Machine Learning Applications in Banking World

Level: PG (MBA)/UG)

Credit: 1

Prerequisites- Basics of Statistics, Quantitative Methods.

Course Objective: To familiarize students with the application of machine learning techniques in the banking industry. The course will give an idea about consumer journey and life cycle in banking industry and how machine learning can be applied to better serve the customers and to get competitive advantage in the market.

Course Contents:

Customers' life cycle in the world of Banking : Brief description of different stages of CLC
Analytical Solution across different Customer Life stages
Machine learning application in Analytics and Journey towards ML
ML applications across functions

Suggested Reference Books:

No book is needed. Materials will be provided.

Case studies on Credit Card Sales, First Business Problem and Fraud Detection will be discussed

Packages:

R packages

library(caTools),library(datasets),library(plyr),library(dplyr),library(class),library(caret),library(readr),
library(e1071),library(nnet),library(gbm),library(readr),library(mlr),library(class),library(ipred),library(rpart),library(randomForest),library(xgboost),library(glm2),library(kohonen),library(lsa), library(text2vec),library(tm),library(topicmodels) ,library(tidytext) ,library(dplyr) ,library(ggplot2) ,library(reshape2),library(ldatuning), library(stringr), library(ggplot2)

Python packages

sklearn, xgboost, ann,PyLearn2,Tensorflow, scikit-surprise,pandas,nltk,gensim

SESSION PLAN

Total duration: 12 hrs

Lecture 1 to 3

    1) Customers' life cycle in the world of Banking : Brief description of different stages of CLC
    a. Understanding customer needs across different stages in banking

    b. Creating an accurate and unique profile of homogeneous set of customers

    c. Studying customer behavior and thereby understanding different approaches to engage customers across different life cycle

2) Analytical Solution across different Customer Life stages :

a. Understanding different dimensions of data to study customer behavior such as integration of transactional data, behavioral data, conversation data

b. Linking products to customer by identifying customer needs

c. Designing risk models that holistically captures the financial-crime risk of a customer

d. Using predictive modeling, data visualization and segmentation techniques enhancing relevance of marketing campaigns

e. How personalization using ML driven solution is leading to better customer experience

f. Putting the customers at the heart of everything:
    i. Optimal targeting
    ii. Approaching through preferred channel
    iii. Valuing customers' privacy

g. Success and failure in product marketing

Lecture 4 to 6

Case Study: Business problem with given customers profiles- credit card x-sell (Kaggle Data)

    o Constructing a strategic roadmap to determine key steps for creating a comprehensive cross sell program. The idea is to clearly articulate short-term and long-term acquisition plans for each step, from audience selection to targeting, offer tailoring, pricing and channel optimization. The ultimate business goal was to deepen portfolio penetration while optimizing risk and revenue trade-offs.

3) Machine learning application in Analytics and Journey towards ML

    Detailed ML applications across functions

    a. POCs/Projects presenting solutions for each life stage : This will encompass and handson

     *i. Unsupervised Segmentation - **SOM***
    *ii. Predictive model building using ML algorithms : **Random Forest, Xgboost***
  *iii. Personalized communication using web browsing history : **ANN***
  *iv. Recommendation framework using historical behavior : **Collaborative Filtering***
     *v. Fraud detection using digital footprints : **GBM***
   *vi. Customer experience enhancement : **Sentiment Analysis & topic modeling***
 *vii. Logistic regression: **Why still preferred in Risk Analytics***

   b. Market Mix Modeling

Lecture 7 and 9

Case Study1: Continuation of the first Business problem

Case Study 2: Identifying Digital Fraud

o Digital technologies are transforming the way people access banking services, as well as turning digital banking fraud into a fast-growing global industry. But huge regulatory changes are also approaching that will create new potential threats to bank security and give banks wider liabilities for fraudulent transactions on their customers' accounts. Under such circumstance, it is of utter importance for banks to come up with a robust framework to proactively identify fraudulent transactions and

Lecture 10 to 12

Group discussion: Discussion around different solutions presented

  4) Analytics products Demo

     i. Image recognition
    ii. Speech to Text
  iii. NLP applications
  iv. Neural Machine translation
    v. Video Analytics
  vi. Time Series Prophet Forecasting