Unsupervised Learning as a standalone technique to solve business problems in credit card industry

Two types of Unsupervised Learning based on Business Problems – Standalone + Pattern discovery for better Supervised Learning

- Clustering for segmentation
- Association Mining
- Anomaly Detection
- Noise/Signal Separation
- Certain types of Recommendation Systems
- Variable Reduction – PCA
- SVD Techniques for Sparse Matrices
- Clustering for identifying subgroups

Identifying potential customers for credit card upgrade – Grade A to Grade B

Problem Statement & likely output

Problem Statement – How to increase Credit Card Spend and loyalty of existing customers

Refined Statement – How to identify the customers who are more likely to upgrade from Grade A to Grade B card. It will ensure additional revenue as card fee + more spend + stronger loyalty

Data Science Statement – Identify what drives a credit card upgrade and identify CMs who have been exhibiting similar behaviour on those attributes

Likely Output – Targeted list of Grade A Card customers who are likely to upgrade to Grade B. It could be an excel based list being generated monthly or a Dashboard where this list can be downloaded after applying filters on attributes and attributes can be studied as well for initiating meaningful conversations

Initial Approaches & Final Approach

Initial Approach – Obtain a list of past upgrades who were pitched for an upgrade and resulted in 0 & 1. Train a classifier to come up with a probability score denoting the chances of upgrade. Since this list could not be obtained or enough data was not available as this exercise was not carried in a structured manner in the past. Also, lot of data understanding work was involved because. We will need to study the pre – upgrade behaviour of different customers.

New Approach – Obtain a list of Grade A Customers & Grade B customers. Understand their spend behaviour. Figure out a list of mixed customer Grade A & Grade B sticking together in the form of clusters. Filter out the list of Grade A customer from different clusters and share the list. Meaningful conversation can be started since spend behaviour of Grade A customers can be talked about.

Data Collection & Preparation

Data Sources – Transaction Data with Variables

Card Number, Type of Card, Date of Transaction, Transaction Id, Merchant ID, Type of Product, Spend Category,

Customer Demographic Data with Variables

CustId, Name, Age, DoB, Cust_Date, Billing Address, Communication Address

Customer Card Relation Data with Variables

CustId, Card Number, Date Issued, Card Type, Status

Card Details Data Variables

Card Number, Card Type, Spend Limit, Geography(State, Country), Active Status, Delinquent Status, Limit Breach Status, Risk Score

Joining the tables to prepare data

Final Data with Variables – Card Number, Card Type, Domestic Travel Spend(3,6,9,12), International Travel Spend(3,6,9,12), Lounge Spend(3,6,9,12), Restaurant Spend(3,6,9,12), Shopping Spend(3,6,9,12), Number of Transactions in Domestic Travel(3,6,9,12), International Travel(3,6,9,12), Lounge Spend(3,6,9,12), Restaurant Spend, Shopping Spend (3,6,9,12),

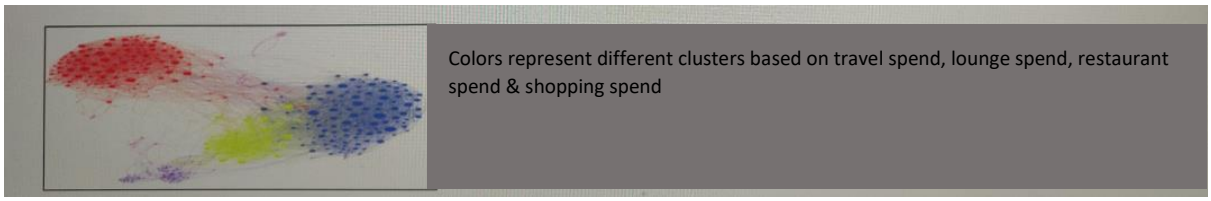
Final Data for KMeans

Sample Data.csv – Refer to the shared data. This is the demo representation of the original data since original data is not available because of compliance issues

Kmeans Output and converting it for Business Consumption

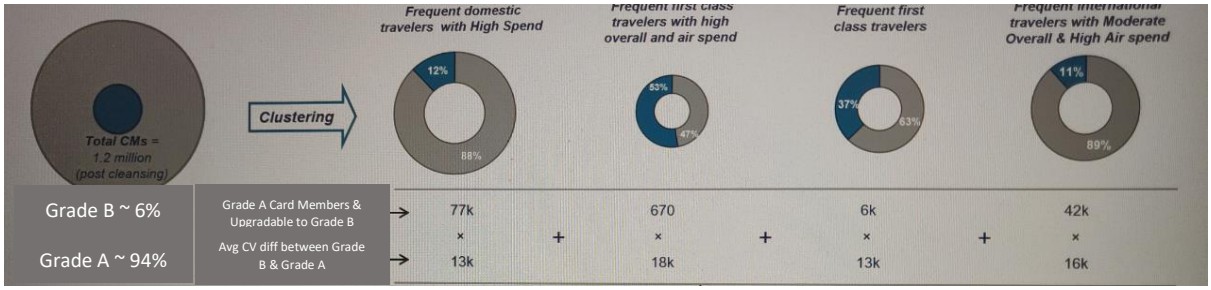
Why ?

Additional Revenue	Higher Stickiness	Better Client Experience
$350 annual fee for higher grade B card. Customers with grade B card spend 3.4x more than grade A card	Higher grade card members are more loyal Spend leakage for grade B CMs is 1.6x less than grade A card CMs	Right fit for right type of expense sizes Provide premium service to the members



Colors represent different clusters based on travel spend, lounge spend, restaurant spend & shopping spend

Value Proposition



Results to $$ Conversion

	# Grade A members	CV from fee with Conversion @ 4%	CV from additional expense with Conversion @ 4%
Spend more than certain limit	8805	123270	
Similar spend pattern with that of Grade B members	48190	674660	28914000
Total Additional CV			**29,711,930**