

Submission

✓ Ran successfully

Submitted by Leonardo Ferreira a month ago

Public Score 0.9180

Feature Engineering

~Almost~ all features of IEEE fraud detectetion dataset

Purpose of the kernel:

In the last week I worked in all features trying to improve my model. I've worked in almost all features and I decided to share with the kaggle fellows.

NOTE: Maybe not all features could be useful, but I think that this work could help other kagglers in Data manipulation or to create another interesting feature

Please if this kernel were useful for you, please **UPVOTE** the kernel

Importing Libraries

```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O
    (e.g. pd.read_csv)
import scipy as sp
from scipy import stats
import matplotlib.pyplot as plt
import seaborn as sns

# Standard plotly imports
#import plotly.plotly as py
import plotly.graph_objs as go
import plotly.tools as tls
from plotly.offline import iplot, init_notebook_mode
#import cufflinks
```

```
#import cuttlinks as ct
import plotly.figure_factory as ff
# Using plotly + cufflinks in offline mode
init_notebook_mode(connected=True)
#cufflinks.go_offline(connected=True)
# Preprocessing, modelling and evaluating
from sklearn import preprocessing
from sklearn.metrics import confusion_matrix, roc_auc
_score
from sklearn.model_selection import StratifiedKFold,
cross_val_score, KFold
from xgboost import XGBClassifier
import xgboost as xgb
from sklearn.preprocessing import minmax_scale
from sklearn.decomposition import PCA
from sklearn.cluster import KMeans
from scipy.spatial.distance import cdist, pdist
## Hyperopt modules
from hyperopt import fmin, hp, tpe, Trials, space_eva
1, STATUS_OK, STATUS_RUNNING
from functools import partial
import os
import gc
print(os.listdir("../input"))
```

```
['train_identity.csv', 'train_transaction.csv', 'test_transaction.csv', 'test_identity.csv', 'sample_submi ssion.csv']
```

Some functions

```
In [2]:
        ## Function to reduce the DF size
        def reduce_mem_usage(df, verbose=True):
            numerics = ['int16', 'int32', 'int64', 'float16',
        'float32', 'float64']
            start_mem = df.memory_usage().sum() / 1024**2
            for col in df.columns:
                col_type = df[col].dtypes
                if col_type in numerics:
                    c_min = df[col].min()
                    c_{max} = df[col].max()
                    if str(col_type)[:3] == 'int':
                        if c_min > np.iinfo(np.int8).min and
        c_max < np.iinfo(np.int8).max:</pre>
                             df[col] = df[col].astype(np.int8)
                         elif c_min > np.iinfo(np.int16).min a
```

```
nd c_max < np.iinfo(np.int16).max:</pre>
                             df[col] = df[col].astype(np.int16
                        elif c_min > np.iinfo(np.int32).min a
        nd c_max < np.iinfo(np.int32).max:</pre>
                             df[col] = df[col].astype(np.int32
        )
                        elif c_min > np.iinfo(np.int64).min a
        nd c_max < np.iinfo(np.int64).max:</pre>
                             df[col] = df[col].astype(np.int64
                    else:
                        if c_min > np.finfo(np.float16).min a
        nd c_max < np.finfo(np.float16).max:</pre>
                             df[col] = df[col].astype(np.float
        16)
                        elif c_min > np.finfo(np.float32).min
        and c_max < np.finfo(np.float32).max:</pre>
                            df[col] = df[col].astype(np.float
        32)
                        else:
                             df[col] = df[col].astype(np.float
        64)
            end_mem = df.memory_usage().sum() / 1024**2
            if verbose: print('Mem. usage decreased to {:5.2
        f} Mb ({:.1f}% reduction)'.format(end_mem, 100 * (sta
        rt_mem - end_mem) / start_mem))
            return df
        def PCA_change(df, cols, n_components, prefix='PCA_',
        rand_seed=4):
            pca = PCA(n_components=n_components, random_state
        =rand_seed)
            principalComponents = pca.fit_transform(df[cols])
            principalDf = pd.DataFrame(principalComponents)
            df.drop(cols, axis=1, inplace=True)
            principalDf.rename(columns=lambda x: str(prefix)+
        str(x), inplace=True)
            df = pd.concat([df, principalDf], axis=1)
            return df
In [3]:
        df_trans = pd.read_csv('../input/train_transaction.cs
        v', index_col='TransactionID')
        df_test_trans = pd.read_csv('../input/test_transactio
        n.csv', index_col='TransactionID')
```

df_trans = reduce_mem_usage(df_trans)

df_test_trans = reduce_mem_usage(df_test_trans)

In [4]:

Concatenating train and test

```
In [5]:
        labels = {np.nan: -999, 'nan': -999, 't': 1, 'f': 2,
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```



O ~Almost~ complete Feature Engineering IEEE data

Python notebook using data from IEEE-CIS Fraud Detection · 5,551 views · 1mo ago · ◆ starter code, beginner, tutorial, +2 more

Ver

```
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```

```
In []:

In [6]:

    df_test_trans['isFraud'] = 'test'
    df = pd.concat([df_trans, df_test_trans], axis=0, sor
        t=False )
    df = df.reset_index()

In [7]:

    df = reduce_mem_usage(df)

Mem. usage decreased to 1031.75 Mb (0.4% reduction)

In [8]:
    for c1, c2 in df_trans.dtypes.reset_index().values:
        if c2=='0':
              df[c1] = df[c1].map(lambda x: labels[str(x).1]
```

```
In [9]:
    print('Shape before PCA')
    df.shape
```

df.fillna(-999, inplace=True)

Shape before PCA

ower()])









```
In [10]:
        mas v = df.columns[55:1]
         for col in mas_v:
             df[col].fillna((df[col].min() - 2), inplace=True)
             df[col] = (minmax_scale(df[col], feature_range=(0))
         ,1)))
         df = PCA_change(df, mas_v, prefix='PCA_V_', n_compone
        nts=35)
         columns = ['PCA_V_0', 'PCA_V_1', 'PCA_V_2', 'PCA_V_3'
         , 'PCA_V_4', 'PCA_V_5',
                    'PCA_V_6', 'PCA_V_7', 'PCA_V_8', 'PCA_V_9'
         , 'PCA_V_10', 'PCA_V_11',
                    'PCA_V_12', 'PCA_V_13', 'PCA_V_14', 'PCA_V
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                    'PCA_V_27', 'PCA_V_28', 'PCA_V_29', 'PCA_V
         _30', 'PCA_V_31',
                    'PCA_V_32', 'PCA_V_33', 'PCA_V_34']
         km = KMeans(n_clusters=6)
         km = km.fit(df[columns])
         df['clusters_V'] = km.predict(df[columns])
         gc.collect()
Out[10]:
```

This kernel has been released under the Apache 2.0 open source license.

Did you find this Kernel useful? Show your appreciation with an upvote

35





















Data

Data Sources



v d	▼ IEEE-CIS Fraud Detection
	■ sample_submission.csv

 \boxplus test_identity.csv $142k \times 41$ \boxplus test_transaction.csv $507k \times 393$ \boxplus train_identity.csv $144k \times 41$



507k x 2

591k x 394

Can you detect fraud from customer transactions? Last Updated: 2 months ago

About this Competition

In this competition you are predicting the probability that an online transaction is fraudulent, as denoted by the binary target <code>isFraud</code>.

The data is broken into two files identity and transaction, which are joined by TransactionID. Not all transactions have corresponding identity information.

Categorical Features - Transaction

- ProductCD
- card1 card6
- addr1, addr2
- P_emaildomain
- R_emaildomain
- M1 M9

Categorical Features - Identity

- DeviceType
- DeviceInfo
- id_12 id_38

The TransactionDT feature is a timedelta from a given reference datetime (not an actual timestamp).

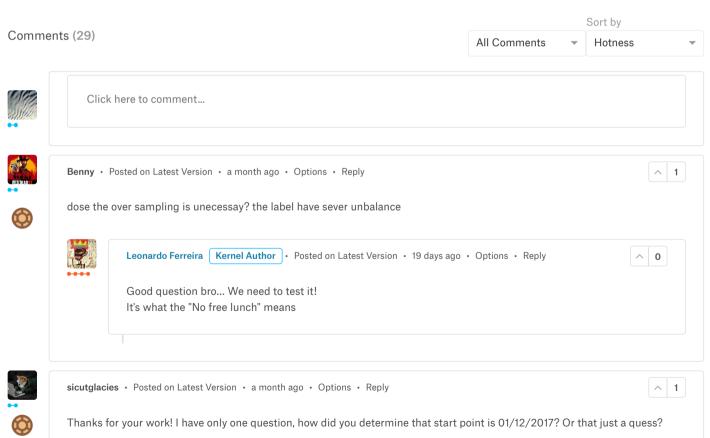
You can read more about the data from this post by the competition host.







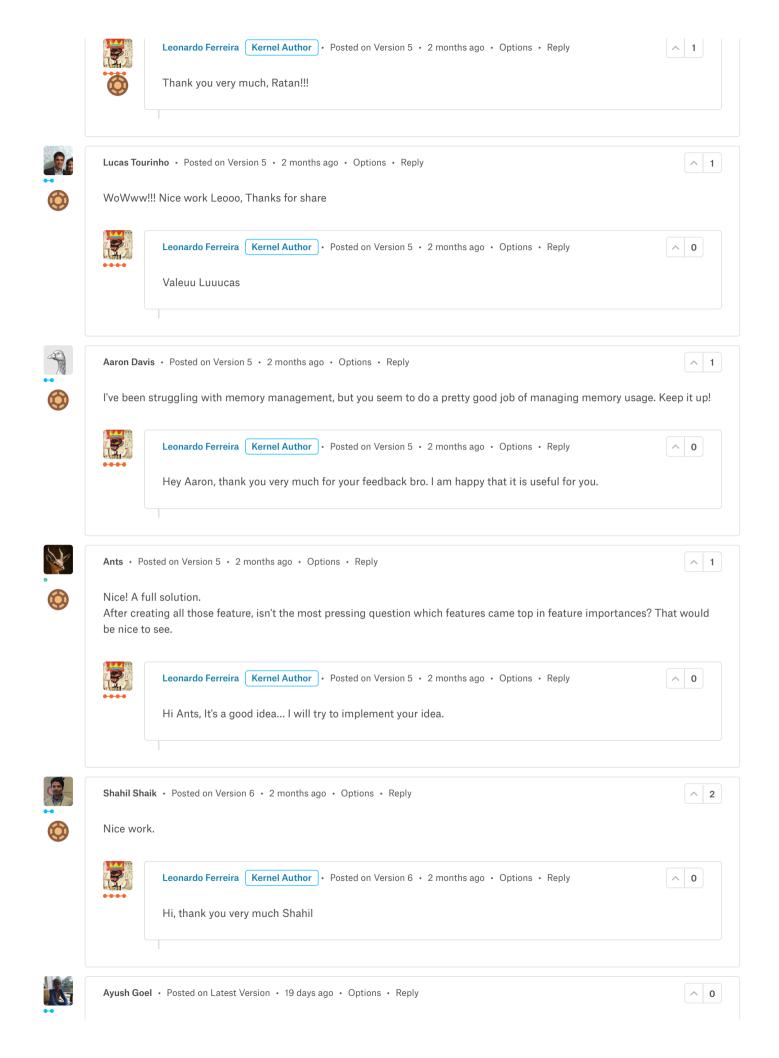
6	3663553	8.65192e- 05
7	3663554	3.9654995e -05
8	3663555	0.00113866 32
9	3663556	0.00244181 81
10	3663557	3.558498e- 05
11	3663558	0.00010949 105
12	3663559	0.00041510 82
13	3663560	0.00027160 25
14	3663561	0.00342851 55
15	3663562	3.0838262e -05
16	3663563	4.3902648e -05
17	3663564	0.00029371 819
18	3663565	0.00035246 85
19	3663566	0.00045081 295
20	3663567	0 00123404



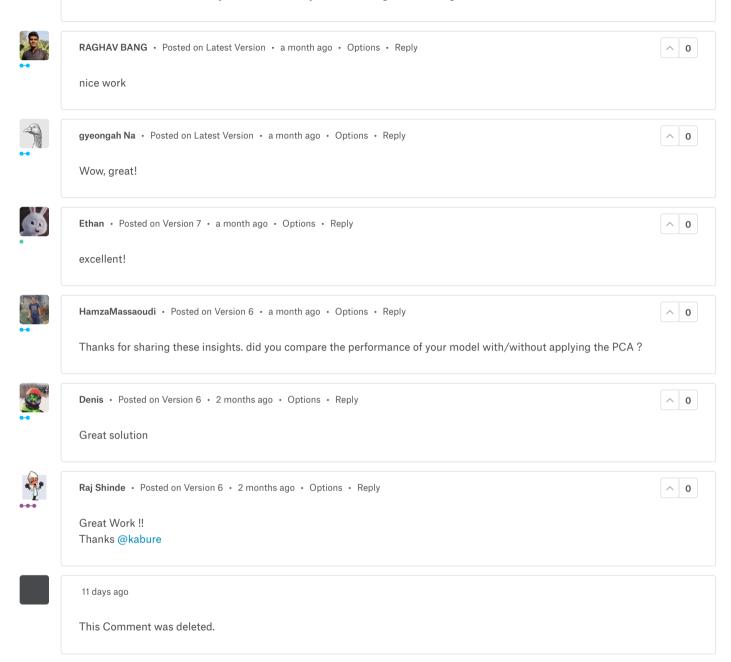
Leonardo Ferreira Kernel Author • Posted on Latest Version • 19 days ago • Options • Reply

^ 0

It's just a guess of any data... I think that doesn't matter bro. Thank you for your feedback; LongYin · Posted on Version 7 · a month ago · Options · Reply ^ 1 Thanks for sharing. Wish you be kernel GM. **Leonardo Ferreira** Kernel Author • Posted on Latest Version • 19 days ago • Options • Reply ^ 0 Thank you very much, Long!!! Möbius · Posted on Version 6 · 2 months ago · Options · Reply ^ 1 Brilliant! I think you got some infs: np.where(df_train.values >= np.finfo(np.float64).max) (array([116, 285, 3587, ..., 588413, 589253, 589985]), array([136, 136, 136, ..., 136, 136, 136])) **Leonardo Ferreira** Kernel Author • Posted on Version 6 • 2 months ago • Options • Reply ^ 1 Hi Móbius, thank you for your feedback. Would you clarify to me what you said?! I think I don't understand your comment Möbius · Posted on Version 6 · 2 months ago · Options · Reply ^ 0 Some features got inf value, during your features engineering and can have a negative effect on the algorithm performance you can drop that column(s). Nicholas Weimer · Posted on Latest Version · a month ago · Options · Reply ^ 0 inf=infinity value in python. i just had to look that up 😁 Nicholas Weimer · Posted on Latest Version · a month ago · Options · Reply ^ 0 thanks for the helpful kernel by the way. I upvoted it ratan rohith · Posted on Version 5 · 2 months ago · Options · Reply ^ 1 Great one!! @kabure thanks for sharing!



Hi, great kernel. I just had one question. In the fifth code block(part of the code: 'labels = {np.nan: -999, 'nan': -999, 't': 1, 'f': 2, 'm2': 3, '), I am assuming you did something similar to manual label encoding. Why did you set the values for strings across different columns to be in ascending order? Also, why didn't you use sklearn's label encoder. Also, this question is only if I understood the code correctly. Please correct my understanding if I am wrong.



Similar Kernels

















