

Project Report

On

VEDAS

“Course Material Recommender System using Content-Based Filtering”

Report Submitted in partial fulfillment of the award of degree of

Bachelor of Technology

(Computer Science and Engineering)

Submitted by

Mr. Gaurav Sonurkar

Mr. Harshik Titirmare

Mr. Himanshu Balani

Mr. Sharad Dwivedi

Mr. Ashishit Shambharkar

**B. Tech. 6th Semester,
Department of Computer Science and Engineering**



Guided by

Ms. Sweta Raut

**Assistant Professor, Department of Computer Science and Engineering
JIT, Nagpur**

**Department of Computer Science and Engineering
Jhulelal Institute of Technology,
Nagpur 2022-23**



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Off Koradi Road, Lonara, Nagpur. Contact No.: 82086 39771, 8208693501

E-Mail ID : admin@jitnagpur.edu.in Visit us at : www.jitnagpur.edu.in

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This is to certify that the report titled "VEDAS - Course Material Recommender System using Content-Based Filtering" submitted to the Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur in partial fulfillment of the requirement for the award of a degree of Bachelor of Technology in Computer Science and Engineering. The record of the candidate's own work carried out under the supervision at the Department of Computer Science and Engineering, Jhulelal Institute of Technology, Nagpur during the academic year 2022-23. The matter embodied in this report is original and has not been submitted for the award of any other degree.

Prof. Sweta Raut
Asst.Prof., CSE JIT,
Nagpur

Prof. Priyanka Dudhe
Mini Project In-charge
JIT, Nagpur.

Prof. Mona Mulchandani
HOD, CSE
JIT, Nagpur.

Department of Computer Science & Engineering
Jhulelal Institute of Technology
Session 2022-23

DECLARATION

We hereby declare that the work for report titled “VEDAS - Course Material Recommender System using Content-Based Filtering” submitted here in has been carried out under the supervision at the Department of Computer Science and Engineering, Jhulelal Institute of Technology, Nagpur during the academic year 2022-23. The work is original and has not been submitted earlier as a whole or in part for the award of any degree/diploma at any other Institution/University.

Mr. Gaurav Sonurkar

Mr. Harshik Titirmare

Mr. Himanshu Balani

Mr. Sharad Dwivedi

Mr. Ashishit Shambharkar

B.Tech, 6th Semester, CSE

JIT, Nagpur.

Department of Computer Science & Engineering
Jhulelal Institute of Technology
Session 2022-23

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Mr. Gaurav Sonurkar

Mr. Harshik Titirmare

Mr. Himanshu Balani

Mr. Sharad Dwivedi

Mr. Ashishit Shambharkar

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Abstract

As the amount of information on any given topic continues to grow, it can be challenging to find accurate and relevant information on the subject matter. The lack of a well-received solution for suggesting tutorials and learning material for the masses has created a problem. This project aims to solve this problem by recommending tutorial videos, books, and other content to users based on their interests. The primary objective of this project is to create a recommender system that accurately suggests content based on user interests. To achieve this, the project will create a user model based on the user's interests, understand the user requirements of UI, and simplify the process of attaining useful information. The project will exploit the YouTube API to collect relevant learning material. Overall, the project aims to provide a useful and efficient solution for users to find and access relevant learning materials with ease.

Keywords : Recommender system, User interests, Learning materials, YouTube API, User model, Efficiency.

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1. INTRODUCTION

As the world becomes more digitized, the amount of data available online grows exponentially. It can be challenging to navigate through the vast amount of content and find something that truly resonates with us. That's where recommender systems come in. These systems use data mining techniques, such as machine learning and artificial intelligence, to analyze user behavior and suggest content that aligns with their interests and preferences.

Recommender systems are not a new concept they have been around since the early days of e-commerce. In fact, Amazon was one of the first companies to implement a recommender system, using collaborative filtering to suggest products to users. However, in recent years, recommender systems have become more advanced, thanks to the rise of machine learning and artificial intelligence.

The application of recommender systems is not limited to e-commerce. In the healthcare industry, recommender systems are used to suggest treatment plans and medications to patients based on their medical history and symptoms. In finance, they are used to suggest investment opportunities based on users' financial history and risk tolerance

One area where recommender systems have had a significant impact is in education. As mentioned in the introduction, recommender systems can be used to suggest educational content to students based on their interests and preferences. This ensures that students receive the most relevant and engaging material, leading to a better learning experience ^[1].

In addition to improving the learning experience, recommender systems can also help bridge the gap between students and instructors. For example, a recommender system can suggest resources to instructors based on the learning styles and interests of their students, allowing them to tailor their teaching methods accordingly.

However, there are some concerns about the use of recommender systems. One issue is the potential for bias. Recommender systems are only as unbiased as the data they are trained on. If the data is biased, then the recommendations will be biased as well. This is especially concerning in areas like healthcare, where biased recommendations could have serious consequences.

Another concern is the potential for privacy violations. Recommender systems rely on collecting and analyzing user data to make recommendations. If this data is not properly secured, it could be accessed by unauthorized parties.

Despite these concerns, recommender systems have the potential to revolutionize the way we consume content. By providing personalized recommendations, they can help us discover new products, services, and educational resources that we may have otherwise missed. As the technology continues to advance, we can expect to see even more sophisticated recommender systems that are even better at predicting our preferences and needs.

In conclusion, recommender systems are an exciting technology that is transforming many industries, including e-commerce, healthcare, finance, and education. While there are concerns about bias and privacy, the benefits of personalized recommendations cannot be ignored. As the technology continues to evolve, we can expect to see even more innovative applications of recommender Systems in the future.[4]

2. PROBLEM STATEMENT AND OBJECTIVE

2.1 PROBLEM STATEMENT :

In today's world, the vast amount of information available on any given topic can be overwhelming and often difficult to navigate. As the internet grows and expands, the volume of information available to us continues to increase, making it challenging to obtain accurate and correct information. This presents a problem for those seeking to learn and expand their knowledge on a particular subject. With so much information available, it can be challenging to separate the wheat from the chaff, which can lead to confusion and frustration. This is particularly true for individuals who are new to a subject and are looking for a reliable source of information. However, a new project aims to address this issue by recommending well-received tutorials, books, videos, and other content to users based on their interests.

2.2 OBJECTIVE:

The objective of the project is:

- To develop a recommender system that accurately recommends content based on user interests.
- To create a user model that reflects the user's interests and preferences.
- To comprehend the user's requirements for UI and streamline the process of accessing valuable information.
- To utilize the YouTube API to gather pertinent learning material.

3. METHODOLOGY

In order to provide a personalized and effective learning experience, it is important to build a strong user profile for each individual. This user profile should take into account various attributes such as the user's learning style, interests, and skill level. By understanding these attributes, the algorithm can assign relevant attributes to different kinds of content and rate it accordingly. This knowledge base will serve as the foundation for the recommendation system, allowing it to suggest content that is tailored to the user's unique needs and preferences. Additionally, a well-designed user interface is crucial for ensuring a positive user experience and promoting engagement with the platform. With these components in place, the project can thrive and effectively support users in their learning journey.

The application development process will be divided into four modules to ensure efficient and effective production throughout the lifetime of the application.

- The first module will focus on enhancing the user interface of the application to provide an optimal user experience. This will entail minimizing the number of steps required for the user to access information, ensuring ease of navigation, and improving the overall aesthetics of the app.
- The second module will involve the creation of a cloud-based database, along with a secure login/signup page to enable users to create accounts and store their login credentials privately. This will facilitate future use and ensure the security of user data.
- The third module will involve the incorporation of relevant study materials for each topic. This will entail extensive research to identify the most appropriate content for the app.
- Finally, the fourth module will focus on creating a robust recommendation engine to drive the content displayed on the app. This algorithm will be responsible for providing personalized recommendations to users.

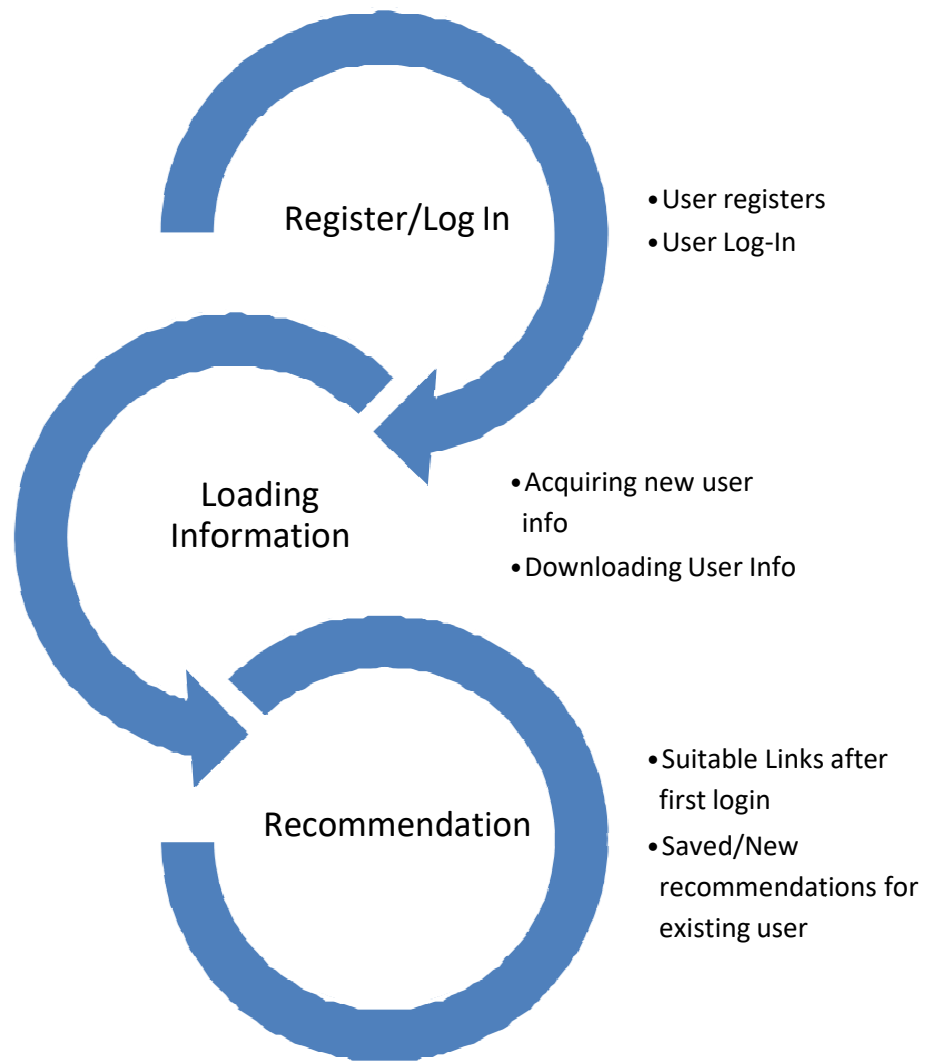


Figure 1: Process Model

6. DATA FLOW CHART

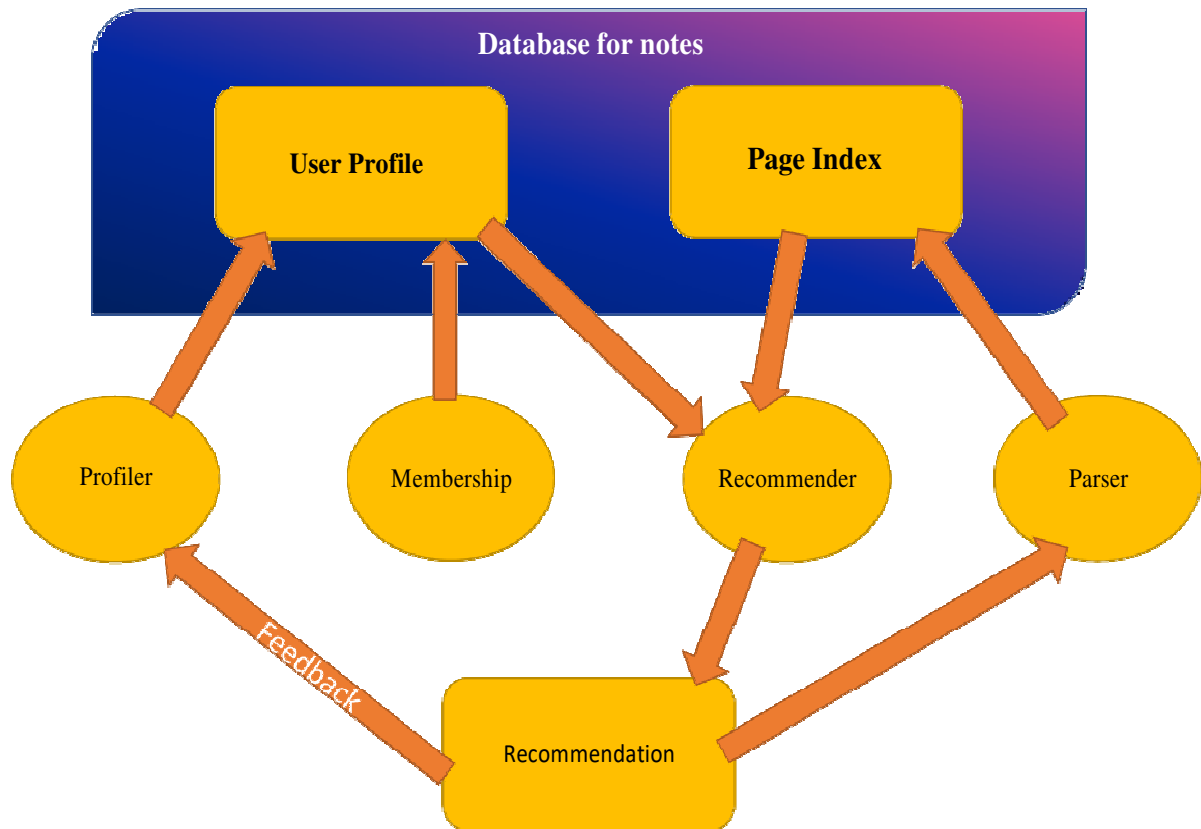


Figure 2: Flow Chart

7. IMPLEMENTATION

The User Interface of VEDAS is designed to be simple and user-friendly, featuring only three buttons: Videos, Books, and Account. Upon launching the app, the user is first greeted with a login screen that works with Google Authentication Services to ensure secure access.

Once the user logs in, they are directed to the Account Page, where they can select an Interest or the subject they wish to learn. The Interests screen contains a list of subjects, and the user can update their selection at any time by visiting the Account page. The user's Interest, along with their account information, is stored in Firebase.

Next, the app fetches videos and books based on the user's selected Interest using the YouTube API. The user can then easily access the video or book of their choice by clicking on the corresponding button. The video will open in the YouTube website, while the book can be read within the app.

VEDAS is designed to minimize distractions, allowing users to focus on learning and acquiring knowledge without unnecessary interruptions. The app's simple and intuitive interface, along with its integration with popular learning resources, makes it an effective tool for those seeking to enhance their knowledge and skills.

Log-in page :

The VEDAS User Interface has been crafted to provide a seamless and intuitive experience for users. Upon logging in to the platform, users are automatically directed to their Account Page. This page serves as a central hub for users to manage their account information, preferences, and settings. The Account Page is designed to be straightforward and user-friendly, allowing users to quickly navigate and make changes as needed. With VEDAS' user-centric design philosophy, users can focus on achieving their goals without being hindered by complex interfaces or convoluted processes.

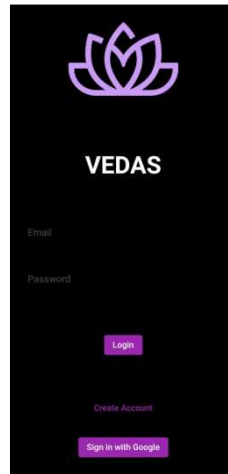


Figure 3: Log-In Page

Profile & Interests Page :

Once the user logs in, they are directed to the Account Page, where they can select an Interest or the subject they wish to learn. The Interests screen contains a list of subjects, and the user can update their selection at any time by visiting the Account page. The user's Interest, along with their account information, is stored in Firebase.

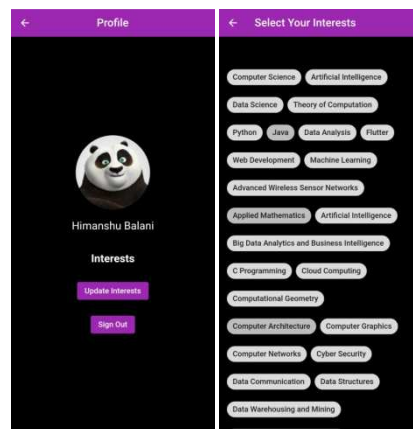


Figure 4: Profile & Interests Page

🏠 Home Page ,Video & Books :

After logging in and accessing their Account Page, the VEDAS app fetches videos and books based on the user's selected interests using the YouTube API. This ensures that users receive personalized recommendations tailored to their interests. Upon selecting a video or book of their choice, the user can easily access it by clicking on the corresponding button. If the user selects a video, it will open in the YouTube website, allowing for a seamless viewing experience. On the other hand, if the user chooses a book, they can read it directly within the VEDAS app, eliminating the need to switch between different applications. With this user-friendly feature, VEDAS aims to provide a convenient and enjoyable learning experience for all users.

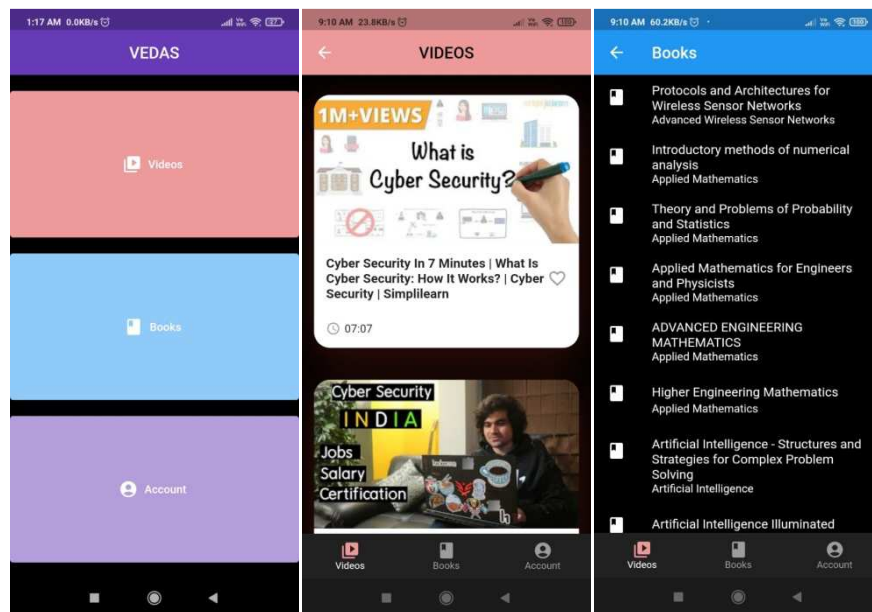


Figure 5: Home Page, Video & Books

6. RESULTS

VEDAS successfully provides users with a distraction-free learning experience by offering a simple and intuitive user interface that features only three buttons: Videos, Books, and Account. By utilizing technologies such as Flutter, Dart, Firebase, Google Cloud, and the YouTube API, the app enables users to easily access learning resources based on their selected interests.

With its effective implementation, VEDAS provides users with a seamless and efficient way to acquire knowledge. By integrating various technologies and APIs, the app ensures a smooth user experience while minimizing distractions and interruptions, making it a valuable tool for those seeking to enhance their knowledge and skills.

7. CONCLUSION

- In today's fast-paced and rapidly evolving world, continuous learning is essential for personal and professional growth. However, with the vast amount of information available online, finding relevant and reliable learning resources can be a daunting and time-consuming task. This is where technology can play a crucial role in facilitating effective and efficient learning.
- The objective of this project is to leverage advanced technologies like algorithms and machine learning to filter and curate the most useful and appropriate content for each user's unique needs. By analyzing user data, the system can understand their preferences, interests, and learning goals, and provide personalized recommendations in as few clicks as possible. This not only saves valuable time but also increases the likelihood of success in the learning journey.
- Ultimately, this project aims to empower individuals to learn and grow by providing them with the tools they need to succeed in an increasingly complex and information-rich world. By leveraging advanced technologies and algorithms, the system can filter and curate high-quality learning material, saving time and increasing the likelihood of success in the learning journey. As technology continues to evolve, it is essential to embrace its potential and utilize it to improve our lives in meaningful ways. This project is a step towards achieving that goal.

8. FUTURE SCOPE

- **Integration with emerging technologies:** As new technologies such as virtual and augmented reality become more prevalent, there is an opportunity to integrate them into the learning experience. For example, a recommendation system could suggest virtual reality simulations or augmented reality overlays to enhance the learning experience.
- **Expansion to new domains:** While the project's initial focus may be on a particular domain or subject area, there is potential to expand the scope to include new areas of learning. As the system's algorithm becomes more sophisticated, it could adapt to new subjects and provide customized recommendations for each.
- **Partnership with educational institutions:** The system could partner with educational institutions such as schools, universities, and training centers to provide personalized learning experiences for students. By integrating with existing learning management systems, the system could provide valuable insights and recommendations to students and teachers alike.
- **Incorporation of user feedback:** The system could incorporate user feedback to continually improve its recommendations and provide a better learning experience. By gathering data on how users interact with the system and the content they find most helpful, the system could adapt and refine its algorithm over time.

Overall, the future scope of this project is significant, with numerous opportunities for growth and development. By continuing to innovate and adapt to emerging technologies and user needs, the system could become a valuable tool for lifelong learning and personal development.

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