week56_analysis

October 26, 2020

1 Analysis of Naive Bayes ML Algorithm

```
[1]: import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt
     from numpy import loadtxt
     from sklearn.model_selection import train_test_split
     from sklearn.metrics import accuracy_score
     from sklearn.metrics import f1_score
     from sklearn.metrics import precision_score
     import pickle
     from sklearn.metrics import confusion_matrix
     from sklearn.naive_bayes import GaussianNB
     from sklearn.naive_bayes import BernoulliNB
     from sklearn.metrics import recall_score
```

2 Training of the Dataset

```
[2]: train = pd.read_csv("final_dataset.csv",index_col = 0)
     data = train
     train.dropna(subset = ["Flow Byts/s"], inplace=True)
     data.dropna(subset = ["Flow Byts/s"], inplace=True)
     from sklearn import preprocessing
     for f in data.columns:
         if data[f].dtype == 'object':
             lbl = preprocessing.LabelEncoder()
             lbl.fit(list(data[f].values))
             data[f] = lbl.transform(list(data[f].values))
         elif data[f].dtype == 'float64':
             lbl = preprocessing.LabelEncoder()
             lbl.fit(list(data[f].values))
             data[f] = lbl.transform(list(data[f].values))
     data=np.array(data)
     data = data.astype(float)
```

/usr/local/Cellar/jupyterlab/2.2.8/libexec/lib/python3.8/site-
packages/numpy/lib/arraysetops.py:580: FutureWarning: elementwise comparison

1

```
failed; returning scalar instead, but in the future will perform elementwise
comparison
  mask |= (ar1 == a)
```

3 Modeling the Dataset with Naive Bayes ML Algorithm

```python
[3]: d0 = pd.DataFrame(data)
     X = d0.drop(83,axis=1)
     Y = d0[83]
     seed = 7
     test_size = 0.33
     X_train, X_test, y_train, y_test = train_test_split(X, Y, test_size=test_size,␣
      ↪random_state=seed)
     model=BernoulliNB(binarize=0.0)
     model.fit(X_train, y_train)
     y_pred = model.predict(X_test)
     misclassified_samples = X_test[y_test != y_pred]
     mc=misclassified_samples.shape[0]
     print("Misclassified :",mc)
```

```
Misclassified : 637737
```

4 Finding the Source IP's of Suspected Clients

```python
[4]: X_ind = X_test.index
     X_new = X_test.reset_index(drop = True)
     y_df = pd.DataFrame(y_pred)
     y_df.columns = [83]
     X_df = X_new.merge(y_df,left_index = True,right_index=True)
     X_df
```

```
[4]:                    0        1        2        3        4     5        6  \
     0          4306243.0   9152.0     80.0   9052.0  40486.0   6.0  43206.0
     1          4444294.0  10296.0  58551.0   8062.0     80.0   6.0  83253.0
     2          1757888.0   9040.0  59082.0   7608.0     53.0  17.0  47059.0
     3          4313308.0   9152.0     80.0   9052.0  54616.0   6.0  42516.0
     4          4721855.0  14397.0   4995.0  12467.0     53.0  17.0  14469.0
     ...              ...      ...      ...      ...      ...   ...      ...
     4212417    4285196.0  10300.0  64731.0   8059.0     80.0   6.0  72935.0
     4212418      82888.0   6906.0  51428.0   7749.0   3389.0   6.0  45464.0
     4212419    2209017.0   9158.0  50440.0   7608.0     53.0  17.0  52163.0
     4212420    4395312.0  24424.0  64541.0   8059.0     80.0   6.0  72913.0
     4212421    4385733.0  24424.0  54964.0   8059.0     80.0   6.0  73784.0

                        7     8    9  …   74   75   76   77   78        79   80  \
     0          5647100.0   4.0  6.0  …  0.0  0.0  0.0  0.0  0.0       0.0  0.0
```

```
1              7728.0    1.0   1.0   …    0.0   0.0   0.0   0.0   0.0          0.0   0.0
2              1732.0    1.0   1.0   …    8.0   0.0   0.0   0.0   0.0          0.0   0.0
3           4258538.0    4.0   4.0   …    0.0   0.0   0.0   0.0   0.0          0.0   0.0
4             95378.0    1.0   3.0   …    0.0   0.0   0.0   0.0   0.0          0.0   0.0
…                 …      …     …   …    …     …     …     …     …            …     …
4212417    26625170.0    2.0   0.0   …   20.0   0.0   0.0   0.0   0.0    611623.0   0.0
4212418     5906464.0   12.0   7.0   …   20.0   0.0   0.0   0.0   0.0          0.0   0.0
4212419         288.0    1.0   1.0   …    8.0   0.0   0.0   0.0   0.0          0.0   0.0
4212420     1601169.0    3.0   4.0   …   20.0   0.0   0.0   0.0   0.0          0.0   0.0
4212421     1222169.0    3.0   4.0   …   20.0   0.0   0.0   0.0   0.0          0.0   0.0

                  81          82     83
0                0.0         0.0    1.0
1                0.0         0.0    1.0
2                0.0         0.0    0.0
3                0.0         0.0    1.0
4                0.0         0.0    0.0
…                 …           …     …
4212417     366149.0    487302.0    0.0
4212418          0.0         0.0    0.0
4212419          0.0         0.0    0.0
4212420          0.0         0.0    0.0
4212421          0.0         0.0    0.0

[4212422 rows x 84 columns]
```

5   IP matched with the Preprocessing

```python
[5]: old_train = pd.read_csv("final_dataset.csv",index_col = 0)
vector = list(old_train['Src IP'].values.tolist())
from sklearn import preprocessing
lbl = preprocessing.LabelEncoder()
x = lbl.fit(list(vector))
vector = lbl.transform(list(vector))
vector1 = list(old_train['Src IP'].values.tolist())
v = pd.DataFrame(vector)
v1 = pd.DataFrame(vector1)
v.columns = [1]
vmerge = v1.merge(v,left_index=True,right_index=True)
vmerge
```

```
/usr/local/Cellar/jupyterlab/2.2.8/libexec/lib/python3.8/site-
packages/numpy/lib/arraysetops.py:580: FutureWarning: elementwise comparison
failed; returning scalar instead, but in the future will perform elementwise
comparison
  mask |= (ar1 == a)
```

```
[5]:                          0      1
      0            192.168.4.118  14447
      1            192.168.4.118  14447
      2            192.168.4.118  14447
      3            192.168.4.118  14447
      4            192.168.4.118  14447
      ...                     ...    ...
      12794622     209.85.203.113  17388
      12794623      172.31.69.17   9172
      12794624      172.31.65.49   8900
      12794625      172.31.67.58   9109
      12794626      172.31.65.89   8937

      [12794627 rows x 2 columns]
```

6 Source IP of Attackers with Preprocessed Values

```python
[6]: vdup = vmerge.drop_duplicates()
     src_ip = X_df[X_df[83]==1][1].values
     df_src = pd.DataFrame(src_ip)
     src_drop = df_src.drop_duplicates()
     vdupi = vdup.reset_index(drop=True)
     src_dropi = src_drop.reset_index(drop=True)
     src_dropint = src_dropi.astype(int)
     src_dropint
```

```
[6]:           0
      0       9152
      1      10296
      2      14399
      3       9155
      4       8907
      ...      ...
      21513  24501
      21514  29643
      21515   3568
      21516   3122
      21517   6047

      [21518 rows x 1 columns]
```

7 Conversion of Preprocessed data to IP address

```python
[7]: src_address = []
     p = src_dropint.shape[0]
     for i in range(0,p):
         src_address.append(vdupi[vdupi[1]==src_dropint.iloc[i][0]][0].values)
     h = len(src_address)
     src_address
```

```
[7]: [array(['172.31.68.19'], dtype=object),
      array(['179.56.181.140'], dtype=object),
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```

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…]
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[8]:
```python
src_addr_df = pd.DataFrame(src_address)
src_addr_df.to_csv('AttackSrcAddr.csv',index = False)
```

[ ]: