International Journal of Scientific Research and Engineering Development-– Volume 9 Issue 1, Jan-Feb 2026
Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Smart Campus Match

Dr. Vidyagouri Kulkarni*, Ayeesha Bepari, Harshita Mantageri, Kartik Prabhu, Poorvika Shivayogi Chakki **

Department of Computer Science and Engineering, SDM College Of Engineering And Technology, Dharwad

*(Email : *vidya.gouri@gmail.com*)
**(Email: ayeeshabepari7@gmail.com)
***(Email: harshitam9008@gmail.com)
****(Email: kartiksp004@gmail.com)
*****(Email: poorvikachakki@gmail.com)

----------**********----------

Abstract:

Selecting an appropriate college and academic branch is a critical challenge for students due to the availability of large and complex admission data. This paper presents a hybrid college recommendation system that integrates content-based filtering with collaborative filtering to provide personalized and realistic recommendations. The system analyzes student-specific inputs such as entrance rank and location to generate ranked college suggestions. Implemented as a web-based application using Python and Flask, the proposed system improves decision-making efficiency and reduces information overload, making it a practical decision-support tool for students.

Keywords — **College recommendation system, Personalized recommendation, Hybrid filtering, Content based filtering, Collaborative filtering.**

----------**********----------

I. INTRODUCTION

Choosing a suitable college and academic branch is an important decision that significantly impacts a student's academic and professional future. With the rapid growth of engineering institutions and specializations, students are required to analyze extensive admission data, including cutoff ranks which is often difficult using traditional methods.

Recommendation systems offer an effective solution by providing personalized suggestions based on user inputs and historical data. This paper proposes a hybrid college recommendation system that combines content-based and collaborative filtering techniques to deliver accurate and relevant recommendations. The system is implemented as a user-friendly web application and demonstrates improved transparency and efficiency in the college selection process.

II. RELATED WORK

Several studies have explored the use of recommendation systems in the education domain to assist students in selecting suitable courses and institutions [1]. Early approaches primarily relied on content-based filtering, where recommendations were generated by matching user preferences with item attributes such as academic interests and location [3]. Although effective in personalization, these systems often suffered from over-specialization and limited diversity [3]. Collaborative filtering techniques were later introduced to leverage historical data and collective user behavior, improving recommendation relevance [1]. However, these methods faced challenges such as cold-start problems and data sparsity [1], [4]. Recent research emphasizes hybrid

recommendation models that integrate both content-based and collaborative filtering to overcome individual limitations [2]. Despite these advancements, most existing systems remain generic and do not adequately address region-specific, rank-based admission processes [4]. This work addresses the gap by proposing a KCET-oriented hybrid recommendation system that incorporates user-specific inputs.

III. SYSTEM ARCHITECTURE AND FLOW

The proposed KCET college recommendation system adopts a modular, layered web-based architecture shown in fig.1 and fig.2 to ensure scalability, efficiency, and ease of maintenance. The frontend layer is implemented using the Flask framework, which provides a clean and intuitive interface for users to input their KCET rank and location details. These inputs are forwarded to an input validation module that verifies correctness, range, and completeness before further processing. The backend layer consists of a data processing module that loads and preprocesses KCET cutoff datasets stored in CSV format to ensure consistency and reliability. The core recommendation engine integrates content-based filtering, which prioritizes user-specific attributes such as location, and collaborative filtering, which analyzes rank similarities. A hybrid recommendation module combines the outputs of both techniques to compute a final relevance score and generate a ranked list of eligible colleges. The results are then passed back to the Flask frontend, where they are dynamically rendered in a structured and user-friendly format, enabling students to make informed and personalized admission decisions efficiently.

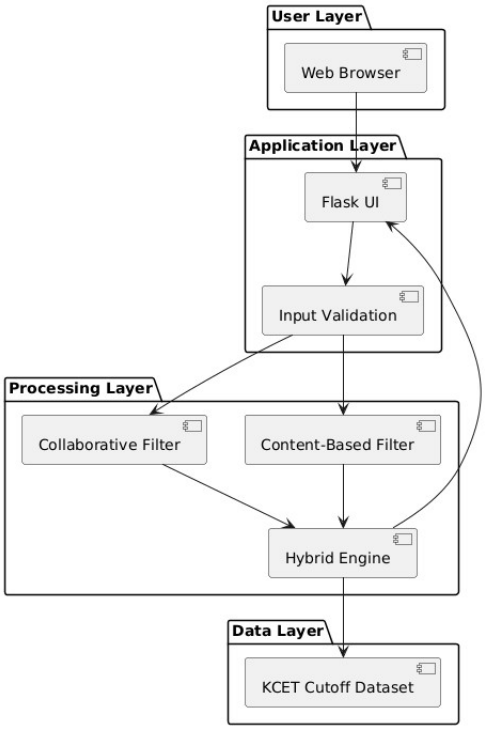

Fig.1 System Architecture

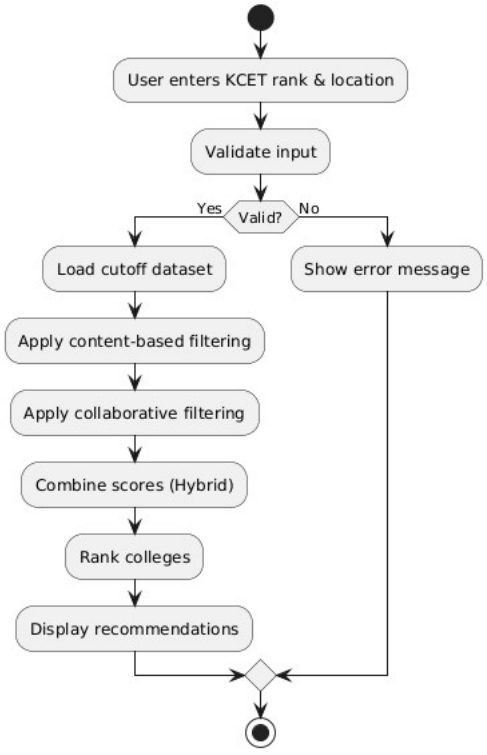

Fig.2 Flow Diagram

IV. SYSTEM MECHANISM

The proposed system operates through a structured sequence of modules designed to transform raw user input into meaningful and personalized college recommendations. Initially, the user provides essential details such as KCET rank and preferred location through a Flask-based web interface shown in fig.3 and fig.4. These inputs are captured via HTTP POST requests and passed to an input validation module, which ensures that the rank is numeric, within a valid range, and that mandatory fields are not left empty.

Once validated, the system loads the preprocessed KCET cutoff dataset into memory. The eligibility filtering module compares the user's KCET rank with the closing ranks of colleges and branches, eliminating options for which the user is not eligible. This step ensures that all subsequent recommendations are realistic and achievable.

The filtered dataset is then processed by the content-based filtering module, which assigns higher relevance scores to colleges matching the user's location preference. In parallel, the collaborative filtering module analyzes historical KCET cutoff trends of students with similar ranks in previous years. These insights help capture collective admission behavior beyond individual preferences.

A hybrid recommendation module combines the scores obtained from both content-based and collaborative filtering approaches to compute a final relevance score for each college. The colleges are ranked based on this score, and the top recommendations are forwarded to the presentation layer. Finally, the Flask frontend dynamically displays the ranked list in a clear and structured format, enabling users to compare options and make informed decisions efficiently.

V. RESULT AND DISCUSSION

The implemented KCET college recommendation system was tested using multiple sample inputs consisting of different ranks and locations one of which shown in fig.3 and fig.4. The results demonstrate that the system successfully generates a ranked list of eligible colleges that align with both user-specific inputs and feedback. The recommendations were found to be consistent with official KCET cutoff data, confirming the correctness of the eligibility filtering process.

The hybrid recommendation approach significantly improved the quality of results compared to using a single filtering technique. Content-based filtering ensured personalization by prioritizing location-relevant colleges, while collaborative filtering enhanced diversity by introducing colleges that students with similar ranks had secured in previous years by considering feedback score as shown in fig. 6. This combination reduced bias and prevented over-specialization in recommendations.

From a performance perspective, the system exhibited fast response times due to dataset preprocessing and in-memory operations. The Flask framework enabled smooth interaction between frontend and backend components, contributing to a positive user experience. Overall, the results validate that the proposed hybrid recommendation system is effective, reliable, and suitable for supporting KCET aspirants during the counseling and decision-making process.

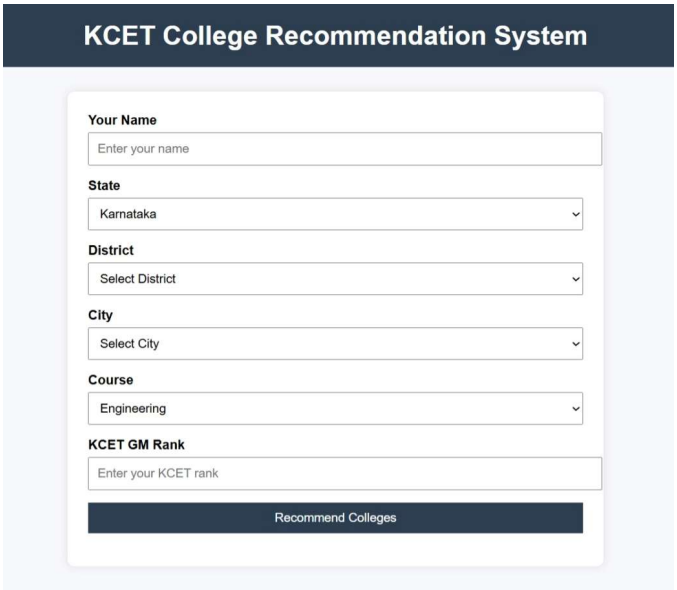

Fig. 3: KCET College Recommendation System – User Input Interface (Initial Form)

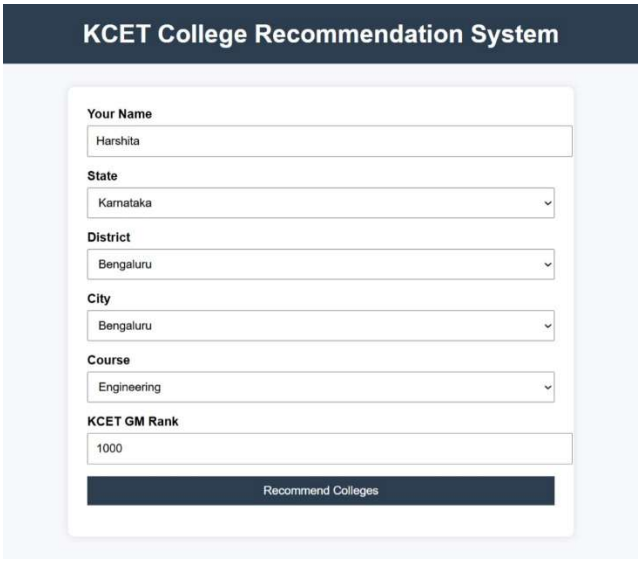

Fig. 4: User Input Form Filled with Candidate Details (Bengaluru Region)

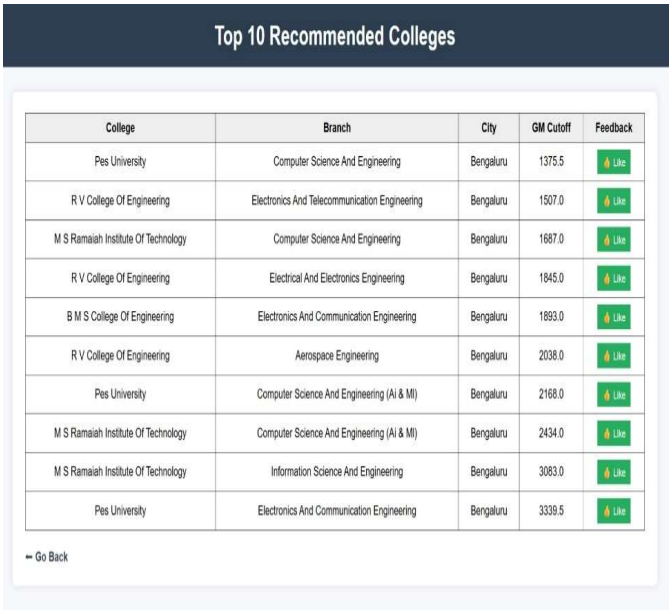

Fig. 5: Top 10 Recommended Colleges for Bengaluru Based on KCET Rank

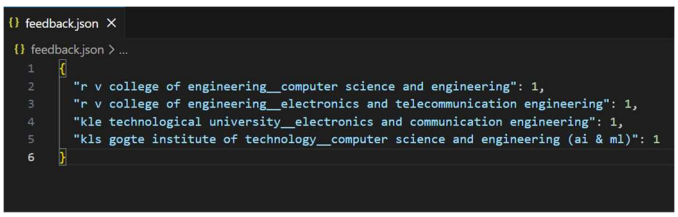

Fig. 6: json Feedback Score

VI. CONCLUSIONS

This paper presented a KCET-based college and branch recommendation system using a hybrid recommendation approach that integrates content-based and collaborative filtering techniques. By leveraging user-specific inputs such as KCET rank and location, the system delivers accurate, personalized, and realistic college recommendations. The use of a Flask-based web interface ensures ease of interaction, while efficient backend processing enables fast and reliable recommendation generation. Experimental results demonstrate that the hybrid model improves recommendation relevance, diversity, and decision support compared to traditional static cutoff-based methods. Overall, the proposed system offers a practical and scalable solution to assist KCET aspirants during the counseling process and can be extended in the future to incorporate additional preferences, and categories , and multi-year admission data for enhanced performance.

VII. ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the faculty members and project guides for their valuable guidance, continuous encouragement, and technical support throughout the development of this project. We also thank our institution for providing the necessary infrastructure and resources required to carry out this work. The insights gained from academic literature have been instrumental in shaping the design and implementation of this system.

VIII. REFERENCES

[1] J. Bobadilla, F. Ortega, A. Hernando, and A. Gutiérrez,"Recommender systems survey," Knowledge Based Systems, vol. 46, pp. 109–132, 2013.
[2] A. Burke, "Hybrid recommender systems: Survey and experiments," User Modeling and User Adapted Interaction, vol. 12, no. 4, pp. 331–370, 2002.
[3] P. Lops, M. de Gemmis, and G. Semeraro, "Content based recommender systems: State of the art and trends," Information Systems, vol. 34, no. 2, pp. 155–180, 2009.
[4] G. Adomavicius and A. Tuzhilin, "Toward the next generation of recommender systems: A survey of the state-of-the-art and possible

extensions," *IEEE Transactions on Knowledge and Data Engineering*, vol. 17, no. 6, pp. 734–749, 2005.

