IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 6, June 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.165

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006078 |

SHARE BOOK: Connecting Readers, Full Stack Application with Hybrid Recommendation Model

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ABSTRACT: The habit of reading affects an individual's mind very much. Reading is a hobby or habit which is possessed by many people. For some it is to gain knowledge while for some just a hobby. It not only increases knowledge but improves concentration and focus as well. There is a limitation on the number of books one can buy as well as store. So, a feasible solution is to borrow books.

Share Books is a place for book enthusiasts willing to go out of their comfort zone and explore new genre and authors. The is a platform for anyone who wants to borrow book or are willing to lend one. Through web browser user can search for any book by its title or author and can then contact the owner.

The search is based on a hybrid recommendation system using both Content Based Filtering and Collaborative filtering. The results will be based on the search query initially, after that there will be recommendations of books from the recommendation model.

Therefore, our motive is to have a one stop platform for people who love to read or want to begin without having to invest money or worrying about space. This will give users the freedom to explore, uncover some hidden gems from the universe of books.

KEYWORDS: Machine learning, Content based filtering, Collaborative filtering, Full Stack Application.

I. INTRODUCTION

With the rapid development of today's society, the emergence of sharing economy has brought great convenience to people's production and life, which makes the service industry pay more attention to the improvement of efficiency. Book sharing platforms are an open place for people to consult, browse and obtain knowledge and information.With the development of economy and the rapid development of Internet information technology, people have more and moreaccess to information resources.

Social media is an essential component of book marketing; using it effectively can get your book in front of the people who most want to see it, and posting in an authentic and engaging way can widen your audience and generate buzz around your title, but a smart social media strategy requires an understanding of who is using each platform and why, and what aspects of a book translate best across each network. Social media is also used for promotion of products and small businesses.But the range of social media is stillquite limited to the field of entertainment like acting/dancing/singing. This platform providesan opportunity specifically to writers, bloggers and enthusiastic readers to share their writings and thoughts.

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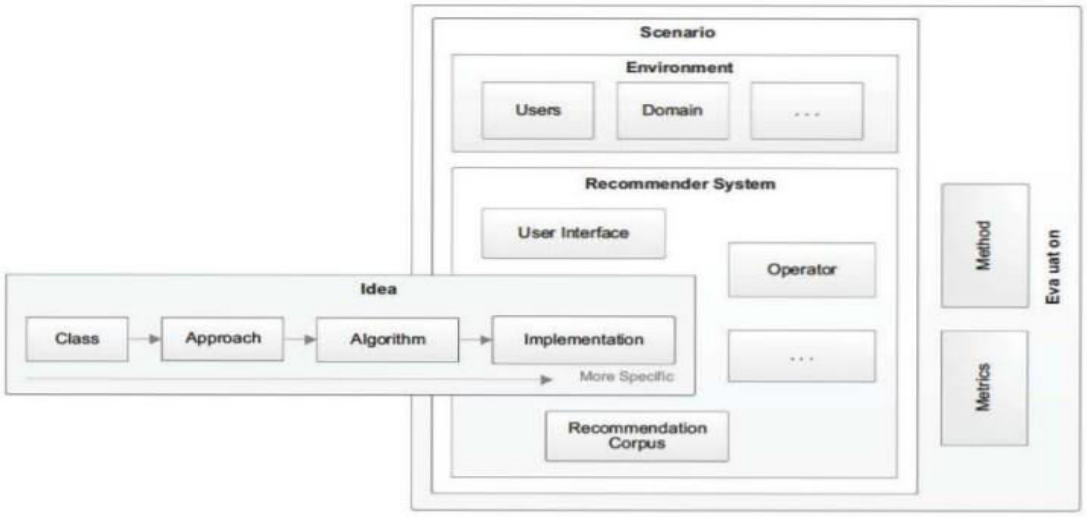
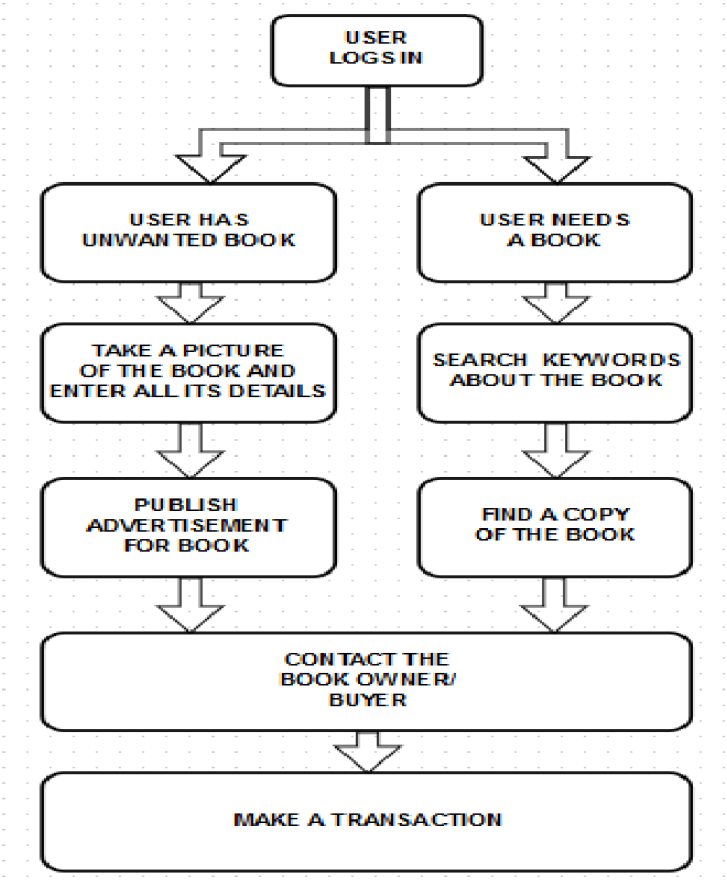


Fig 1.1: Illustration of recommendation system terminology and concepts

The purpose is to build a platform for there aders' community. It will give an opportunity for people to post their poems/ writing/ short stories and also can be used for promotion oftheir books. Like any other social media platform, it provides the searching facilities based onvarious factors such as Users, Shares, Photos, Book Name. It will be designed to show the informationand description of the Users and Shares. All the fields such as Users, Shares, Book Name are validatedand do not take invalid values. It will provide filters on Shares, Photos, Book Name. Through thispeople will be able to share books among themselves. This will ensure and promote a growth of talent amongstpeoplewholovetoreadandwritetheirthoughts. The below diagram gives a basic idea about how the platform will work.



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II. LITERATURE SURVEY

1. Cheng Luo1,* , Ying Chen1 says Based on the current situation, from the perspective of the sharing economy, it adds a lot of convenience to daily life. When accessing information or resources, the content that people want can be obtained quickly and easily through the Internet. At present, it has a great impact on the traditional private book system. The purpose of this paper is to study the design and research of the private library sharing system under the sharing economy in the current information age. The research method adopted in this paper is to first build a shared cloud platform, and build a private book platform by using RFID; CAN bus technology; network communication protocol and other research methods. Finally, the literature research method is used to understand the domestic plan for the construction of a private book function sharing system and the use of network surveys to analyze the resource utilization rate of domestic private libraries, which provides powerful data for the modern shared economy model of private book sharing systems. stand by. Experimental research results show that by creating a shared platform, more idle resources can be used more effectively to meet people's more diverse needs. In addition, the establishment of a shared platform helps to establish and improve the supervision and management mechanism.

2. Xiongcai Cai, Michael Bain, Alfred Krzywicki, Wayne Wobcke, Yang Sok Kim, Paul Compton, Ashesh Mahidadia says predicting people other people may like has recently become an important task in many online social networks. Traditional collaborative filtering approaches are popular in recommender systems to effectively predict user preferences for items. However, in online social networks people have a dual role as both “users” and “items”, e.g., both initiating and receiving contacts. Here the assumption of active users and passive items in traditional collaborative filtering is inapplicable. In this paper we propose a model that fully captures the bilateral role of user interactions within a social network and formulate collaborative filtering methods to enable people to recommend people. In this model users can be similar to other users in two ways – either having similar “taste” for the users they contact, or having similar “attractiveness” for the users who contact them.Traditional social filtering or recommender systems attempt to discover user preferences over items by modeling the relation between users and items. The aim is to recommend items that match the taste (likes or dislikes) of users in order to assist the active user, i.e., the user who will receive recommendations, to select items from an overwhelming set of choices. Such systems have many uses in e-commerce, subscription-based services and other online applications, where provision of personalized suggestions is required. By applying recommendation techniques, it is possible to greatly increase the likelihood of the successful purchase of products or services by the active user.

3. Joeran Beel, Bela Gipp, Stefan Langer, Corinna Breitinger found that more than half of the recommendation approaches applied content-based filtering (55%). Collaborative filtering was applied by only 18% of the reviewed approaches, and graph-based recommendations by 16%. Other recommendation concepts included stereotyping, item-centric recommendations, and hybrid recommendations. The content-based filtering approaches mainly utilized papers that the users had authored, tagged, browsed, or downloaded. TF-IDF was the most frequently applied weighting scheme. In addition to simple terms, n-grams, topics, and citations were utilized to model users’ information needs. We concluded that several actions could improve the research landscape: developing a common evaluation framework, agreement on the information to include in research papers, a stronger focus on non-accuracy aspects and user modeling, a platform for researchers to exchange information, and an open-source framework that bundles the available recommendation approaches.

4. Jianming He, Wesley W. Chu says social influence plays an important role in product marketing

. However, it has rarely been considered in traditional recommender systems. In this chapter, we present a new paradigm of recommender systems which can utilize information in social networks, including user preferences, item’s general acceptance, and influence from social friends. A probabilistic model is developed to make personalized recommendations from such information. We extract data from a real online social network, and our analysis of this large data set reveals that friends have a tendency to select the same items and give similar ratings. Experimental results on this data set show that our proposed system not only improves the prediction accuracy of recommender systems but also remedies the data sparsity and cold-start issues inherent in collaborative filtering. Furthermore, we propose to improve the performance of our system by applying semantic filtering of social

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networks and validate its improvement via a class project experiment. In this experiment we demonstrate how relevant friends can be selected for inference based on the semantics of friend relationships and finer-grained user ratings. Such technologies can be deployed by most content providers.

5. Fabrício Benevenuto, Tiago Gomes Rodrigues, Meeyoung Cha, Virgilio Almeida suggests how users behave when they connect to social networking sites creates opportunities for better interface design, richer studies of social interactions, and improved design of content distribution systems. In this paper, we present a rest of a kind analysis of user workloads in on- line social networks. Our study is based on detailed click- stream data, collected over a 12-day period, summarizing HTTP sessions of 37,024 users who accessed four popular social networks: Orkut, Myspace, Hi5, and LinkedIn. The data were collected from a social network aggregator web- site in Brazil, which enables users to connect to multiple social networks with a single authentication. Our analysis of the clickstream data reveals key features of the social net- work workloads, such as how frequently people connect to social networks and for how long, as well as the types and sequences of activities that users conduct on these sites. Additionally, we crawled the social network topology of Orkut, so that we could analyze user interaction data in light of the social graph. Our data analysis suggests insights into how users interact with friends in Orkut, such as how frequently users visit their friends' or non-immediate friends' pages. In summary, our analysis demonstrates the power of using clickstream data in identifying patterns in social network workloads and social interactions. Our analysis shows that browsing, which cannot be inferred from crawling publicly available data, accounts for 92% of all user activities. Consequently, compared to using only crawled data, considering silent interactions like browsing friends' pages increases the measured level of interaction among users.

6.

SL. NO.	Author	Year	Title of the paper	Methodology	Remarks/ Limitations
1.	Cheng Luo1,*, Ying Chen1	2020	Design and Research of Private Book Sharing System Based on Sharing Economy Model	The basic idea of the algorithm is to recommend similar books for specific users based on books previously borrowed by other similar users. The prediction is usually based on the weighted average of the recommendations of several people, not just on the most similar people	To filter the undesired messages from OSN walls, the system exploits a machine learning soft classifier to enforce customizable content-dependent filtering rules. Learning paradigms are used to infer new rules from the existing one.

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2.	Joeran Beel, Bela Gipp, Stefan Langer, Corinna Breitinger	2016	Research-paper recommender systems: a literature survey	Collaborative filtering was applied by only 18% of the reviewed approaches, and graph-based recommendations by 16%. Other recommendation concepts included stereotyping, item-centric recommendations, and hybrid recommendations	Content-based filtering (CBF) is the predominant recommendation class. The main problem of collaborative filtering for research papers seems to be scarcity.
3.	Xiongcai Cai, Michael Bain, Alfred Krzywicki, Wayne Wobcke, Yang Sok Kim, Paul Compton, Ashesh Mahidadia	2010	Collaborative Filtering for People-to-People Recommendation in Social Networks	A model that fully captures the bilateral role of user interactions within a social network and formulate collaborative filtering methods to enable people to people recommendation. In this model users can be similar to other users in two ways – either having similar “taste” for the users they contact, or having similar “attractiveness” for the users who contact them.	The proposed algorithms Social Collab and CF+ both outperform standard CF as measured on both Precision (SR) and Recall, with Social Collab being the best. A general framework for ranking in the context of the Social Collab algorithm is the subject of further work.

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4.	Jianming He, Wesley W. Chu	2010	A Social Network-Based Recommender System (SNRS)	Presented with a new paradigm of recommender systems which can utilize information in social networks, including user preferences, item's general acceptance, and influence from social friends. A probabilistic model is developed to make personalized recommendations from such information	The performance of SNRS with other methods, such as collaborative filtering (CF), friend average (FA), weighted friends (WVF), and naive Bayes (NB) with the same data set. In terms of the prediction accuracy, SNRS achieves the best result. It yields a 17.8% improvement compared to that of CF
5.	Fabrício Benevenuto, Tiago Gomes Rodrigues, Meeyoung Cha, Virgilio Almeida	2009	Characterizing user behavior in online social networks	Understanding how users behave when they connect to social networking sites creates opportunities for better interface design, richer studies of social interactions, and improved design of content distribution systems.	Many previous social network studies reconstructed user actions from “visible” artifacts, such as comments and testimonials. Using the clickstream model, we underscored the presence of “silent” user actions, such as browsing a profile page or viewing a photo of a friend. These results led us to classify social interactions into two groups, composed of publicly visible activities and silent activities, respectively.

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III. METHODOLOGY

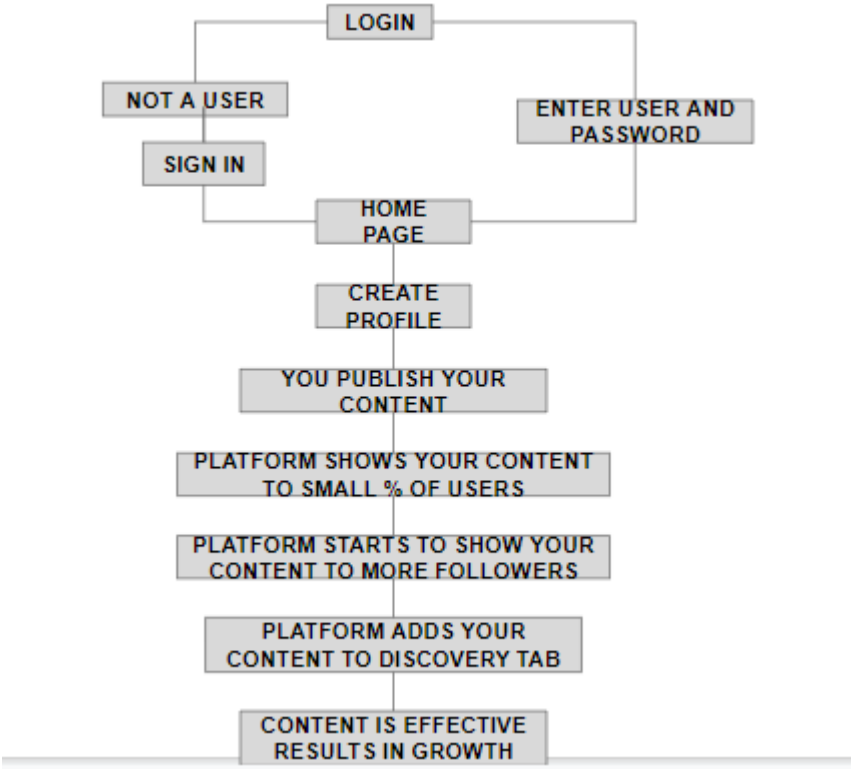

Fig 1.3 System Architecture

As shown in Fig 1.3, our first step involves logging in the user. It lands the user on the homepage and then the user can create a profile which will track all user activities and posts. Other users will see the posts and based on the engagement from those users, if feedback is positive, content is shown on the discovery tab for more users, and if the feedback is negative, there is less engagement to the profile.

- **Content Recommendation through Collaborative Filtering**

  Collaborative filtering uses similarities between users and items at the same time to provide recommendations. This allows for random recommendations. That is, the collaborative filtering model can recommend items to User A based on the interests of similar User B.

  Basically, the SVD predicts how a user will rate a new item, depending on the rating the user gives to the item. Making recommendations is as much as predicting how to rate all items that the user hasn't interacted with (in this case shared), and sorting the list back to the user. it's simple.

  To make this prediction, first create a matrix where each row represents the user and each column represents the element. An element of this matrix is the user's rating on the article.

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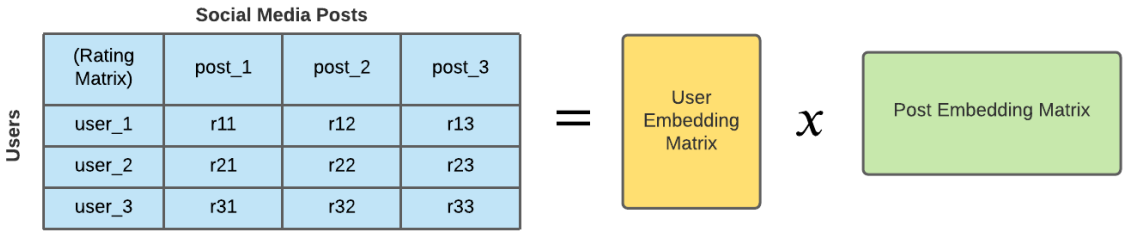

Fig 1.4: Collaborative Filtering in a nutshell

- **Content based Filtering Recommender System**

  Content based filtering is a type of recommender system that attempts to guess what a user may like based on that user`s activity.

  Content based filtering makes recommendations by using keywords and attributes assigned to objects in a database (e.g., items in an online marketplace) and matching them to a user profile. The user profile is created based on data derived from a user`s actions, such as purchases, ratings (likes and dislikes), downloads, items searched for on a website and/or placed in a cart, and clicks on product links.

  Recommender systems such as content-based filtering benefit both sellers and buyers. Buyers can spend less time searching through pages of different products in a digital marketplace. Sellers can use content-based filters to better understand customer preferences, provide a more personalized buyer experience.

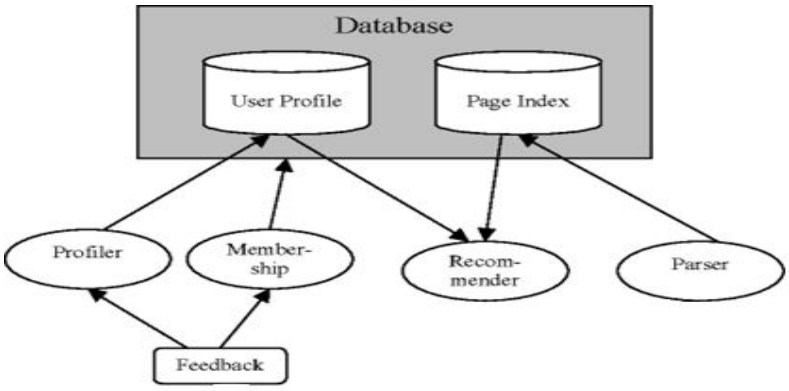

Fig 1.5: Content based filtering Recommender System

Metrics

Measuring the performance of recommender systems based on accuracy is a kind of anti-pattern. When using accuracy, assume that a system that recommends posts that user will definitely share is best. Users didn't even think about it, but it's still better to encourage contributions that find true value.

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Diversity: measures how narrow or wide the spectrum of recommended products is to a single user. A recommender that only recommends the music of one topic of post is pretty narrow; one that recommends across multiple topics is more diverse.

Coverage: reflects the degree to which the generated recommendations cover the catalog of available items, wider coverage increases user`s satisfaction. Coverage is not defined at the level of an individual user, but rather at the level of the system. High diversity! = high coverage, e.g.: if different users are recommended the same diverse set of items, the average diversity of the system will be high, but the coverage will remain low. Diversity is measured according to user recommendations, while coverage is a system-level measurement.

Novelty: Measure how new, original, or unusual a recommendation is to a user. In general, recommendations consist primarily of popular items. This is because (i) popular items contain more data, and (ii) popular items work well for offline and online ratings

IV. ISSUES IN THE PREVIOUS WORK

1. Subscription based model which is not very cost effective.
2. There are platforms specifically for articles, blogs but there is no particular platform for book sharing.
3. There is no such dedicated platform for writers to host their book announcements and promotions virtually.

V. PLAN OF ACTION

It will provide a platform for readers to post their books of poems/ writing/ short stories and it can also be used for promotion of their books. It provides the searching facilities based on the name of the book and author. If a user has finished reading a particular book, he can create a post of the book that he wishes to lend. Other enthusiast reader who wishes to borrow a book can send a request to this user for borrowing the book. A request will be sent to the former user and if he approves the request his details will be shared. The users can connect with each other and all the other transactions will be done in offline mode.

VI. CONCLUSION

In the context of the rapid development of the sharing system, shared books take "Internet + books" as the core, and the book reading under the connection of Internet big data technology realizes the temporary transfer of book use rights and effectively improves the whole society.

The reading environment has greatly reduced reading costs, changed the status quotient people who have fewer books, expensive books, and inconvenience in borrowing and returning books. Book sharing system that use digital sharing systems can not only enrich collection resources, but also achieve resource and information sharing, and improve private books. Business efficiency and better serve readers. However, most book sharing systems have the disadvantages of insufficient facility construction, scattered resource allocation, low safety factor, large maintenance workload and personalized service limitations.

In summary, in the process of continuous deepening of reforms in the design of private book sharing systems and the continuous improvement of service levels, affected by the development of information technology, it is necessary for relevant practitioners to learn the "sharing economy" in practice in order to obtain inspiration to implement the essence of the "sharing economy".

ACKNOWLEDGEMENT

It gives us immense pleasure to express our sincere gratitude to the management of **Sir M. Visvesvaraya Institute of Technology,** Bengaluru for providing the opportunity and the

resources to accomplish our project work on their premises.

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On the path of learning, the presence of an experienced guide is indispensable and we would like to thank our guide **Mrs. Shanta Biradar,** Assistant Professor, Department of Information Science & Engineering for her help and guidance.

Also, heartfelt and sincere thanks to **Dr. P Vijaykarthik**, HOD, Department of Information Science & Engineering, for his suggestions, constant support, and encouragement.

We would also like to convey our regards to **Dr. V.R. Manjunath,** Principal, Sir. MVIT for providing us with the infrastructure and facilities needed to develop our project.

We would also like to thank the staff of the Department of Information Science and Engineering and lab-in-charges for their co-operation and suggestions. Finally, we would like to thank all our friends for their help and suggestions without which completing this project would not have been possible.

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Impact Factor: 8.165

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ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

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