Geron, Appendix B: ML Project Check List

- Define the problem
- Describe the Data
    - where does it come from
- Exploratory data analysis
    - visualize, gain insights
    - find potentially useful features
- Data cleaning
    - problems with the data and how we fixed them
- Data transformation
    - pre-processing data
- Experiments
    - describe a hypotheses, experiment and result
    - iterate

In [1]:
```
from IPython.core.interactiveshell import InteractiveShell
InteractiveShell.ast_node_interactivity = "all"

# Reload all modules imported with %aimport
%load_ext autoreload
%autoreload 1

%matplotlib notebook
```

In [2]:
```
import matplotlib.pyplot as plt
import numpy as np
```

In [3]:
```
def gen_data(num):
    """
    Function to generate random data

    Parameters
    -----------
    num: Integer.  Number of pairs to generate

    Returns
    -------
    Tuple (X,Y):
    - X NumPy ndarray, shape (num, 1)
    - Y NumPy ndarray, shape (num, 1)
    """
    v = 2
    t = np.arange(0, num).reshape(-1,1)
    d= (v * t) + np.random.normal(0, np.sqrt(num), (num,1))

    return t,d

X, Y = gen_data(50)
```

In [4]:
```
# np.<TAB>
# np.random.<TAB>
```

In [6]:
```
gen_data??
```

Problem Description

This is the problem I'm trying to solve. Here are the key points to know:

- First point
- Second point

Data

The data was obtained from scraping the web.

Exploratory Data Analysis

The distribution of the data is:

In [7]:
```
print("X: mean={:3.2f}, std={:3.2f}".format(X.mean(), X.std()))
print("Y: mean={:3.2f}, std={:3.2f}".format(Y.mean(), Y.std()))
```

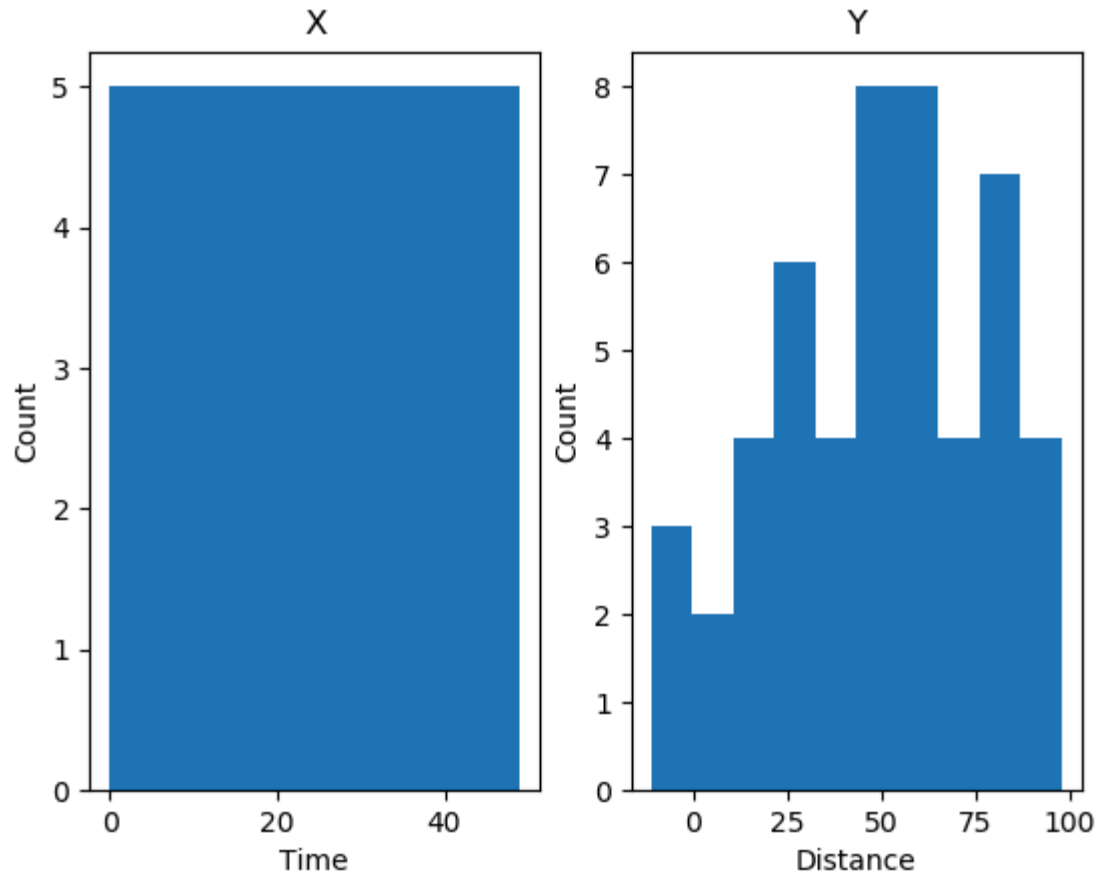
```
X: mean=24.50, std=14.43
Y: mean=49.23, std=27.74
```

In [8]:

```
fig = plt.figure()

ax_x = fig.add_subplot(1,2, 1)
_ = ax_x.hist(X)
_ = ax_x.set_xlabel("Time")
_ = ax_x.set_ylabel("Count")
_ = ax_x.set_title("X")

ax_y = fig.add_subplot(1,2, 2)
_ = ax_y.hist(Y)
_ = ax_y.set_xlabel("Distance")
_ = ax_y.set_ylabel("Count")
_ = ax_y.set_title("Y")
```



least one feature
(e.g., negative or

ut rejected that

Data transformation

Because different features had widely different ranges (i.e., min and max) we first transformed the data as follows:

- standardized (mean 0, unit variance) variables ...