RECOMMENDING TOP-N BANKING PRODUCTS TO CUSTOMER BASED ON IMPLICIT DATASET

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Date : 12-February-2020

Introduction/Background

- During the last few decades, with the rise of content over the web, it's very crucial to understand your audience and present them information which they are looking for or what they need it but due to heavy amount of information on the web or applications, users usually **miss the information**.
- Presenting information/item as per the user's taste (**personalization**) can increase the probability of buying that item or reading that information (in case of article/news).
- So **Recommendation system** is an information filtering system which recommends item based on user's likes . Recommendation system learn user's buying or watching pattern in order to personalize the information for any user's per their choice.

Introduction/Background

With the rise of applications like YouTube, Amazon, Netflix and Flipkart the recommendation system started taking more and more importance in our life and below facts support this statement:

- More than 80% TV shows/movies people watch on **Netflix** are discovered through the Netflix's Recommendation system.
- 20% to 35% sale volume of Amazon is derived from Recommendation system.
- Google news recommendations generate 38% more clickthrough.

Literature Review

There are lot of literature available on the web for recommendation system but very few are available for implicit feedback dataset.

- In 2008, Y. Hu, Y. Koren and C. Volinsky published a paper on "Collaborative Filtering for Implicit Feedback Datasets". In this paper they introduced concept of Preference-Confidence for implicit data.
- In other words, for each user - item pair, they derived from the input data an estimate to whether the user would like or dislike the item("Preference") and couple this estimate with a confidence level. They provided a latent factor algorithm that directly addresses the preference - confidence paradigm.

Literature Review

- If a user u consumed item i then we have an indication that u likes item i (pui=1).

  On the other hand, if u never consumed an item i then we believe no preference (pui=0). However, our beliefs are associated with greatly varying confidence levels.

  Pui values are defined by binarizing rui values: $pui = \begin{cases} 1 & rui > 0 \\ 0 & rui = 0 \end{cases}$

- In 2018, Abdorreza and Martin published a paper on “Presenting Bank Service Recommendation for Bon Card Customers”. In this paper, they presented an architecture in banking area for recommending the specific POS for available customers with the help of powerful approach called Singular value decomposition.

Problem Statement

It is easy to develop recommendation system for explicit dataset as this contains user's likes and dislikes in terms of rating but collecting explicit feedback from user is costlier and as well as it does not truly represent user's view (as some time user just provide rating to bypass the rating step).

In response to this problem, our research proposes to develop top-n recommendation system on implicit feedback data by using a scoring technique to understand user's confidence in purchasing any product.

Aim and Objective

Aim:

To Propose a Recommendation System algorithm for recommending top-n banking product to existing customer of the bank/financial institution based on implicit dataset (purchase history of the customer with the bank) available with the bank/FI.

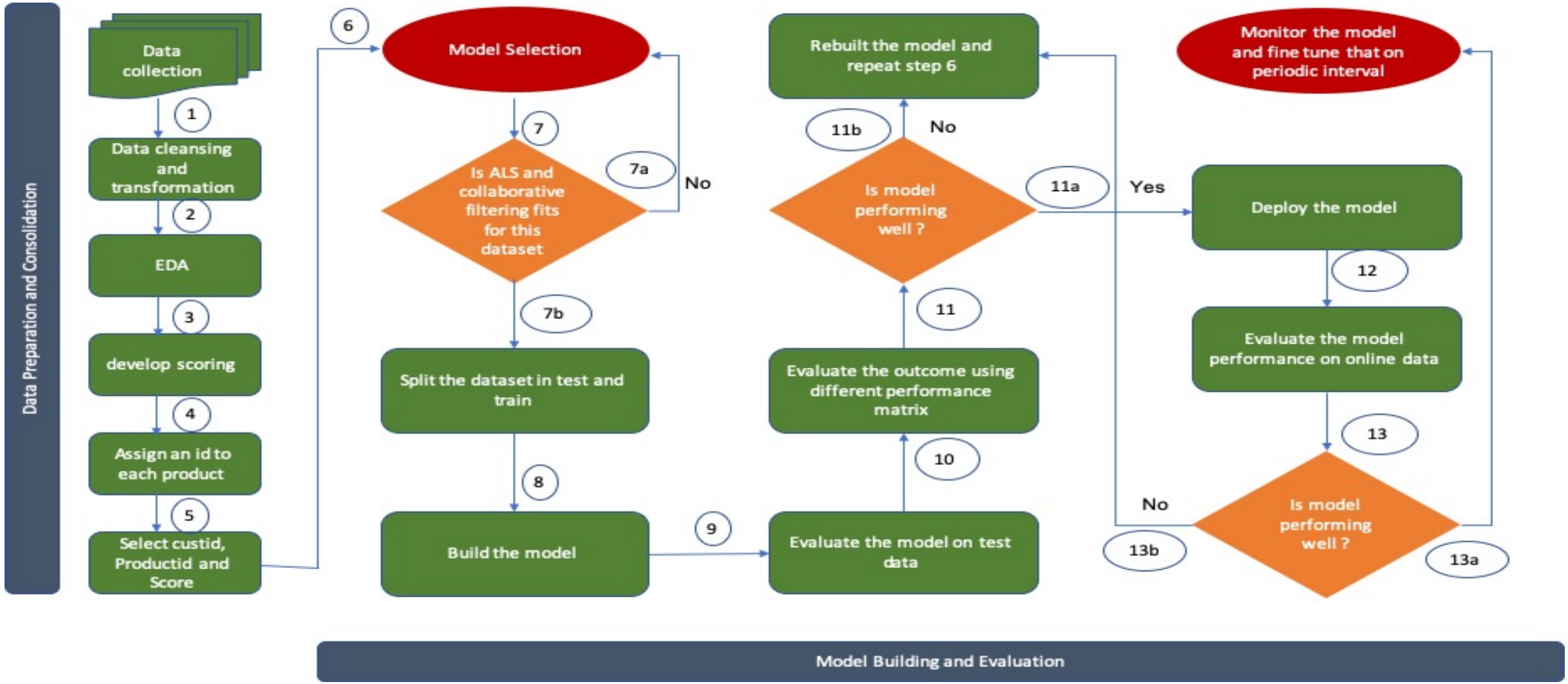
Objective:

Following are the objective of this research:

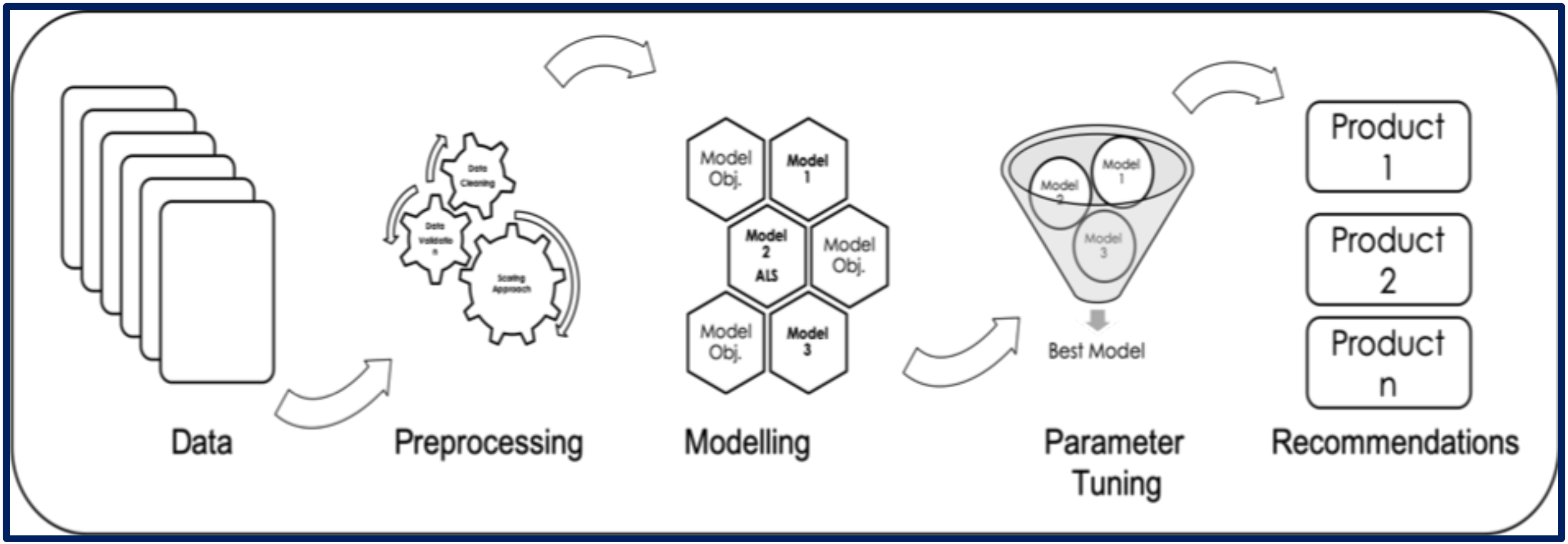
- To propose a scoring technique which can help in understanding user's confidence on performed action(purchase) using implicit data (binary in nature).
- To propose approach of cross selling of products to existing customer.
- To propose Top-n performing products among existing customer.

Research Methodology

In this research quantitative research methods are used.

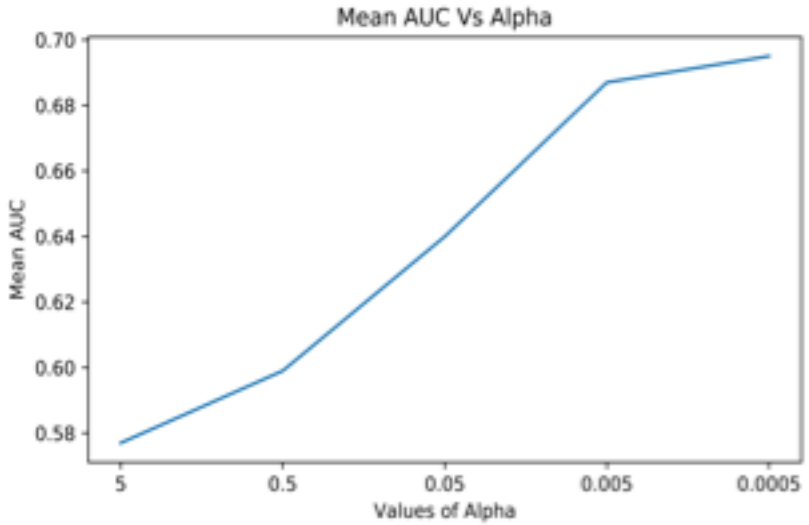


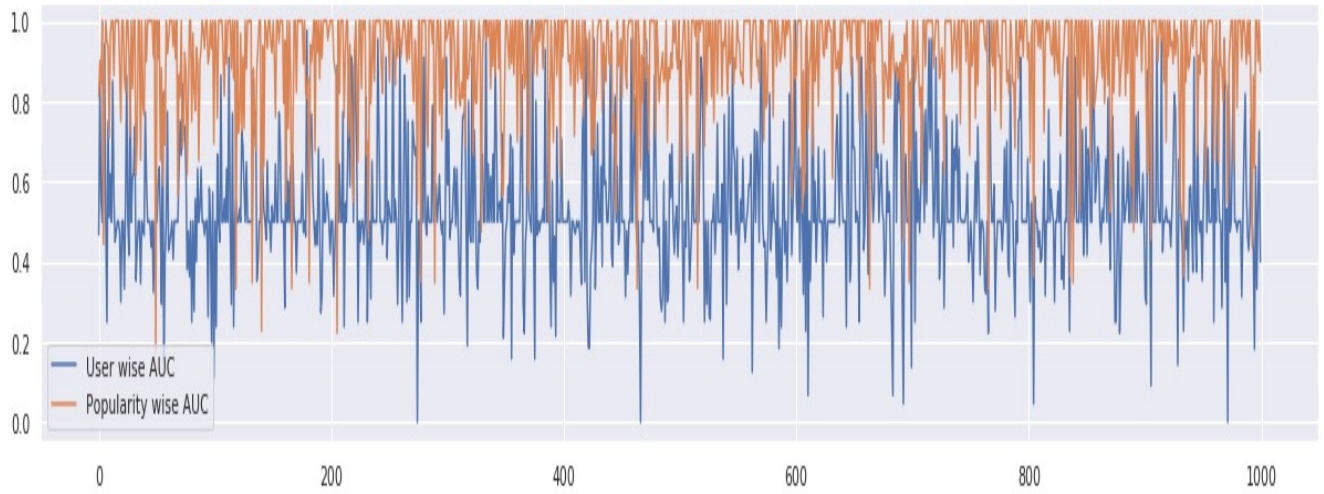
System Design



Results and Discussion

Evaluation parameter	Result
Mean AUC (at alpha= 0.0005)	0.699
MAP at 10	0.052
Mean Recall	0.42





Conclusion

- Recommending top-n banking products to customer based on implicit dataset (binary form) has been studied in this research.
- A scoring approach is developed using implicit dataset to understand the users confidence- preference on the purchased product
- Cross selling of the product with existing customer is studied and also how it can be increased is studied in this thesis.
- This approach is computationally efficient and also provide the list of features which are playing a key role in generating the recommendation of the product
- In this research, we have seen that how implicit dataset is cheaper and accurate in identifying the user's buying/purchasing pattern as compared to the explicit dataset.
- Confidence-Preference paradigm is discussed and implemented in this research and also highlighted the importance of the same in banking and FI use cases.

Future works

- Online evaluation of the proposed model.
- Some other form can be also used for developing scoring approach eg: advance algorithms.
- Matrix factorization is used in this research for identifying latent features and some other advance algorithm can also be considered to perform this task as part of the future research.

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Thank You!!!!!