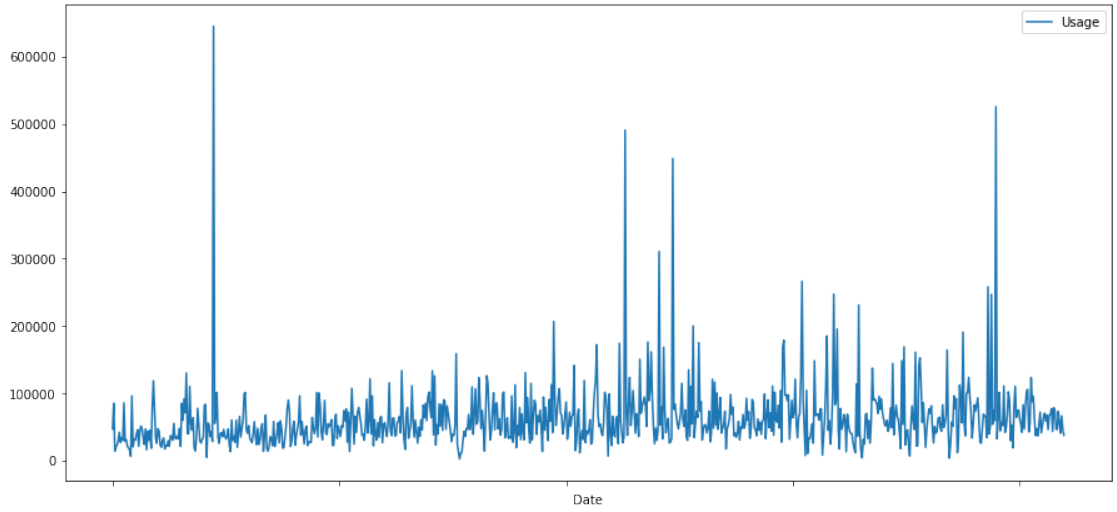
ARIMA_time_series_forcast

April 25, 2018

```
In [112]: import pandas as pd
          import datetime
          import numpy as np
          import datetime
          import matplotlib.pyplot as plt
          from sklearn.metrics import mean_squared_error
          from statsmodels.tsa.arima_model import ARIMA

In [113]: df = pd.read_csv('sms_usage.csv')

In [114]: x = df['Usage'].values
          dt  = df['Date']
          # df.index = df['Date'].rename('DatetimeIndex')
          train,test = x[1:len(x)-30], x[len(x)-30:]

In [115]: train.shape,test.shape

Out[115]: ((809,), (30,))

In [116]: df.plot(figsize=(15,7),x=df['Date'],y='Usage')

Out[116]: <matplotlib.axes._subplots.AxesSubplot at 0x7fe726cc0c88>
```



```
In [117]: train = train.astype('float')
          test = test.astype('float')
```

```
In [118]: history = [x for x in train]
          predicted = []
          a = dict()
          a['date'] = df['Date']
          a['usage'] = df['Usage']
```

```
In [119]: #  ARIMA(p,d,q)x(P,D,Q), where D, P, and Q are, respectively, the number of seasonal d
          # seasonal autoregressive terms (lags of the differenced series at multiples of the se
          # and seasonal moving average terms (lags of the forecast errors at multiples of the s
          for t in range(len(test)):
              model = ARIMA(history, order=(0,1,0)).fit(disp=0)
              output = model.forecast()
              predicted.append(output[0])
          #     obs = test[t]
              history.append(test[t])
```

```
In [120]: test_temp  = history[-31:-1]
          for i,j in zip(predicted,test_temp):
              print('Predicted: ',i,'Expected: ',j)
```

```
Predicted:  [54995.5259901] Expected:  55033.0
Predicted:  [123556.21508035] Expected:  123509.0
Predicted:  [87694.9382716] Expected:  87692.0
Predicted:  [95531.58569667] Expected:  95519.0
Predicted:  [61294.45812808] Expected:  61324.0
Predicted:  [37299.01599016] Expected:  37358.0
Predicted:  [47724.88083538] Expected:  47771.0
Predicted:  [36730.46380368] Expected:  36790.0
Predicted:  [55180.11887255] Expected:  55217.0
Predicted:  [72065.80660955] Expected:  72082.0
Predicted:  [41322.28850856] Expected:  41376.0
Predicted:  [52837.3968254] Expected:  52877.0
Predicted:  [64542.70244015] Expected:  64568.0
Predicted:  [70602.1047503] Expected:  70620.0
Predicted:  [58749.72506083] Expected:  58782.0
Predicted:  [67528.41798299] Expected:  67550.0
Predicted:  [46091.45995146] Expected:  46139.0
Predicted:  [67708.68848485] Expected:  67730.0
Predicted:  [68631.83050847] Expected:  68652.0
Predicted:  [77306.33131802] Expected:  77316.0
Predicted:  [43390.43115942] Expected:  43441.0
Predicted:  [78583.89384801] Expected:  78592.0
Predicted:  [73985.36987952] Expected:  73999.0
```

```
Predicted:  [47108.08182912] Expected:  47154.0
Predicted:  [46282.14543269] Expected:  46329.0
Predicted:  [73309.60864346] Expected:  73324.0
Predicted:  [55861.73021583] Expected:  55897.0
Predicted:  [40838.80239521] Expected:  40892.0
Predicted:  [66602.64712919] Expected:  66625.0
Predicted:  [45212.14814815] Expected:  45260.0
```

```
In [121]: mean_squared_error(predicted, test_temp)
```

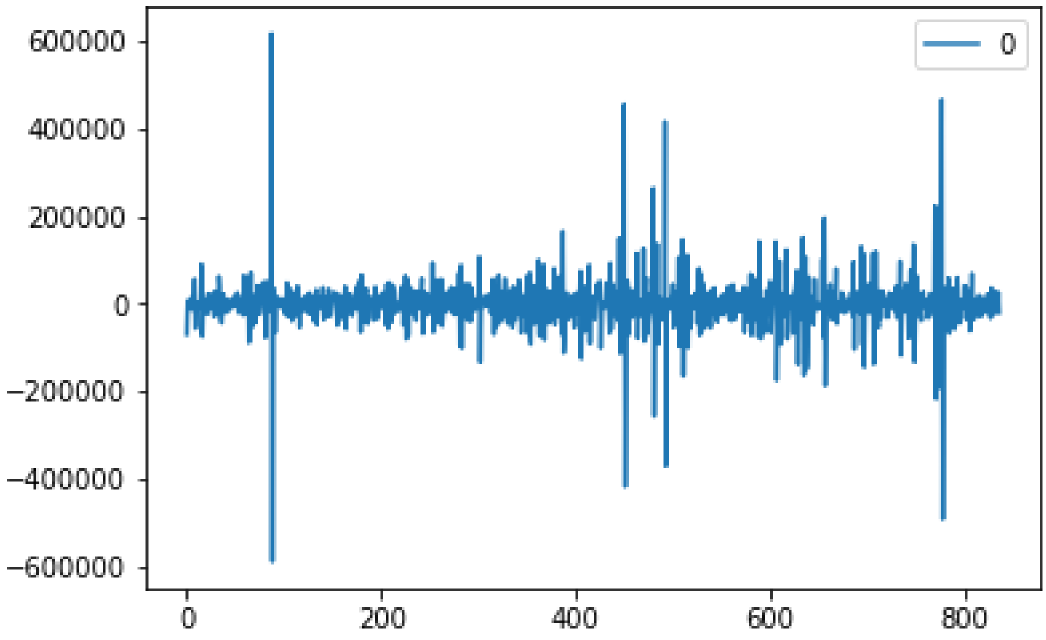
```
Out[121]: 1325.49901885738
```

```
In [122]: model.params, model.k_ar
```

```
Out[122]: (array([-47.85185185]), 0)
```

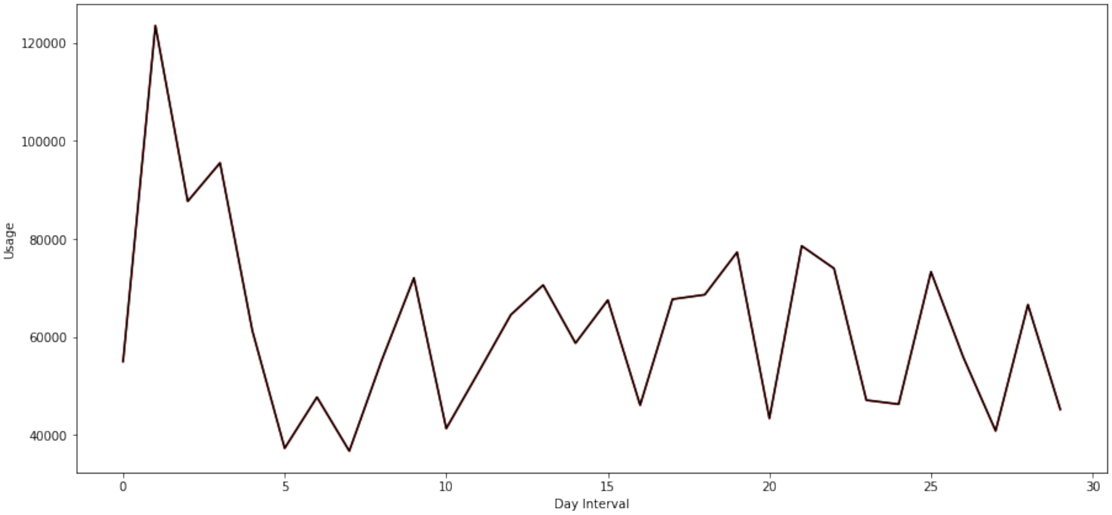
```
In [123]: p = pd.DataFrame(model.resid)
          p.plot()
```

```
Out[123]: <matplotlib.axes._subplots.AxesSubplot at 0x7fe726cb1c88>
```



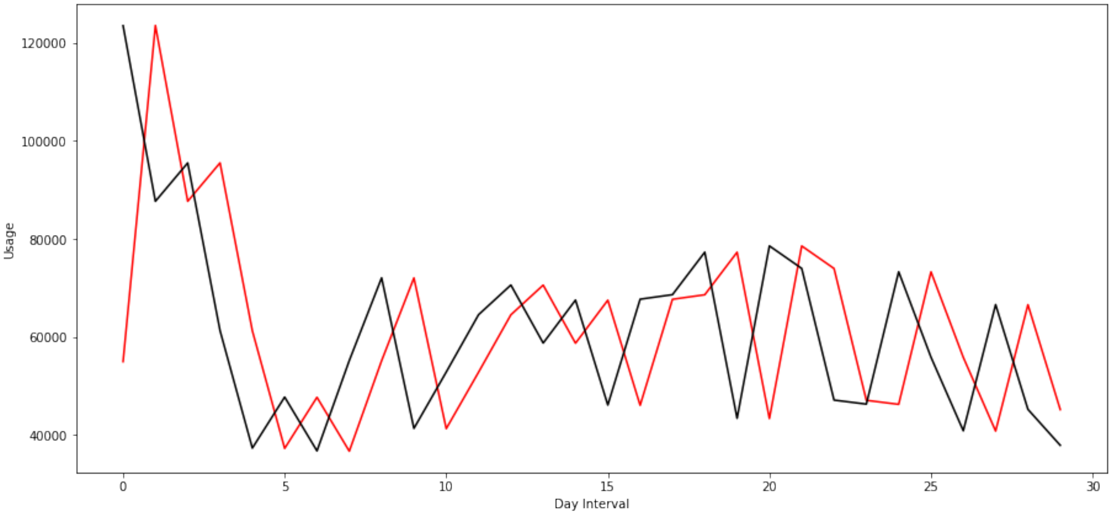
```
In [125]: plt.figure(figsize=(15,7))
          plt.ylabel('Usage')
          plt.xlabel('Day Interval')
          plt.plot(predicted,color='red')
          plt.plot(test_temp,color='black')
```

```
Out[125]: [<matplotlib.lines.Line2D at 0x7fe726b80978>]
```



```
In [126]: plt.figure(figsize=(15,7))
          plt.ylabel('Usage')
          plt.xlabel('Day Interval')
          plt.plot(predicted,color='red')
          plt.plot(test,color='black')
```

```
Out[126]: [<matplotlib.lines.Line2D at 0x7fe726bb0940>]
```


Usage
Day Interval