# Improving Customer Retention Using Customer Segmentation


Abstract:
Companies are always looking for maintaing their customers' satisfaction level. So, we had a Starbucks dataset in which companies had differnet deals for mobile, web and sms subscribers and we had to determine on whcih platform, we got most of the customers attracted towards our comapny.


Data
We had Starbucks original dataset which was formed by combination of three different datasets i-e;
Portfolio
Profile
Transcript

Features:
We had a total of 70-80 different features in our dataset out of which some are:
Event
Time
Reward Received
Gender
Email
Mobile etc.

Discussion:
Data was cleaned and reformat. It was rather tricky as we have json and array format within a column that needs to 'unstack'. Other procedure was fairly common like filling missing value and rename few column.
PCA come out not as rewarding, since 10-20 dimesionality already covers the data. Yet at the same time, that means we have discovered few features that actually representative for all. Low pca also means good performance!

Results:
The model is quite useful as it predicts the clusters of customers based on the number and type of offers they achieve and their response rate to the offers.
The model can be easily deployed on the web as it is relatively light using a flask script.
The number of clusters are small enough to have any real world implications.

Models:
We used KMeans and DBSCAN. The mathematical formula for Kmeans is as:

$$\arg\min_{\mathbf{S}} \sum_{i=1}^{k} \frac{1}{2|S_i|} \sum_{\mathbf{x},\mathbf{y}\in S_i} \|\mathbf{x}-\mathbf{y}\|^2$$

$$E = \sum_{i=1}^{k} \sum_{\mathbf{x}\in C_i} d(\mathbf{x}, \mu(C_i)),$$


References:
[1] Analysis of banking data using machine learning | Priyanka S. Patil
[2] Forecasting client retention – A machine-learning approach | Satu ElisaSchaeffer


Future:
This model can be used as a commercial application for the companies that are unable to use ML applications for customer retention.


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