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College Recommendation System

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Abstract—Selecting the right college is difficult due to many options and different admission criteria. To solve this, a Machine Learning–based College Recommendation System is developed to guide students based on their marks, preferences, and goals. It uses algorithms like Decision Trees to suggest suitable colleges and predicts admission chances, categorizing them into Safe, Target, and Dream options for better decision making.

Keywords: Artificial Intelligence, Drug Discovery, Machine Learning, Deep Learning, Natural Language Processing.

I. INTRODUCTION

Selecting an appropriate college after completing higher secondary education has become a challenging task for students due to the large number of available institutions and varying admission criteria. Students often rely on manual searching and limited guidance, which can lead to confusion and incorrect decision-making. With the growth of Artificial Intelligence and Machine Learning, intelligent systems can now analyze student data and provide personalized recommendations based on academic performance, preferences, and eligibility requirements.

The proposed College Recommendation System uses machine learning algorithms to recommend suitable colleges by comparing information with historical admission data. A unique feature of the system is the admission chance prediction, which estimates the probability of securing admission in different colleges and categorizes them into Safe student, Target, and Dream options. This system reduces the time required for college searching and helps students make informed and data-driven admission decisions.

II. REVIEW OF RELATED WORK

1. **Review of Related Work**

Several existing systems and research studies have focused on college selection and admission prediction. These systems help students identify suitable colleges based on academic performance, entrance examination scores, and admission criteria.

- **Traditional College Search Systems:** These systems provide college information such as courses, fees, facilities, and admission requirements. However, students must manually compare different colleges.
- **Web-Based College Recommendation Systems:** These systems allow students to search colleges using filters such as location, courses, fees, and eligibility criteria.
- **Machine Learning-Based Recommendation Systems:** Machine learning algorithms analyze student academic data and recommend colleges according to their performance and preferences.
- **Admission Prediction Systems:** These systems use historical admission data and previous cutoff marks to estimate the possibility of getting admission into a particular college.
- **Existing System Limitations:** Many existing systems provide basic college information but do not offer personalized recommendations or admission chance predictions.

III. RESEARCH METHODOLOGY

The research methodology of the proposed College Recommendation System involves collecting, processing, analyzing, and predicting student admission possibilities. Initially, college information, previous admission cutoff marks, courses, fees, and student academic records are collected from available datasets. The collected data is then preprocessed by removing duplicate records, handling missing values, and organizing the information into a suitable format.

After preprocessing, important features such as HSC marks, entrance examination scores, student category, preferred course, location, and budget are selected. Machine Learning algorithms, such as Decision Tree and classification techniques, are used to analyze the collected data. The model is trained using historical admission records to identify patterns and predict suitable colleges. Finally, the system

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generates personalized recommendations and classifies colleges into Safe, Target, and Dream options.

IV. MODELING AND ANALYSIS

The modeling and analysis phase focuses on developing a machine learning model that analyzes student information and generates suitable college recommendations. The system takes student details such as academic marks, entrance examination scores, preferred course, category, location, and budget as input. These details are processed and compared with historical college admission data to identify suitable institutions.

The proposed system uses the Decision Tree algorithm to analyze student eligibility and recommend colleges based on different conditions. Classification techniques are also

used to categorize colleges according to admission possibilities. The system compares the student's scores with previous years' cutoff marks and estimates the chances of admission. Based on this analysis, colleges are divided into Safe, Target, and Dream categories. The final recommendations help students understand their admission possibilities and make better decisions.

the result may activate an indicator, control an actuator, or be transmitted to another system.

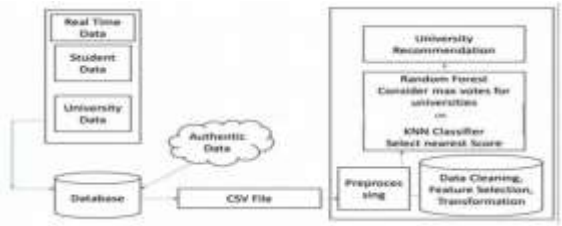

Fig. Recommendation Process Diagram

1. Model Optimization Techniques

Model optimization techniques are used to improve the performance, accuracy, and efficiency of the proposed College Recommendation System. These techniques help the machine learning model generate better college recommendations by analyzing student academic details and historical admission data. Proper optimization reduces prediction errors and improves the reliability of admission chance predictions.

1. Data Preprocessing: Data preprocessing is used to improve the quality of the dataset by removing duplicate records, handling missing values, and correcting inconsistent information. It helps the model understand student details and college admission data more effectively.

2. Feature Selection: Feature selection identifies the most important input parameters, such as HSC marks, entrance examination scores, student category, preferred course, and location. Selecting relevant features reduces unnecessary data and improves model performance.

3. Algorithm Selection: Selecting a suitable machine learning algorithm is important for obtaining accurate recommendations. Decision Tree and other classification algorithms can be used to analyze student details and classify colleges according to admission possibilities.

4. Hyperparameter Tuning: Hyperparameter tuning helps improve model performance by adjusting parameters such as tree depth, minimum samples, and splitting criteria. It helps control model complexity and reduces the chances of overfitting.

5. Model Evaluation: The trained model is evaluated using performance metrics such as Accuracy, Precision, Recall, and F1-score. These metrics help measure the effectiveness of the model and identify areas for improvement.

V. APPLICATIONS OF TINYML

1. College Selection Assistance

The primary application of this system is to help students select the most suitable colleges based on their academic performance, entrance scores, and personal preferences. It reduces confusion and simplifies the decision-making process.

2. Admission Chance Prediction

The system provides an estimate of admission probability for different colleges using historical cutoff data. This helps students understand their chances and plan their applications more effectively.

3.Educational Decision Support System

The system acts as a decision support tool for students, parents, and counselors by providing data-driven recommendations and reducing dependency on manual guidance.

4. Automation In Admission Guidance

The system automates the process of analyzing student data and matching it with college requirements, saving time and effort compared to traditional manual search methods.

5. Data Analysis And Visualization

The system generates charts and graphs to display admission chances and college comparisons, helping users easily understand the results.

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6. Integration With Educational Platforms
The system can be integrated into school or college portals to provide real-time recommendation services to students during the admission process.

7.Benefits And Challenges

1. Benefits
The proposed College Recommendation System provides several benefits to students during the college 22selection and admission process. It saves time and effort by automatically recommending suitable colleges based on student academic performance, entrance examination scores, interests, and preferences. The system provides personalized recommendations and helps students identify colleges according to their eligibility criteria. Its admission chance prediction feature estimates the possibility of getting admission by comparing student scores with historical cutoff data. It also categorizes colleges into Safe, Target, and Dream options, making the selection process easier and reducing confusion. Additionally, students can compare colleges based on courses, fees, and location, which supports better decision-making and provides data-driven admission guidance..

2. Challenges
The development of the College Recommendation System involves several challenges. One of the major challenges is collecting accurate and updated information about colleges, courses, fees, and previous admission cutoff marks. Missing, outdated, or incorrect data may affect the accuracy of recommendations. Another challenge is that admission cutoffs change every year depending on competition, available seats, and admission policies. Different colleges may also follow different eligibility criteria and admission procedures, making the recommendation process more complex. Prediction accuracy is another concern because machine learning models cannot guarantee actual admission results. Furthermore, maintaining student data privacy, handling large datasets, and regularly updating the model with new admission information are important challenges for ensuring the reliability and effectiveness of the system

8. Future Scope
The proposed College Recommendation System provides various features to make the college selection process easier and more effective for students. It collects student information such as HSC marks, entrance examination scores, preferred course, category, location, and budget to generate personalized college recommendations. The system compares student details with historical admission data and previous cutoff marks to identify suitable colleges. One of its important features is admission chance prediction, which estimates the possibility of getting admission into different colleges. It categorizes colleges into Safe, Target, and Dream options. The system also allows students to compare colleges based on courses, fees, location, and eligibility criteria. These features help students make informed decisions and reduce the time required for manual college searching.

VI. CONCLUSION

In summary, the implementation of Artificial Intelligence (AI) in smart city systems represents a significant advancement in modern urban development. By enabling real-time data analysis, automation, and intelligent decision-making, AI enhances the efficiency of city operations, including traffic management, energy usage, and public safety. This approach not only improves the quality of life for citizens but also promotes sustainability and effective resource utilization. As cities continue to grow, AI-driven smart city solutions offer a reliable and scalable pathway toward creating safer, more efficient, and future-ready urban environments. 33 therefore be selected when its resource and reliability trade-offs match the needs of the intended application.

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