Analysis and Prediction of Crime in Indore City . The data of Indore City crime is publicly available.
https://www.indorepolice.org/index.php

1) We scrap the Indore Police Records using Beautiful Soup
https://www.geeksforgeeks.org/downloading-files-web-using-python/

```
!pip install beautifulsoup4
```

```
Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.6/dist-packag
```

2) We create data.csv file from all the raw data scraped from website https://github.com/vikram-bhati/PAASBAAN-crime-prediction

Data Processsing Should be done here tilll then we procced with visualisaation andd model training of already processed data

Preprocessing Steps

1. Convert the xlsl file to csv and pandas dataframes
2. Use google translate packages to translate name of police station to English.
3. Convert the police station name to adress and find its lattitude and longitude
4. Split the values in IPC Act column and Label Encode
5. Split the date and time from time stamp

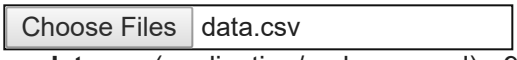
```
import requests
from bs4 import BeautifulSoup
import urllib3


http = urllib3.PoolManager()
url = "https://www.indorepolice.org/"

def get_links():

    r = requests.get(url)
    response = http.request('GET', url)
    soup = BeautifulSoup(response.data)
    links = soup.find_all("a")

    file_links = [url + link['href'] for link in links if link['href'].endswith("xlsx")]
    return file_links

def download_links(file_links):

    for link in file_links:
        f_name = link.split("/")[-1]

        print ("Downloading file:"+f_name)

        # create response object
        r = requests.get(link, stream = True)

        # download started
        with open(f_name, 'wb') as f:
```

```
            for chunk in r.iter_content(chunk_size = 1024*1024):
                if chunk:
                    f.write(chunk)

        print (f_name+" downloaded!")

    print ("All videos downloaded!")
    return


if __name__ == "__main__":

    # getting all video links
    file_links = get_links()

    # download all videos
    download_links(file_links)
```

```
/usr/local/lib/python3.6/dist-packages/urllib3/connectionpool.py:858: InsecureRequest
  InsecureRequestWarning)
Downloading file:2019-01-02-IND DSR 02.01.2019.xlsx
2019-01-02-IND DSR 02.01.2019.xlsx downloaded!
Downloading file:2019-01-02-IND DSR 02.01.2019.xlsx
2019-01-02-IND DSR 02.01.2019.xlsx downloaded!
Downloading file:2019-01-01-IND DSR 01.01.2019.xlsx
2019-01-01-IND DSR 01.01.2019.xlsx downloaded!
All videos downloaded!
```

Double-click (or enter) to edit

```
import pandas as pd


from google.colab import files
uploaded = files.upload()
```



- **data.csv**(application/vnd.ms-excel) - 95340 bytes, last modified: 5/30/2018 - 100% done

```
Saving data.csv to data.csv
```

```
!pip install -U -q PyDrive
from pydrive.auth import GoogleAuth
from pydrive.drive import GoogleDrive
from google.colab import auth
from oauth2client.client import GoogleCredentials
# Authenticate and create the PyDrive client.
auth.authenticate_user()
gauth = GoogleAuth()
gauth.credentials = GoogleCredentials.get_application_default()
drive = GoogleDrive(gauth)


link = 'https://drive.google.com/open?id=1QJxRGGMgx6JJ0oyYyxpJlxymCWWIxszP'


downloaded = drive.CreateFile({'id':'1QJxRGGMgx6JJ0oyYyxpJlxymCWWIxszP'})
downloaded.GetContentFile('Filename.csv')
data = pd.read_csv('Filename.csv')
```

```
data_shape = data.shape


print(data_shape)
data.head(10)
```

(2090, 9)

	timestamp	act379	act13	act279	act323	act363	act302	latitude	longitude
0	28-02-2018 21:00	1	0	0	0	0	0	22.737260	75.875987
1	28-02-2018 21:15	1	0	0	0	0	0	22.720992	75.876083
2	28-02-2018 10:15	0	0	1	0	0	0	22.736676	75.883168
3	28-02-2018 10:15	0	0	1	0	0	0	22.746527	75.887139
4	28-02-2018 10:30	0	0	1	0	0	0	22.769531	75.888772
5	28-02-2018 14:15	0	0	0	1	0	0	22.735218	75.913366
6	28-02-2018	0	0	0	0	1	0	22.736766	75.908570

```
label_names = ['act379','act13','act279','act323','act363','act302']
dummies = data[label_names]
dummies
```

	act379	act13	act279	act323	act363	act302
0	1	0	0	0	0	0
1	1	0	0	0	0	0
2	0	0	1	0	0	0
3	0	0	1	0	0	0
4	0	0	1	0	0	0
5	0	0	0	1	0	0
6	0	0	0	0	1	0
7	0	0	0	1	0	0
8	1	0	0	0	0	0
9	0	0	0	1	0	0
10	0	0	0	1	0	0
11	0	0	0	1	0	0
12	0	1	0	0	0	0
13	0	0	0	1	0	0
14	0	0	0	1	0	0
15	1	0	0	0	0	0
16	0	0	0	0	1	0
17	0	0	0	1	0	0

```
import numpy as np
data["all_acts"] = pd.Series(dummies.columns[np.where(dummies==1)[1]])
```

20	0	0	1	0	0	0

```
#s3 = dummies.idxmax(axis=1)
#s3
```

22	0	0	1	0	0	0

```
data.head(10)
```

	timestamp	act379	act13	act279	act323	act363	act302	latitude	longitude	al
0	28-02-2018 21:00	1	0	0	0	0	0	22.737260	75.875987	
1	28-02-2018 21:15	1	0	0	0	0	0	22.720992	75.876083	

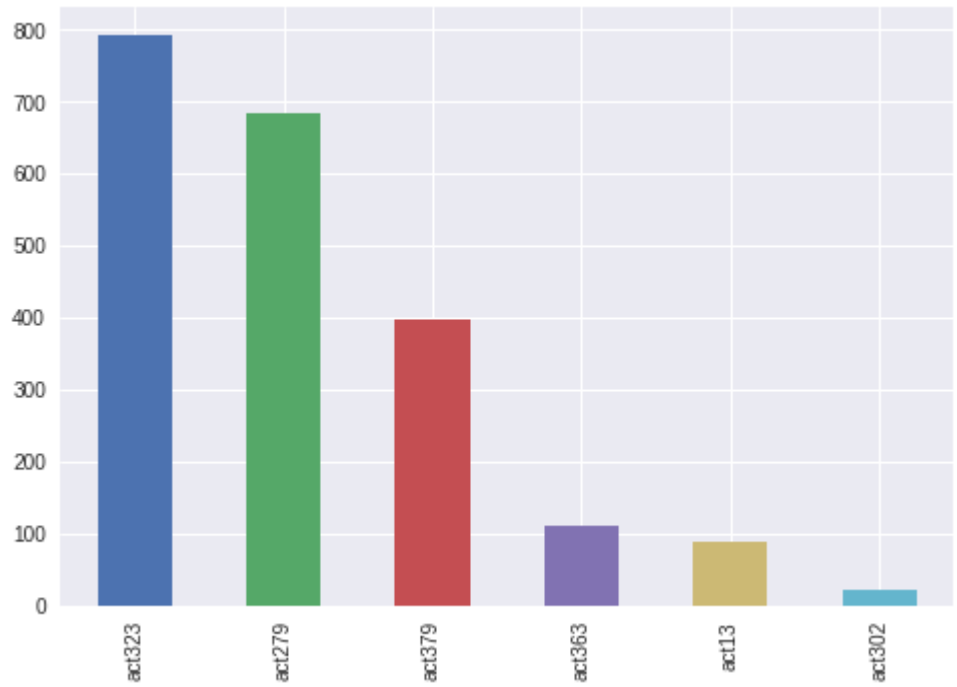
```
count = data["all_acts"].value_counts()
pd.DataFrame({'acts':count.index, 'total':count.values})
```

	acts	total
0	act323	792
1	act279	682
2	act379	396
3	act363	110
4	act13	88
5	act302	22

```
type(count)
```

```
pandas.core.series.Series
```

```
ax = count.plot(kind="bar")
```



```
for col in data:
    print (type(data[col][1]))
```

```
<class 'str'>
<class 'numpy.int64'>
<class 'numpy.int64'>
<class 'numpy.int64'>
<class 'numpy.int64'>
<class 'numpy.int64'>
<class 'numpy.int64'>
<class 'numpy.float64'>
<class 'numpy.float64'>
<class 'str'>
```

```
data['timestamp'] = pd.to_datetime(data['timestamp'],errors='coerce')
data['time'] = data["timestamp"].dt.hour
data.head()
```

	timestamp	act379	act13	act279	act323	act363	act302	latitude	longitude	al
0	2018-02-28 21:00:00	1	0	0	0	0	0	22.737260	75.875987	
1	2018-02-28 21:15:00	1	0	0	0	0	0	22.720992	75.876083	
2	2018-02-									

```
data.head(10)
```

	timestamp	act379	act13	act279	act323	act363	act302	latitude	longitude	al
0	2018-02-28 21:00:00	1	0	0	0	0	0	22.737260	75.875987	
1	2018-02-28 21:15:00	1	0	0	0	0	0	22.720992	75.876083	
2	2018-02-28 10:15:00	0	0	1	0	0	0	22.736676	75.883168	
3	2018-02-28 10:15:00	0	0	1	0	0	0	22.746527	75.887139	
4	2018-02-28 10:30:00	0	0	1	0	0	0	22.769531	75.888772	

```
db2 = data["all_acts"]
```

```
column_1 = data["timestamp"]

db=pd.DataFrame({"year": column_1.dt.year,
                 "month": column_1.dt.month,
                 "day": column_1.dt.day,
                 "hour": column_1.dt.hour,
                 "dayofyear": column_1.dt.dayofyear,
                 "week": column_1.dt.week,
                 "weekofyear": column_1.dt.weekofyear,
                 "dayofweek": column_1.dt.dayofweek,
                 "weekday": column_1.dt.weekday,
                 "quarter": column_1.dt.quarter,
                })


db.head()
```

	day	dayofweek	dayofyear	hour	month	quarter	week	weekday	weekofyear	year
0	28.0	2.0	59.0	21.0	2.0	1.0	9.0	2.0	9.0	2018.0
1	28.0	2.0	59.0	21.0	2.0	1.0	9.0	2.0	9.0	2018.0
2	28.0	2.0	59.0	10.0	2.0	1.0	9.0	2.0	9.0	2018.0
3	28.0	2.0	59.0	10.0	2.0	1.0	9.0	2.0	9.0	2018.0
4	28.0	2.0	59.0	10.0	2.0	1.0	9.0	2.0	9.0	2018.0

```
dataset1=data.drop('timestamp',axis=1)


data1=pd.concat([db,dataset1],axis=1)


#data1=pd.concat([db2,data1],axis=1)


data1.head()
```

	day	dayofweek	dayofyear	hour	month	quarter	week	weekday	weekofyear	year
0	28.0	2.0	59.0	21.0	2.0	1.0	9.0	2.0	9.0	2018.0
1	28.0	2.0	59.0	21.0	2.0	1.0	9.0	2.0	9.0	2018.0
2	28.0	2.0	59.0	10.0	2.0	1.0	9.0	2.0	9.0	2018.0
3	28.0	2.0	59.0	10.0	2.0	1.0	9.0	2.0	9.0	2018.0
4	28.0	2.0	59.0	10.0	2.0	1.0	9.0	2.0	9.0	2018.0

Data Analysis

```
data1.describe()
```

	week	weekday	weekofyear	year	act379	act13	act279	act
	)00000	2068.000000	2068.000000	2068.0	2090.000000	2090.000000	2090.000000	2090.000(
	)25532	2.601064	12.925532	2018.0	0.189474	0.042105	0.326316	0.378
	131554	1.535561	8.131554	0.0	0.391978	0.200877	0.468977	0.485
	)00000	1.000000	1.000000	2018.0	0.000000	0.000000	0.000000	0.000(
	)00000	2.000000	9.000000	2018.0	0.000000	0.000000	0.000000	0.000(
	)00000	2.000000	9.000000	2018.0	0.000000	0.000000	0.000000	0.000(
	)00000	3.000000	18.000000	2018.0	0.000000	0.000000	1.000000	1.000(
	)00000	6.000000	27.000000	2018.0	1.000000	1.000000	1.000000	1.000(

```
data1.shape
```

```
(2090, 20)
```

We have 2090 rows of data but with null values , so when we dropped we get 2068 rows for all

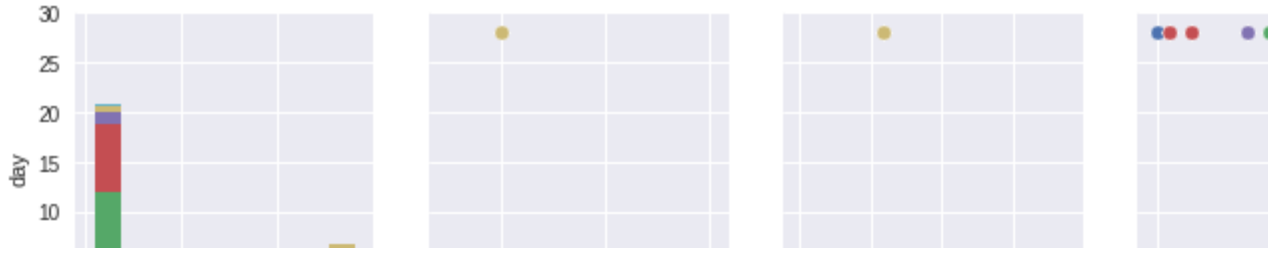
```
data1.dropna(inplace=True)
data1.describe()
```

	week	weekday	weekofyear	year	act379	act13	act279	
)	2068.000000	2068.000000	2068.000000	2068.0	2068.000000	2068.000000	2068.000000	2
3	12.925532	2.601064	12.925532	2018.0	0.191489	0.042553	0.329787	
3	8.131554	1.535561	8.131554	0.0	0.393568	0.201896	0.470249	
)	1.000000	1.000000	1.000000	2018.0	0.000000	0.000000	0.000000	
)	9.000000	2.000000	9.000000	2018.0	0.000000	0.000000	0.000000	
)	9.000000	2.000000	9.000000	2018.0	0.000000	0.000000	0.000000	
)	18.000000	3.000000	18.000000	2018.0	0.000000	0.000000	1.000000	
)	27.000000	6.000000	27.000000	2018.0	1.000000	1.000000	1.000000	

Data Visualisation and Analysis

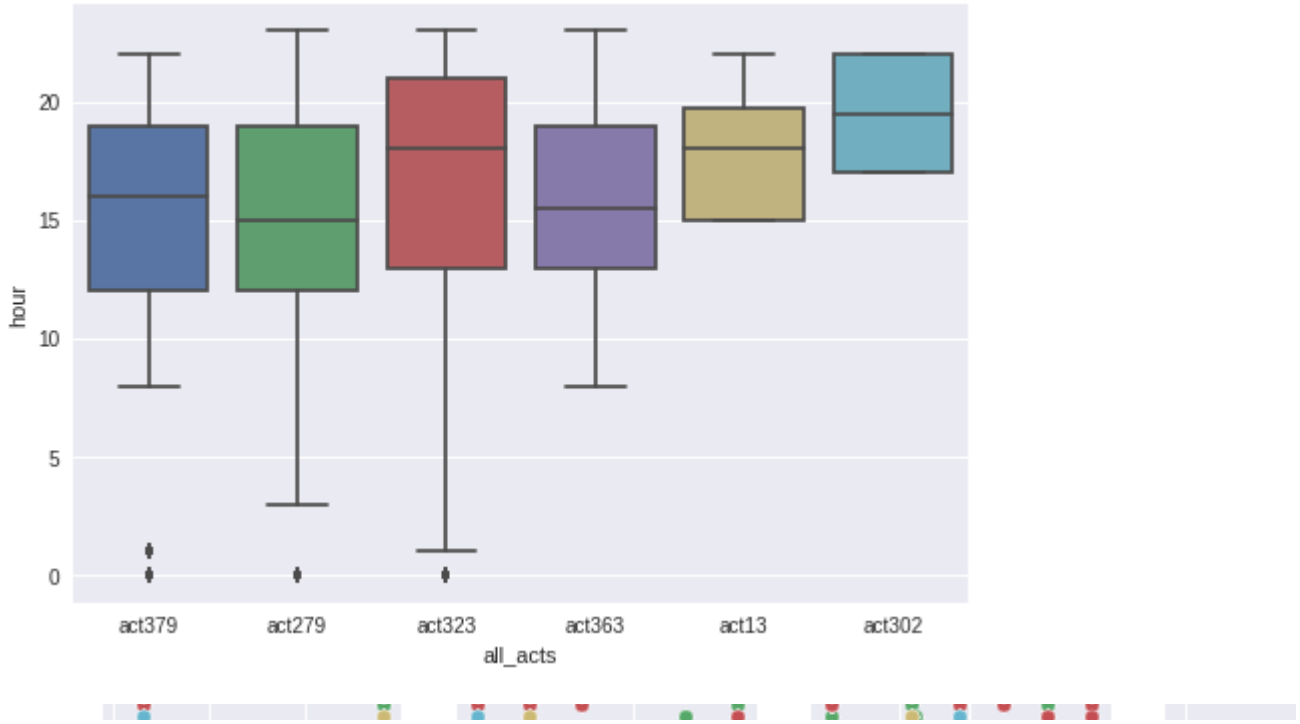
```
#Pair plot gives the graph for grids where columns and rows are the features , it checks the

import seaborn as sns

sns.pairplot(data1,hue="all_acts")
```

```
<seaborn.axisgrid.PairGrid at 0x7fc9f1b46b00>
```




```
sns.boxplot(data=data1,x='all_acts',y='hour')
```

```
/usr/local/lib/python3.6/dist-packages/seaborn/categorical.py:454: FutureWarning: rem
  box_data = remove_na(group_data)
<matplotlib.axes._subplots.AxesSubplot at 0x7fc9f0a2ec18>
```




```
data1.plot.hexbin(x='act302',y='hour',gridsize=25)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc9e7a30518>
```

Selecting Features

```
X0= data1[['dayofweek','dayofyear','hour','month','week','latitude','longitude']]
```

```
X0.head()
```

	dayofweek	dayofyear	hour	month	week	latitude	longitude
0	2.0	59.0	21.0	2.0	9.0	22.737260	75.875987
1	2.0	59.0	21.0	2.0	9.0	22.720992	75.876083
2	2.0	59.0	10.0	2.0	9.0	22.736676	75.883168
3	2.0	59.0	10.0	2.0	9.0	22.746527	75.887139
4	2.0	59.0	10.0	2.0	9.0	22.769531	75.888772

```
X=X0.values
```

```
X
```

```
array([[  2.      ,  59.      ,  21.      , ...,   9.      ,  22.73726 ,
         75.875987],
       [  2.      ,  59.      ,  21.      , ...,   9.      ,  22.720992,
         75.876083],
       [  2.      ,  59.      ,  10.      , ...,   9.      ,  22.736676,
         75.883168],
       ...,
       [  1.      , 184.      ,  12.      , ...,  27.      ,  22.531931,
         75.769126],
       [  1.      , 184.      ,  10.      , ...,  27.      ,  22.719569,
         75.857726],
       [  1.      , 184.      ,  23.      , ...,  27.      ,  22.686437,
         76.032055]])
```

```
Y0= data1[['act379','act13','act279','act302','act363','act323']]
```

```
Y0.head()
```

	act379	act13	act279	act302	act363	act323
0	1	0	0	0	0	0
1	1	0	0	0	0	0

```
Y=Y0.values
Y
```

```
array([[1, 0, 0, 0, 0, 0],
       [1, 0, 0, 0, 0, 0],
       [0, 0, 1, 0, 0, 0],
       ...,
       [0, 0, 1, 0, 0, 0],
       [0, 0, 1, 0, 0, 0],
       [0, 0, 1, 0, 0, 0]])
```

Spliting Data

```
!pip install sklearn
```

```
Requirement already satisfied: sklearn in /usr/local/lib/python3.6/dist-packages (0.0
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.6/dist-packages
Requirement already satisfied: numpy>=1.8.2 in /usr/local/lib/python3.6/dist-packages
Requirement already satisfied: scipy>=0.13.3 in /usr/local/lib/python3.6/dist-package
```

```
from sklearn.model_selection import train_test_split
```

```
X_train , X_test , Y_train , Y_test = train_test_split(X,Y,test_size=0.20,random_state=4)
```

```
from sklearn.neighbors import KNeighborsClassifier as KNC
```

```
knn = KNC(n_neighbors=10)
```

```
knn.fit(X_train,Y_train)
```

```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
                     metric_params=None, n_jobs=None, n_neighbors=10, p=2,
                     weights='uniform')
```

```
knn.score(X_test,Y_test)
```

```
0.9685990338164251
```

```
jupyter nbconvert --to FORMAT notebook.ipynb
```

```
  File "<ipython-input-78-7cf26eddb1fe>", line 1
    jupyter nbconvert --to FORMAT notebook.ipynb
                      ^
SyntaxError: invalid syntax
```

SEARCH STACK OVERFLOW