COLLABORATIVE FILTERING-BASED BOOK RECOMMENDER SYSTEM USING MACHINE LEARNING

A.NAGA RAJU [1], SETTI SAI CHINNARI [2]

[1] **Assistant Professor MCA, DEPT, Dantuluri Narayana Raju College, Bhimavaram, Andharapradesh**
Email id :- nagaraju.dnr345@gmail.com
[2] **PG student of MCA, D.N.R. COLLEGE, P.G. COURSES (AUTONOMOUS), BHIMAVARAM-534202.**
Email id :- settisaichinnari@gmail.com

ABSTRACT

Online Book store is an online web application where the customer can purchase books online. Through a web browser the customers can search for a book by its title or author, later can add to the shopping cart and finally purchase the books The Online Book Store (OBS) application enables vendor to setup online book store, customers to browse through the books, and a system administrator to approve and reject requests for new books. Online Book Store" is to provide an essence of online book store via a simple and yet powerful medium The project has been designed to simulate the working of an actual online book store. which user can put details of books and user can search it, can be member of site, buy online books, and see other related books of same author or same category. User can view online book detail from anywhere through internet.

This Online book selling websites helps to buy the books online with recommendation system which is one of the stronger tools to increase profit and retaining buyer. The book recommendation system must recommend books that are of buyer's interest. Recommendation systems are widely used to recommend products to the end users that are most appropriate. This system uses features of collaborative filtering to produce efficient and effective recommendations. Collaborative recommendation is probably the most familiar, most widely implemented and most mature of the technologies. Collaborative recommender systems aggregate ratings of objects, recognize commonalities between users on the basis of their ratings, and generate new recommendations.

1. INTRODUCTION

Recommendation systems were evolved as intelligent algorithms, which can generate results in the form of recommendations to users. They reduce the overhead associated with making best choices among the plenty. Now, Recommendation systems can be implemented in any domain from E-commerce to network security in the form of personalized services. They provide benefit to both the consumer and the manufacturer, by suggesting items to consumers, which can't be demanded until the recommendations. Every recommendation system comprises of two entities, one is user and other is item. A user can be any customer or consumer of any product or items, who get the suggestions. Input to recommendation algorithm can be a database of user and items and output obliviously will be the recommendations. As in our case, inputs consist of database of customers and database of books and output denotes the book recommendations. This Project presents a new approach for recommending books to the buyers. This system combines the features of collaborative filtering to produce efficient and effective recommendations.

A Recommendation system will help users who do not have enough individual knowledge to peruse through the different types of options offered by a website. It will provide the users with information to assist them to make a decision as to which items to

purchase. The proposed work alters from the existing recommendation systems since the existing ones only consider one technique to recommend items to the users. They do not recommend items using two or more techniques and are not a Hybrid Recommendation system. The proposed system uses the combination of collaborative filtering. Collaborative filtering is used to predict the ratings of a particular item by calculating ratings given to similar items or ratings given by similar users. Thus, the usage of this technique can help to control the data sparsity problem and cold start problem in recommendation systems.

Recommendation systems have been keeping my mind occupied for quite a while, and owing to my inclination for reading books, exploring Book Crossing dataset was very much engaging. Online recommendation systems are the in thing to do for many e-commerce websites. A recommendation system broadly recommends products to customers best suited to their tastes and traits. Before building any machine learning model, it is vital to understand what the data
is, and what are we trying to achieve. Data exploration reveals the hidden trends and insights and data preprocessing makes the data ready for use by ML algorithms.

Recommendation system filters information by predicting ratings or preferences of consumers for items that the consumer would like to use. It tries to recommend items to the consumer according to his/her needs and taste. RS mainly uses two methods to filter information – Content based and Collaborative filtering. Content-based filtering involves recommending those items to a consumer which are similar in content to the items that have already been used by him/her. First, it makes a profile of the consumer, which consists of his/her taste. Taste is based on the type of books rated by the consumer. The system analyses the books that were liked by the consumer with the books he had not rated and looks for similarity. Out of these unrated books, the books with the maximum value of similarity index will be recommended to the consumer. Paul Resnick and Hal Varian were the ones who suggested Collaborative filtering algorithm in 1997. It became popular amid the various frameworks available at that time.

2. LITERATURE SURVEY AND RELATED WORK

2.1 Role of Information Technology in the Academic System

The introduction of computer into information technology has massively improved the information need of organization; the success of this machine is dependent on the knowledge base. Therefore, one can be prompted to ask aloud “what is a computer” Funk (1980) defined a computer as an electronic device that can perform automatically at a high speed of a sequence of logical operations according to instructions giving to it inform of pre-arranged program.

Anigbogu (2000) defined a computer as an electronic device capable of accepting data and instruction; process the data base on the instruction to generate result or output in such a manner that is yet to be equalled by any other known machine to mankind.
Chimezie (1990) define computer by saying that computers are looked upon as obedient servants who are ever ready to free man from tedious procedures and produce result as compared with human computing time.

Oblique (1995) define a computer as a machine that is capable of accepting input data, store and process the data base on the instructions giving by the computer users and in this way produce expected result, generally called output.
World net describes an information system (I.S) as systems consisting of all communication channels used within an organization and include software and hardware. It may also be define as a system that collect and 18 process data (information) and provide it to manager of all levels that use it for decision making, planning, program implementation and control.

The aim of information system to admission, registration, result processing and clearance in universities using computer software based online clearance system is to improve the quality and accuracy of information provided to all involved as well as assisting universities in compiling and reporting information, making work lesser for the management.
Information technology has been an integral part of academic system since almost four decades.

According to Hewlett (1993) the world is entering an era in which technology will literally transform every aspect of business, every aspect of life and every aspect of society.

Since the arrival of internet technology, school system has taken a new shape style with a blend of convenience and satisfaction. Taylor (1980) says that computer base education includes both computer-assisted instruction programs that interact with students in a dialogue and a broader array of educational computer applications such as simulations or instructions in computer programming. Learning from a student bedroom, office or anywhere in the world has made its way into university system with the advent of internet technology. Information technology has always helped the university system to educate student in better way. To explain few examples. Student online clearance is a method where the student obtains his/her clearance letter without carrying files around. This is safe, fast and has no hazels. Filling out the documents and comparing options and writing for approval is a time consuming process. Through the internet, this process is made much easier and sometimes the approval is made within minutes. This explains an efficient way of obtaining clearance and saves time and money for students.

2.2 Data and Information

The concept of data and information are very important in understanding issues that go with development and implementation of a computer software based online clearance system. The term “data” and “information” are used interchangeably every day conversation as meaning the same thing Too many manager and information specialist. However, these terms have distinct meaning.

According to O’Leary (1996) data simply consist of raw unprocessed facts while information is a data that have been processed by the computer. Hordeski (1986) gives the following definition of data; A graphic or textual representation of facts concepts, numbers, letters, symbols or instructions suitable for communication, interpretation or processing. Data is the basic element of information that is use to described objects, ideas, conditions or situations.
Lucy (1991) defines data and information as Data is fact events, transactions and so on, which have been recorded. They are the raw

materials from which information is produced. Information is data that has been produced in such a way as to be useful to the recipient. Data are fact obtained by observation, counting, measuring, weighing etc, which are often records of day-to- day transactions of the organization. For example, 20 the date, amount, and other details of an invoice or cheque, payroll details of payment, the number of a student living in a particular hostel and so on.

Enwerem (1992) argue that concept of information in an organization sense is more complex and difficult than the frequent use of this common word would suggest. Oketunji (2002) emphasized that information is data that have been processed, transmitted by the recipient, interpreted and understood by the recipient. Here it should be noted that the user, not just the sender is involved in the transformation of data into information. There is a process of though and understanding involved and if follows that a given message can have different meaning to different people. Based on this, one can conclude that data which has been analysed, summarized or processed in some other fashion to produce a message or report which is conveniently deemed "management information" only becomes information if it is understood by the recipient. Therefore it the user who determine whether a report contains information or just processed data.

2.3Technology Enhance Computer Software Based Online Clearance System

According to Jeremy V Ernest, a comparison of traditional and hybrid online system in communication technology .

Online system has become a central element of the discourse on higher education (cox 2005). There seems to be an overall derive towards online system given the mountain need for flexibility in scheduling and the daily emergency of communication technology and capabilities (Hill stock 2005).

Online system is presented as a means of conveying instruction to an extensive learning community any place at any time Cox (2005). Indicate that adequate designate online learning as the driving force and model for transformation in teaching, learning and formal schooling online course has the potential to provide learner individualized attention by the instructor, otherwise impossible in a large classroom environment (environmental education and training partnership(2006

3. EXISTING SYSTEM

Though internet provides a quick and easy way to purchase a product, some people prefer to use this technology only in a limited way. They regard internet as a means for gathering more information about a product before buying it in a shop. Some people also fear that they might get addicted to online shopping. this is that they are providing the books at cheapest price but this benefits is still awaited in rural areas, search something, I find it easier and faster when searching it in a real book. Well, the problem with setting up an online book store is that it is extremely difficult to differentiate your product, as books are generic and universal. The only way one can differentiate itself from existing. The traditional shopping exercise provides lot of fun in the form of show-room atmosphere, smart sales attendants, scent and sounds that cannot be experienced through a website. Indians generally enjoy shopping. Consumers look forward to it as an opportunity to go out and shop.

DISADVANTAGES

- The only disadvantage is if the customer receives a book that is not in proper condition or has some kind of defect then there incurs an additional charge of posting it back.
- Long duration and lack of proper inventory management result in delays in shipment. Though the duration of selecting, buying and paying for an online product may not take more than 15 minutes; the delivery of the product to customer' s doorstep takes about 1-3 weeks. This frustrates the customer and prevents them from shopping online.
- Physical stores offer discounts to customers and attract them so this makes it difficult for to compete with the offline platforms.
- Customers have to be careful in revealing their personal information

4. PROPOSED SYSTEM

The online bookstore has gained much popularity with consumers in recent years. Online bookstores offer a host of benefits, from customer convenience and access to a greater variety of books to significant cost savings. Here are some of the greatest advantages of shopping at an online bookstore. The average online bookstore offers the consumer huge savings over traditional brick and mortar stores. They are able to pass on these savings to you for a variety of reasons. Rental costs for online stores tend to be cheaper, as they operate out of warehouses rather than in prime retail space. Some stores also contract directly with suppliers, forwarding customer orders directly, which eliminates inventory costs as well. As with all Internet shopping, online bookstores offer great convenience to the consumer. Not only do they cut out travel time, but with the help of the store's search engine, finding exactly what you're looking for has never been easier. Another advantage is that you're not constrained by the store's hours; instead, you can shop 24/7, whenever you find the time. Physical bookstores are typically limited on what they're able to stock in terms of space and budget; on the contrary, an online bookstore is restricted by neither. Online bookstores tend to work with multiple suppliers, which allows them to offer a wider variety of books than a traditional retail store without accruing a large, costly inventory. With the rise of Internet shopping, it is much easier to access products from around the world, and books are no exception. The online bookstore makes it possible to get your hands on books

ADVANTAGES

- This system saves the precious time of customer and very efficient to use.
- Provides large number of choices for books & also recommend for books.
- The system recommending algorithm scale well with co-rated items.
- One of the greatest benefits of an online bookstore is the access these venues allow to reader recommendations and customer feedback. Many sites allow customers to rate their books and provide information as to why or why not they would recommend the product to fellow readers. This can give the book shopper wonderful insight as to whether or not a particular title right for them.
- User can get to know different kinds of books that they were unaware of by just searching in the system using keyword.

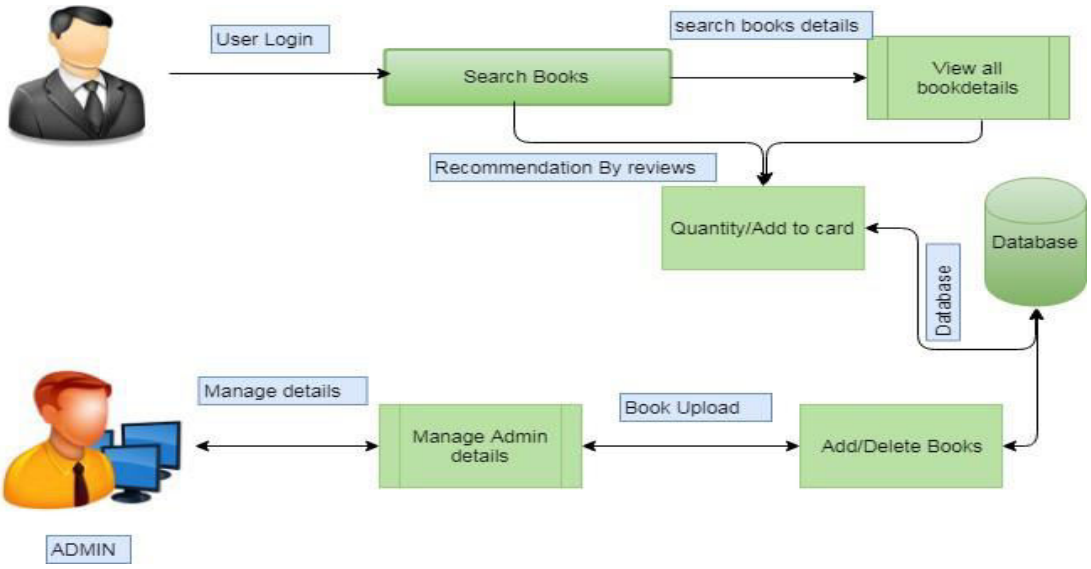


FIG 1 – SYSTEM ARCHITECTURE

5. IMPLEMENTATION

COST SAVINGS

The average online bookstore offers the consumer huge savings over traditional brick and mortar stores. They are able to pass on these savings to you for a variety of reasons. Rental costs for online stores tend to be cheaper, as they operate out of warehouses rather than in prime retail space. Some stores also contract directly with suppliers, forwarding customer orders directly, which eliminates inventory costs as well.

RECOMMENDATIONS AND CUSTOMER FEEDBACK

One of the greatest benefits of an online bookstore is the access these venues allow to reader recommendations and customer feedback. Many sites allow customers to rate their books and provide information as to why or why not they would recommend the product to fellow readers. This can give the book shopper wonderful insight as to whether or not a particular title right for them.

MANAGING USER ACCOUNTS

Each user should have an account to access all the functionalities of website. User can login using login page and logout using the logout page. All the user sessions will be saved in the database.

SEARCH

A search by keyword option is provided to the user using a textbox .The keyword to be entered should be the book title. If the user would like to know details about a book he can click on the title or the image from where he will be directed to a Book description page. It includes the notes of the book content.

6. RESULTS AND DISCUSSION SCREEN SHOTS

The following screenshots will demonstrate the final result of project:

LOGIN AND SIGNUP SCREEN :

A user can sign up or log in through this page. If user already sign up then he can log in to the site by clicking on log in button.
If the user do not have an account then he can register to the site by clicking on sign up button.

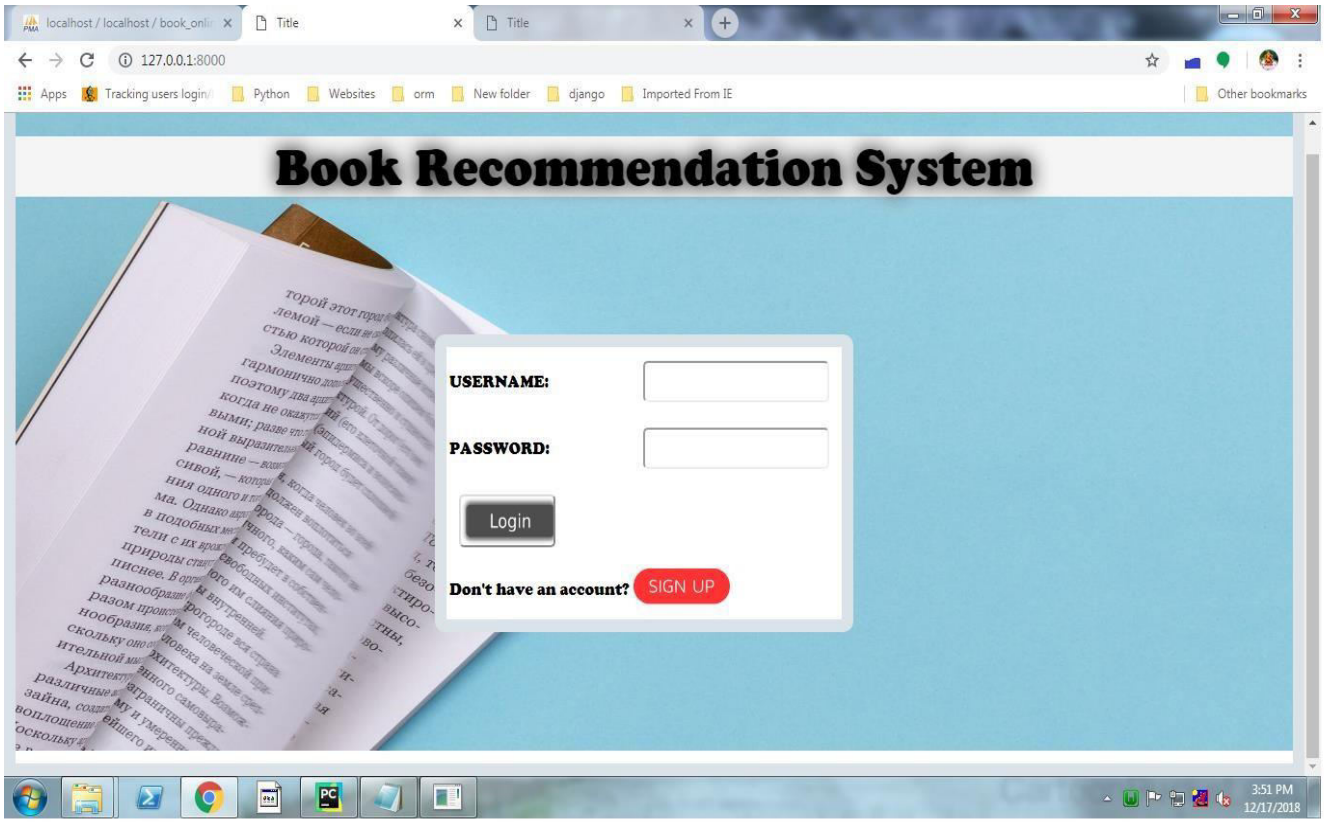


FIG - 2

The sign up page will appear like this. This page contains details of the user. After giving details user can submit the details and then an account is created for the user.
After creating an account user can log in to the web site by giving his user name and password then click on log in button.

User can log in to the web site.

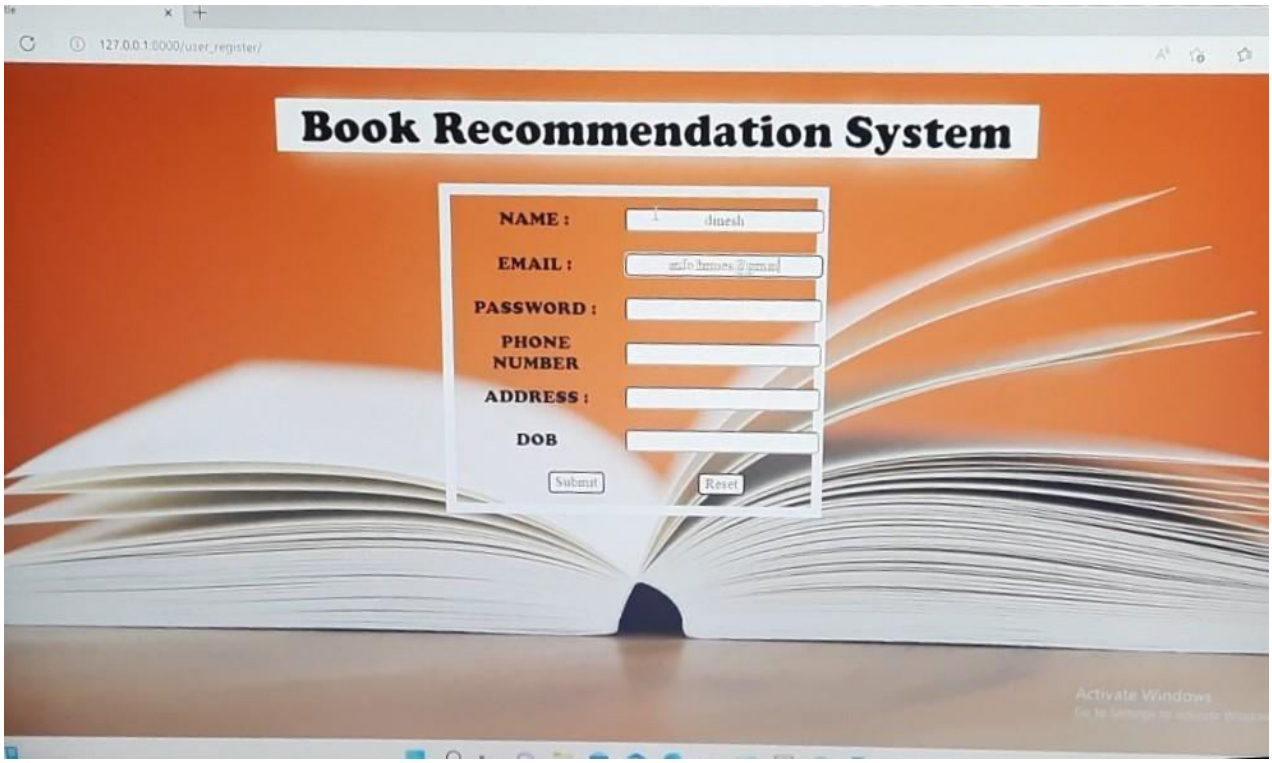


FIG - 2

FIG : 1, 2 LOGIN AND SIGNUP SCREENS

MY DETAILS :

After log in to the site the page will appear like this . This page contains the registered details of the user.

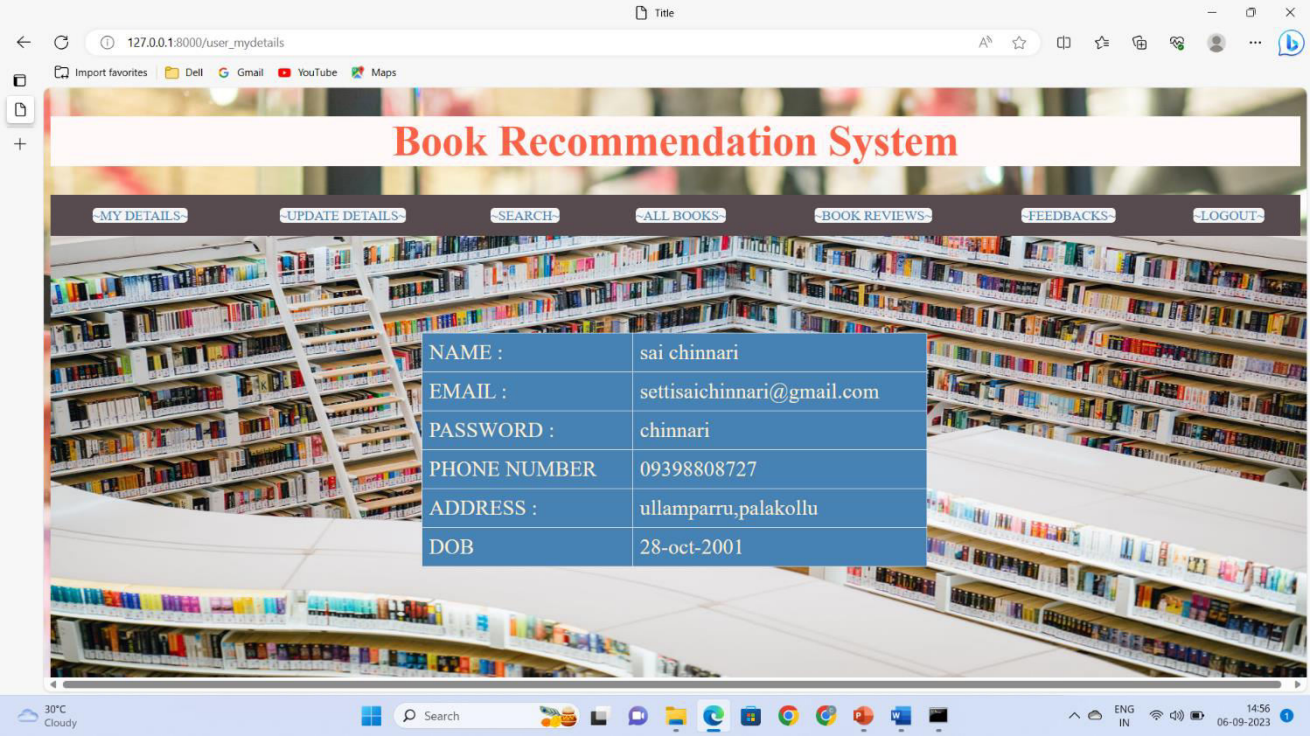


FIG : 3 MY DETAILS

UPDATE DETAILS :

If user want to update their details, then click on update details button. User can update their details in this page. Give update details and click on the update button then the details of the user updated.

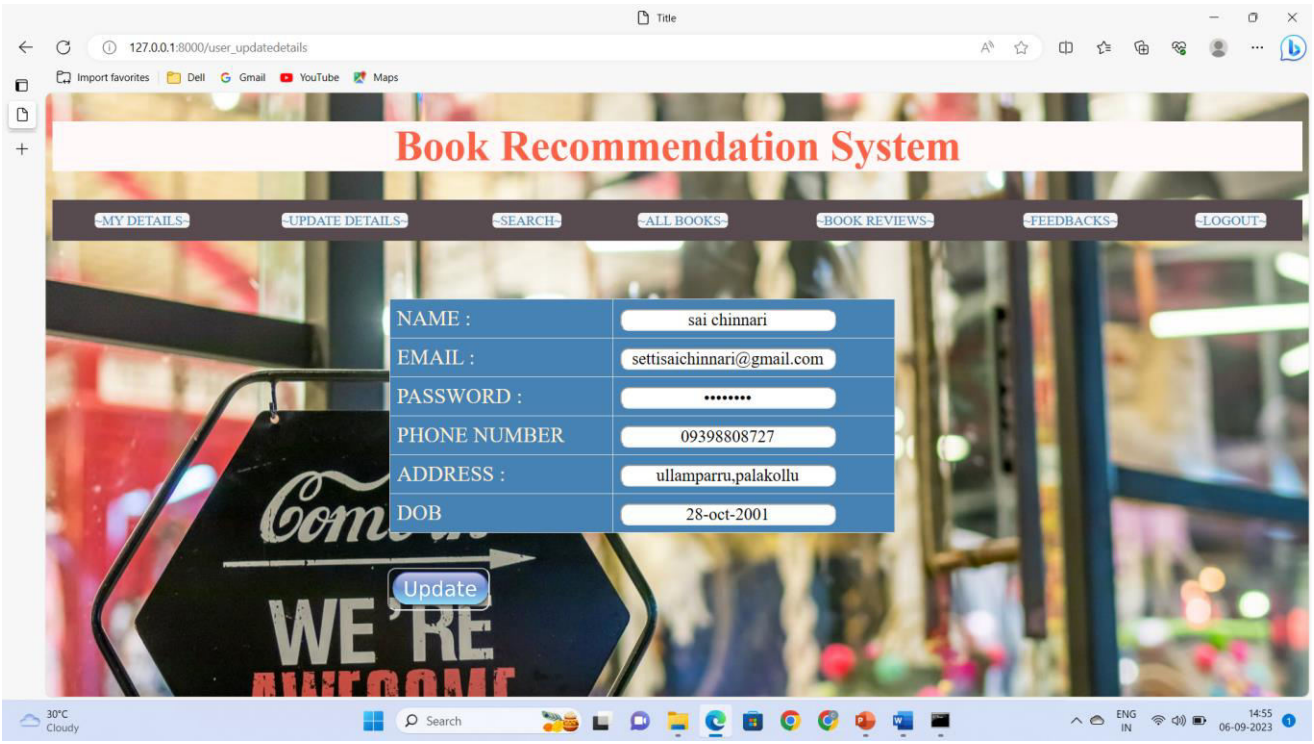
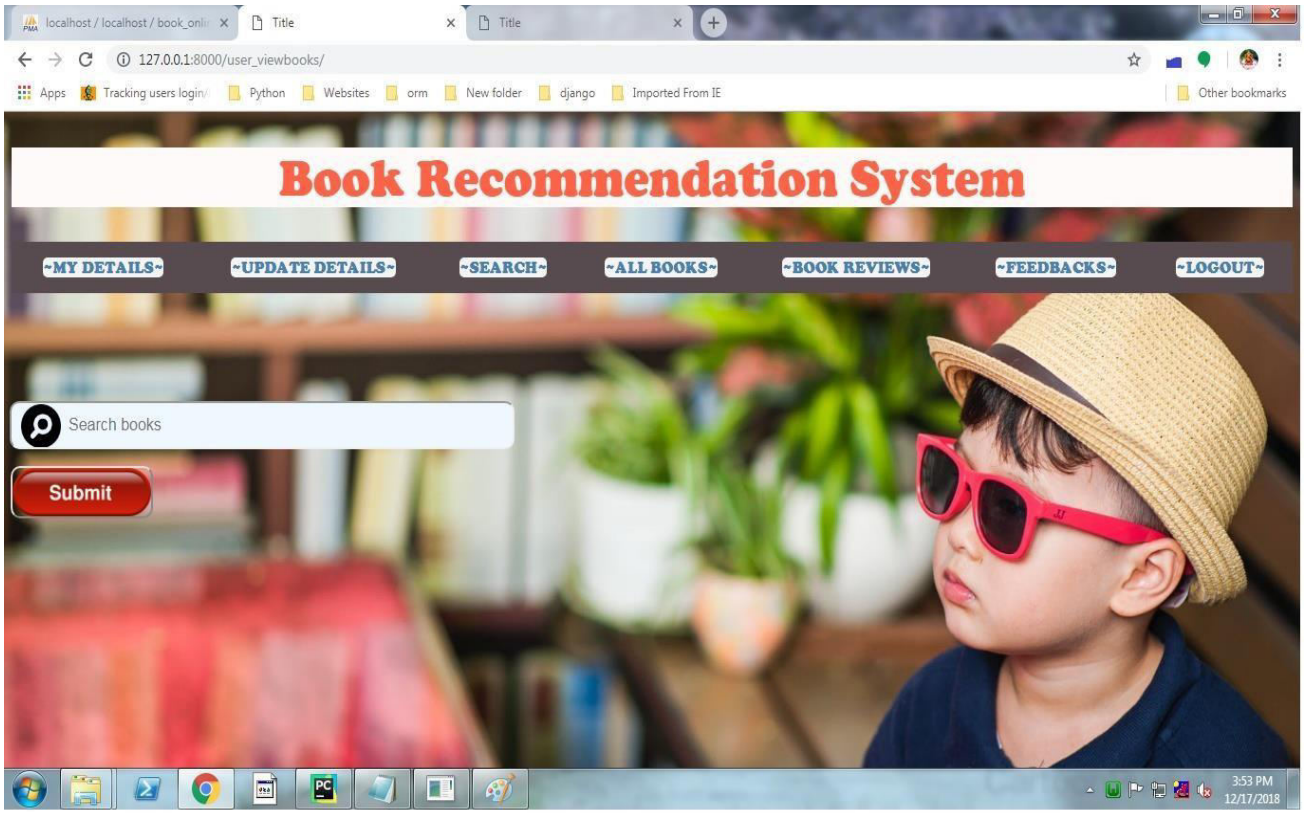


FIG : 4 UPDATE DETAILS

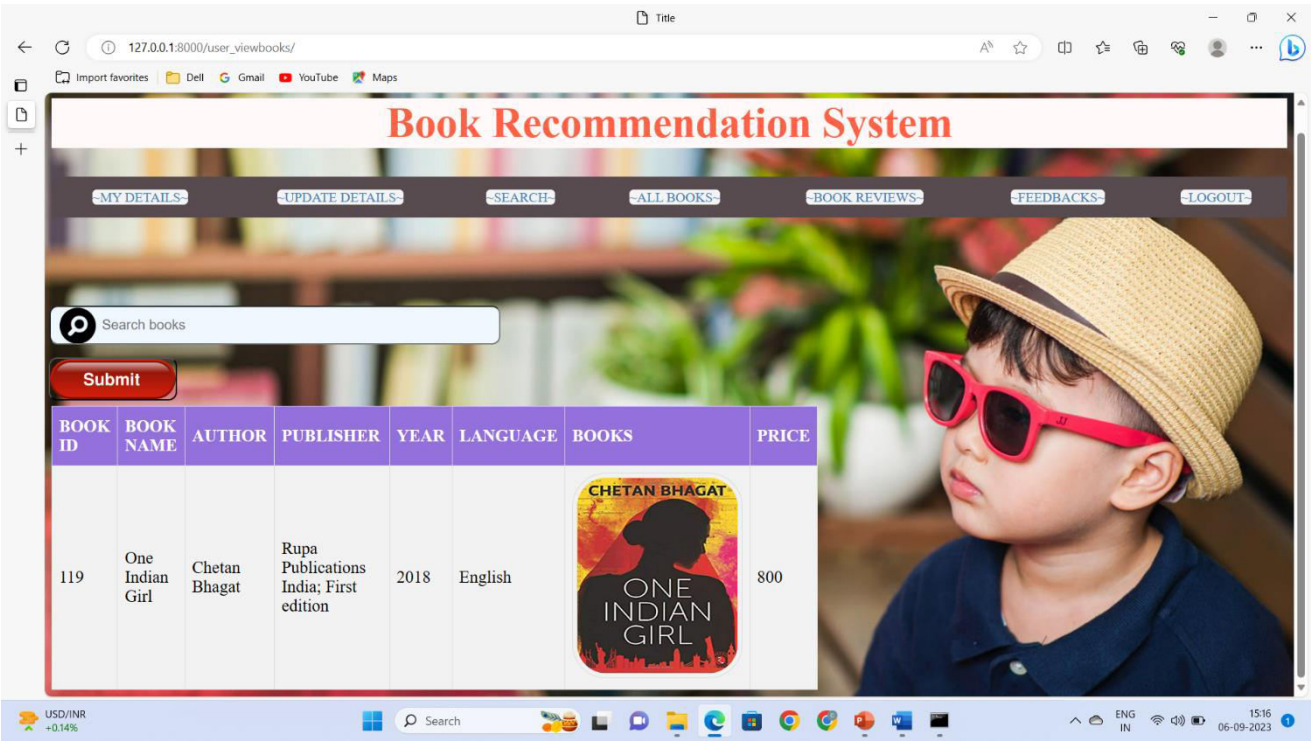
SEARCH BAR :

The next button is search button , user can search any book on search tab and then click on the submit button.



(a)

If you search the book on search tab then the book will appear like this on the page.



(b)

FIG : (a), (b) SEARCH

7. CONCLUSION AND SCOPE

CONCLUSION :

Online book store is online web application where the customer can purchase books online. Through the web browser the customer can search for a book by its title or author , later can add to the shopping cart and finally purchase the books. This system uses features of collaborative filtering to produce efficient and effective recommendations .The purpose of a book recommendation system is to predict buyer's interest and recommend books to them accordingly. Collaborative recommender systems aggregate ratings of objects, recognize commonalities between users on the basis of their ratings, and generate new recommendations.

This project show that the proposed system gives relevant recommendations to the users.

FUTURE SCOPE :

The research work carried out is limited to online clearance only. It would be better if a full portal is developed for effective and wholesome of information management technology in our universities. When this is done the following modules are

recommended to include in the portal.

1. Developing an online student's admission system to enable full tracking of student records
2. Automation of student academic record to enable the management to have access to student academic performance.
3. Maintaining a central database for accessing information relating to student. And books and also to implement recommendation system

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