TalkingData AdTracking Fraud Detection Challenge

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Data Source and Goals

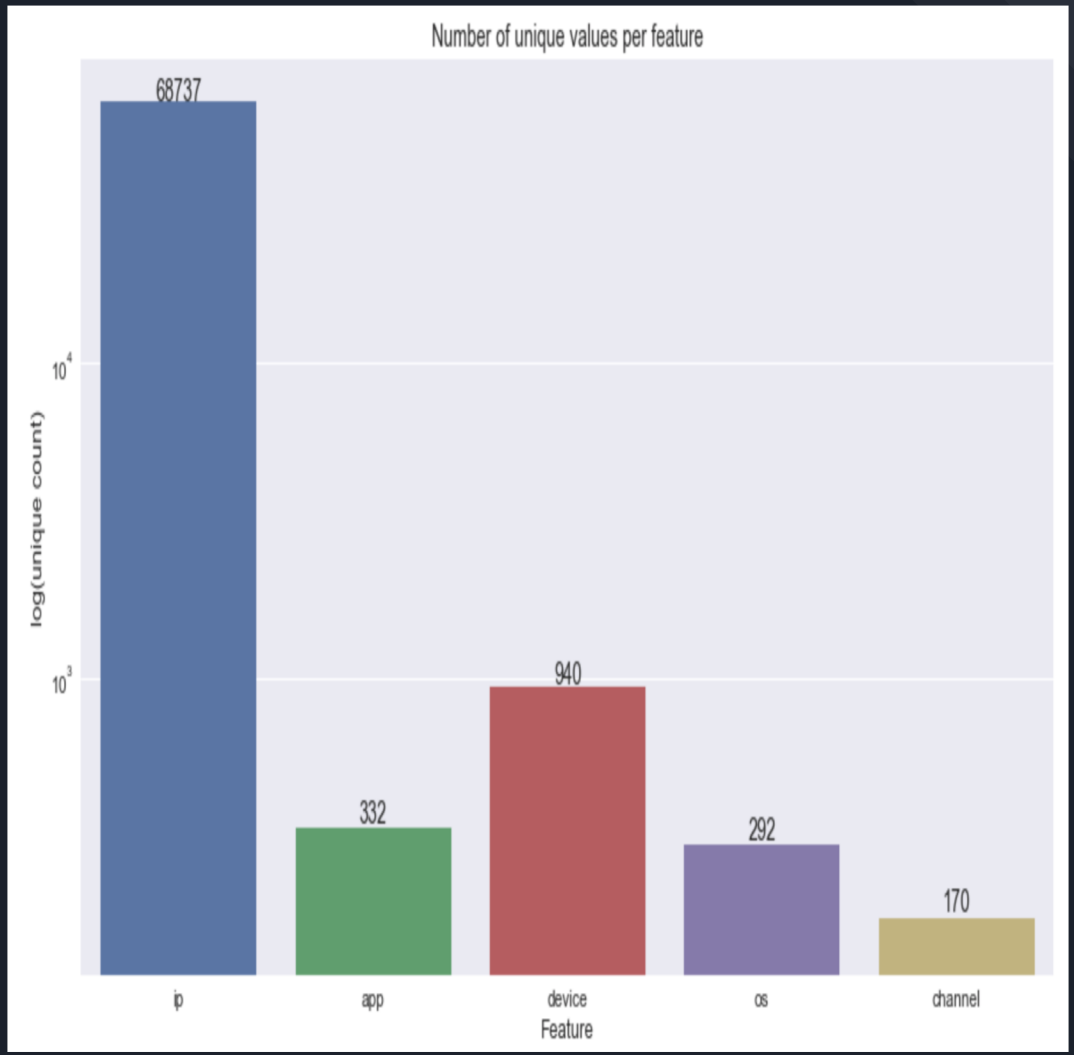
- Kaggle competition
- Predicts if the user will download an app after clicking in the mobile apps advertisement.

Project Data

- Train - 7 variables
- Test-5 variables
- Sample

- Target Variable:
  - Is_attributed(categorical)

- Predictor Variables:
  - IP
  - App
  - Device
  - OS
  - Channel
  - Click Time
  - Attributed time



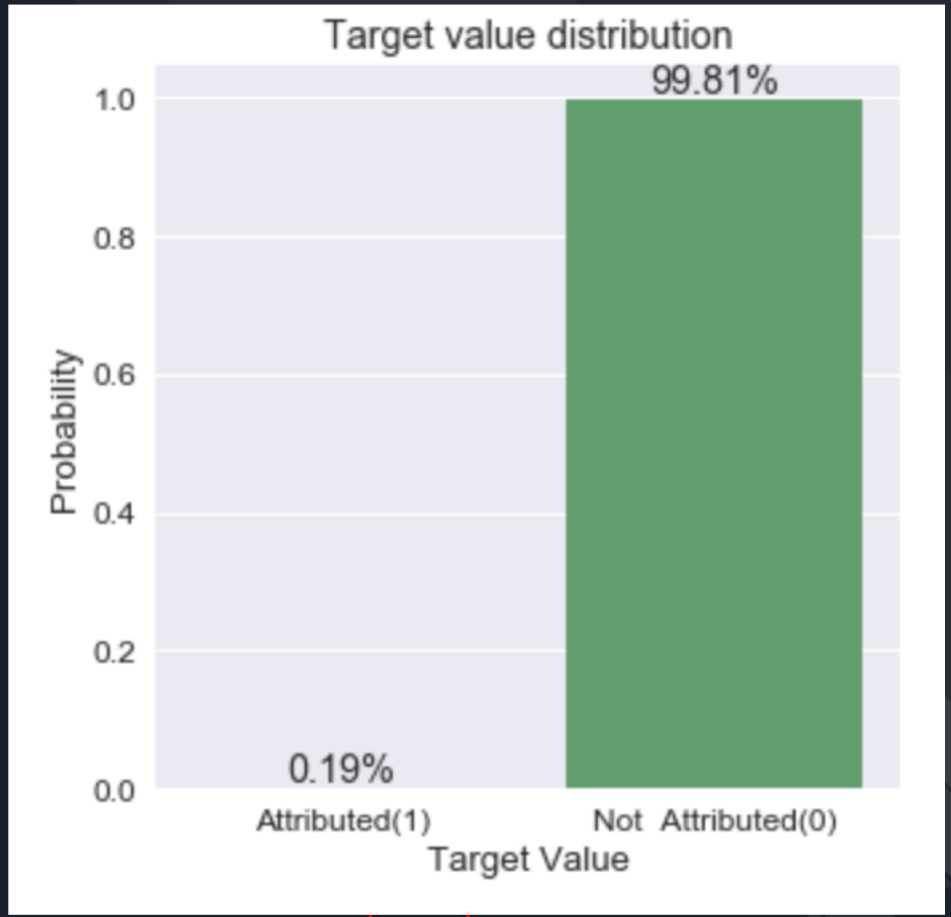
Exploratory Data Analysis

10mill rows, 250 skip rows

Target value distribution

- Only 0.19% has downloaded an app after clicking the mobile app

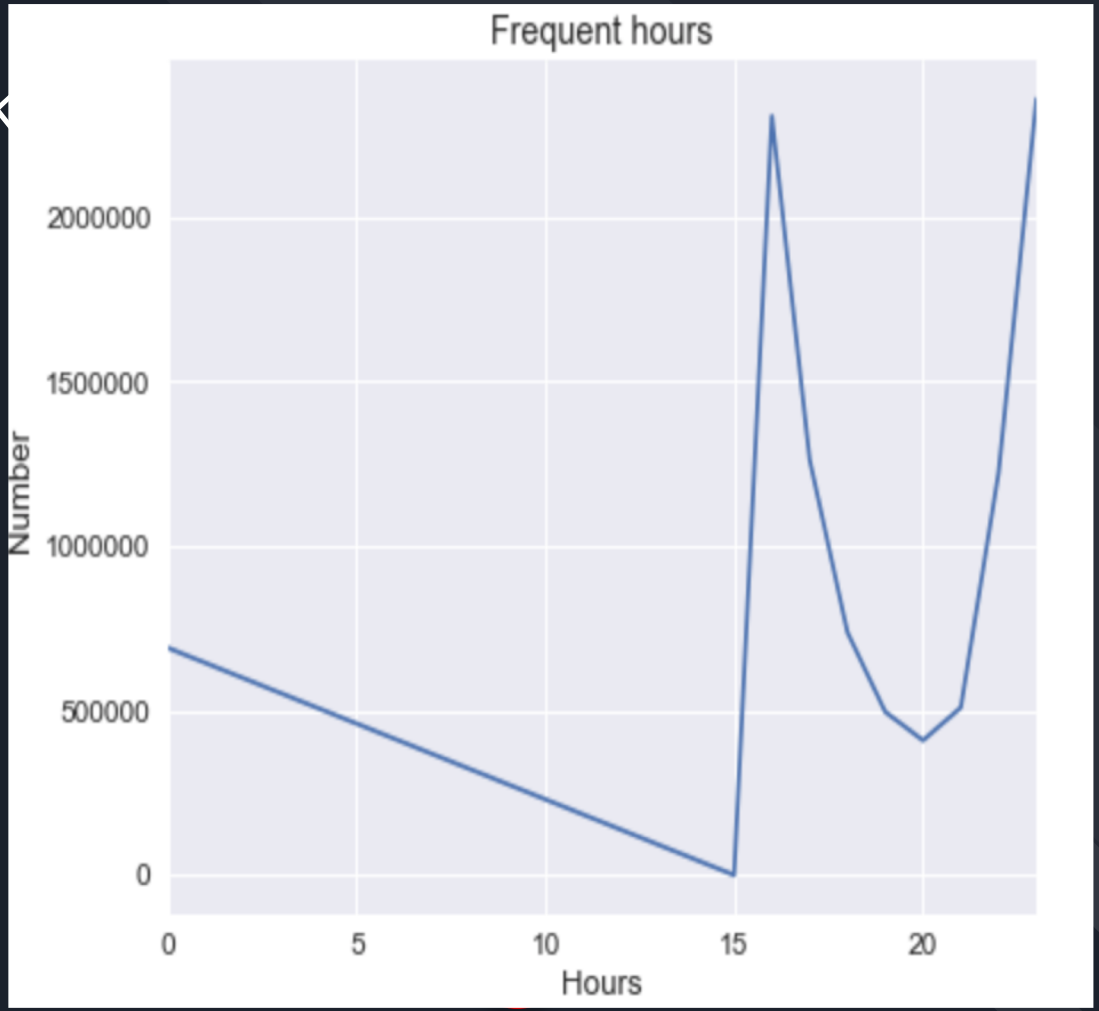
- We have a unbalanced dataset



Hourly distribution of click time

- From 12am-3pm, there is a decreasing trend.

- Highest number of click is at 4 pm



Feature Description

- ATTRIBUTION:

```
Calculating confidence-weighted rate for: ['os', 'device'].
Saving to: os_device_confRate. Group Max /Mean / Median / Min: 2348023 / 6472.49 / 3.0 / 1
```

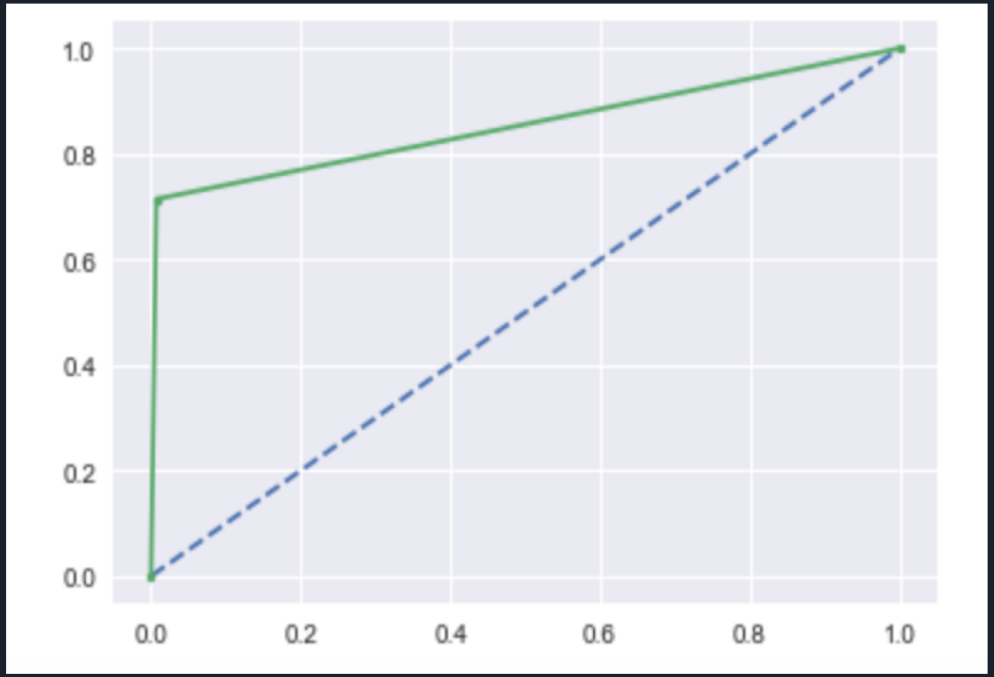
- AGGREGATION:
  - Average clicks on app by distinct users; is it an app they return to?
  - How popular is the app or channel?

- NEXTCLICK:
  - Frequency of past and future in same ip, app and channel

XG Boost

- MODEL SPECIFICATION:
  - Gradient boosting decision algorithm
  - Training and Valid Accuracy increases in each iteration

```
[0]     train-auc:0.90349       valid-auc:0.879048
[10]    train-auc:0.938977      valid-auc:0.939491
[20]    train-auc:0.941291      valid-auc:0.940179
[30]    train-auc:0.943421      valid-auc:0.942232
[40]    train-auc:0.949386      valid-auc:0.942464
[50]    train-auc:0.954674      valid-auc:0.941487
[60]    train-auc:0.958978      valid-auc:0.940165
[70]    train-auc:0.961994      valid-auc:0.941022
[80]    train-auc:0.964812      valid-auc:0.942077
[90]    train-auc:0.967064      valid-auc:0.942405
[99]    train-auc:0.968163      valid-auc:0.942163
[102.00958800315857] Finish XGBoost Training
```



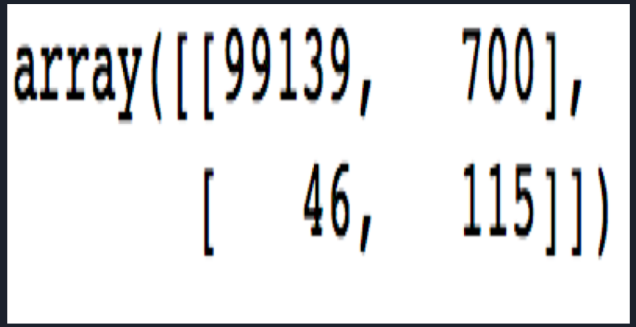
ROC Curve:

- Usefulness of true positive against false positive rate

Confusion Matrix

Accuracy Result/Confusion Matrix/:

- Accuracy: Overall, how often is the classifier correct?99.275%
- Misclassification Rate: Overall, how often is it wrong?0.746%.
- True Positive Rate: When it's actually yes, how often does it predict yes? 0.115%
- False Positive Rate: When it's actually no, how often does it predict yes? 0.70%
- True Negative Rate: When it's actually no, how often does it predict no? 99299%



Random Forest

Standardization:

- Not necessary
  - Robust to numerical instabilities due to partitioning rules that wouldn't change with scaling

Model Specifications:

- Number of trees
  - Ideally select largest amount of trees your computer can handle

- The model predicts 0.99808 accuracy.
- Random_state = 99, n_estimator=100

```
Accuracy: 0.99808
```

Best Classifier

XGBoost and Random Forest model predicts download app best

Accuracy Score:

- XGBoost= 0.968
- RF=0.99808

Conclusions

- If non encoded features were provided, the model would explain better result and helps in tracking fraud click.
- Hour 16, 17, 22, 23 has the highest click time of the day.
- Need more computation power to run the whole dataset.