Training X1 vs X2 Dataset')
        ax3.legend()
```

```
Out[5]: <matplotlib.legend.Legend at 0x294688f6a58>
```



- 3D mesh plot for X1, X2 & Y

```
In [6]: # Plot X1,X2, Y
        fig = plt.figure()
        ax = fig.add_subplot(111, projection='3d')
        ax.scatter(X1, X2, Y, c='r', marker='o')
```