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University Information Application

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Abstract: ***Choosing the right college is a pivotal step for aspiring engineers, as it greatly influences their career trajectory in the field of engineering. Many students face confusion when completing admission forms, often due to insufficient information and a lack of understanding about how to prioritize their preferred colleges on their selection lists. As competition for admission into education increases, it becomes even more important for applicants to find correct college which is suitable for him that fit their requirements and expectation. Selecting appropriate college to apply, however, is a time-consuming process, especially when looking for colleges at graduate level due to the various factors in decision making imposed by the colleges and applicants. In this project, we propose a recommendation system that suggests appropriate colleges to the students based on K-Nearest Neighbor algorithm. As graduate programs make decisions based on applicants' qualification, our recommender considers user's personal data and cutoff data of various graduate colleges registered by college admin.***
Keywords: university portal, information hub, digital age, Indian universities, students, resources, courses, faculty, research opportunities, campus events, accessibility, information retrieval, academic pursuits, professional development.

I. INTRODUCTION

In the ever-evolving landscape of higher education, students often find themselves overwhelmed by the plethora of choices available when it comes to selecting a university or college. Recognizing the significance of this decision and the need for tailored guidance, we are delighted to introduce our University Information Application. Our system is designed to simplify and personalize the college selection process, offering students a comprehensive platform to explore their options, receive informed recommendations, and embark on their academic journey with confidence. UniInfo revolutionizes the college search process by allowing students to customize their search criteria based on location, available courses, admission requirements, and campus facilities. The platform also delivers real-time notifications about new courses, admission updates, and relevant events, ensuring users remain engaged throughout their exploration journey. Through interactive campus maps and a feedback and ratings system, UniInfo facilitates virtual exploration of university facilities and leverages the experiences of other students. Join us as we redefine how individuals' access and engage with information about Indian universities, making academic exploration more accessible, efficient, and enjoyable with UniInfo. We understand that every student is unique, with individual preferences, aspirations, and circumstances. Through interactive assessments and profiling tools, our system tailors' recommendations to align with each student's academic interests, career goals, and personal preferences. Designed with simplicity and accessibility in mind, our interface offers a seamless and intuitive user experience. Whether exploring university profiles, comparing program features, or seeking advice from virtual counselors, students can navigate the system effortlessly across multiple devices.

II. LITERATURE REVIEW

There are only a few college/university recommendation systems that have been proposed and developed in the past. Dikhale et al. [5] introduce a college recommendation system in which they compare Na¨ıve Bayes and Weka's J48 implementation of the C4.5 algorithm to generate recommendations. They use 160 entries about students which include students' demographical information like gender, university, caste, merit number, previous college, and stream as their six features to create classification results for five colleges based in India. In contrast to Dikhale et al.'s approach, we generate recommendations for graduate schools in the USA and the number of schools to be considered are much higher than 160.

Furthermore, our platform offers distinct features compared to others, as it encompasses data not only on undergraduate institutions but also on graduate schools, providing a comprehensive resource for students. In addition to utilizing a larger dataset, we adopt an alternative approach by implementing SVM (Support Vector Machine) and KNN (K-Nearest Neighbors) algorithms to provide recommendations for their work. Hasan et al. [7] examine the idea of using K-Nearest Neighbors to generate relevant graduate school recommendation. They devise a weighting score for both their training and test sets to gauge the similarity between the two scores, subsequently generating a list of the top K similar outcomes. However, they do not articulate how the weighted scores are computed and how the similarity of those scores is calculated.

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For testing their system, they recommend top-K similar users to a user without specifying how the value of K is determined and which value of K they finally use. In contrast, we conduct an experiment on varying values of K to determine the most ideal value, i.e., the one that gives the highest accuracy, and use the value further into the process of generating recommendations. In our analysis, we have explored various distance functions, including Euclidean and Manhattan distances, to determine the nearest neighbors efficiently. Leveraging the data of similar users who have already enrolled in certain graduate programs for testing the system represents a viable design strategy, especially considering the availability of such data. Bokde et al. [1] introduce dimensionality reduction techniques in university recommendation. They develop a university recommendation system using the Mult collaborative filtering approach, address issues like scalability and sparsity, and combine dimensionality reduction techniques with collaborative filtering (CF) algorithms. They use Principal Component Analysis (PCA) mean and Higher Order Singular Value Decomposition (HOSVD) for mapping a higher dimensional input space into lower dimensional latent space. They also adopt PCA for identifying reducing factors in matrix factorization (MF) and HOSVD for tensor factorization. Their reduction techniques, however, are mainly in conjunction with collaborative filtering techniques and involve user preference. The user preference is a constraint, since they are not widely available, and is thus a restriction in making recommendation. Rather than employing reduction techniques, we opt for feature selection algorithms to streamline the process.

III. PROPOSED WORK

Our aim through this system is to guide the student for choosing right career decision. The system is built with a variety of filters that helps to provide accurate results as per the students' requirement. The major goal of the proposed effort is to give students a list of institutions depending on their entrance exam results. A clearly defined algorithm is created to provide the system the proper functionality. This model basically focuses on engineering colleges and the data is also provided for the same. The system will ask the student to enter his/her entrance exam score and the field of interest in which the student wants to get admitted to. The system will then compare the data such as college cut-off and student's scores and provide a list of colleges that best matches the provided criteria. The list will majorly focus on the cut-off and the field of the student, but the results will also be filtered with various factors like caste, minority, and region of the student. This list of college will prove useful to the student and can be used by the student while filling the registration form for college selection rounds, without doing much manual work, searching, comparing and all.

A. Process

In the first phase we will work on constructing the frontend and backend of the system. After completing the first phase we will be working on the dataset that will contain all the engineering colleges, their cut-off, city-state where they are located, user registration details, login details and all the useful information required to the system. The data will be trained thoroughly and tested by giving various scenarios, the results will be observed and changes if required will be made accordingly.

B. Algorithms

The algorithms used for building the system includes K Nearest Neighbour, Feature Weighted K-Nearest Neighbour, Matrix Factorization, Content-based filtering, Collaborative filtering algorithms. The algorithms are used for data preparation, feature selection, feature weighting, training the data, model validation, recommendation. The above algorithms will help the system to give more accurate results.

C. The Process Of Training And Constructing The Model

1) *Data preparation:* The first step is to prepare the data by collecting relevant information about the colleges and universities. This information can include factors like location, program offerings, admission requirements, student demographics, and more.
2) *Feature selection:* The next step is to select the features that are most relevant to the recommendation task. These features can be selected based on their correlation with the target variable (i.e., the fields that students are likely to prefer).
3) *Feature weighting:* Once the relevant features have been selected, they can be weighted based on their importance to the recommendation task. This can be done using various techniques, such as mutual information or correlation analysis.
4) *Training data:* The data is then split into training and testing sets, with the training set used to train the FW-KNN model. During training, the FW-KNN algorithm calculates the distance between each data point (i.e., each student's preferences) and its k-nearest neighbours (i.e., colleges that are like the student's preferences). The weights assigned to each feature are used to adjust the distance metric.

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5) *Model validation:* After the model is trained, it is validated using the testing set to evaluate its performance. This is done by comparing the predicted colleges with the actual colleges that the students eventually attend.
6) *Recommendation:* Once the model is validated, it can be used to make recommendations to new students based on their preferences. The FW-KNN algorithm calculates the distance between the student's preferences and the data available in the training set, considering the feature weights. The k-nearest neighbours (i.e., the colleges that are most like the student's preferences) are then recommended to the student.

IV. ALGORITHMS USED

A. *K-nearest Neighbour (KNN)algorithm*

The K-Nearest Neighbors (KNN) algorithm is a supervised machine learning method employed to tackle classification and regression The K-Nearest Neighbors (KNN) algorithm, pioneered by Evelyn Fix and Joseph Hodges in 1951 and later expanded by Thomas Cover, is a supervised machine learning approach utilized for addressing both classification and regression tasks. This article delves into the core principles, mechanisms, and practical application of the KNN algorithm. KNN's versatility enables it to handle classification and regression predictive tasks effectively. Notably, it operates as a non-parametric method. In KNN classification, the algorithm's output corresponds to class membership, providing a valuable tool for various predictive modeling scenarios. An object's classification is determined by a majority vote among its neighbors, where it is assigned to the class that is most prevalent among its k nearest neighbors. This approach, known as k-nearest neighbors (KNN), relies on a positive integer value k, which is typically small, to define the number of neighbors considered for classification. When k equals 1 in the KNN algorithm, the object is straightforwardly assigned to the class of its single nearest neighbor. In practical terms, when a new point needs classification, the algorithm identifies its K nearest neighbors from the training dataset. The similarity metrics overlook the interrelation of attributes, leading to inaccuracies in distance calculations and subsequently affecting the precision of classification outcomes. The wrong classification due to presence of many irrelevant attributes is often termed as the presence of many irrelevant attributes is often termed as the curse of dimensionality [5]. In k-NN regression, the algorithm predicts the property value for a given object by averaging the values of its k nearest neighbors. This averaging process helps in smoothing out noise and providing a more accurate estimate. Weighting the contributions of neighbors is often beneficial, where closer neighbors have a higher weight in the average calculation compared to more distant ones. A common weighting scheme involves assigning each neighbor a weight of 1/d, where d represents the distance to the neighbor. In the KNN algorithm, the comparison between the trained data and test data involves calculating distances, typically using the Euclidean distance metric. The algorithm then proceeds to classify an instance by identifying its nearest neighbors and recommending the top n nearest neighbor universities. The algorithm can be outlined as follows:

1) Initialize the value of k, representing the number of nearest neighbors to consider.
2) To make a recommendation, iterate through each row in the trained dataset.
3) Calculate the distance between the test data and each row using the chosen distance metric (such as Euclidean distance).
4) Organize the calculated distances in ascending order.
5) Select the top k rows with the smallest distances, representing the nearest neighbors.
6) Recommend these top k nearest neighbor universities to the user.

V. PROPOSED METHODOLOGY

In this project, we proposed an online web application and an android application for colleges' recommendation system based on students score and college cutoff. Also, we proposed notes sharing module for college students. In this application we have developed web application for administrator and college administrators whereas for students and end users we have developed android app. For college recommendation, we proposed KNN algorithm.

In this application, colleges will be able to register themselves but for verification their accounts will remain pending until and unless administrator approves their account. After approval, college admin will be able to login into the system. After Login College admin will approve pending student's accounts and view registered students.

College admin will register cutoff and college brochure and other details.

In student panel, students will be able to register by their own and after approval of their account by college admin they will be able to login into the system. After login students will share their notes if they want to share their notes for free or paid, they will be able to register notes. Other students will be able to view notes and notes owner details accordingly.

End user ie non college student will be able to get colleges recommendation based on score and college cutoff using KNN algorithm. End user will be able to view college information and details uploaded by college admin.

A. Modules

1) Admin Panel

- Login
- View pending colleges
- Approve pending colleges
- View college wise students

2) College Admin Panel

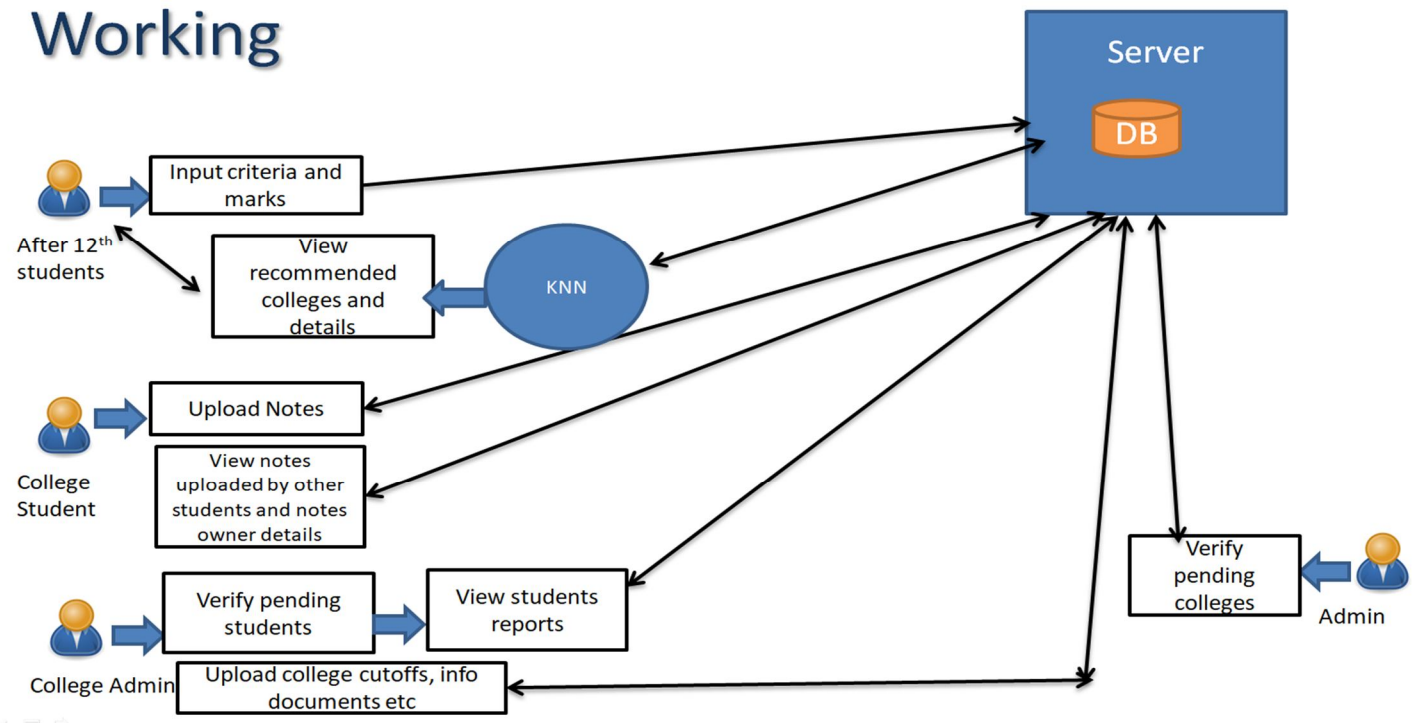
- Login
- View pending students
- Approve pending students' registration
- View student list
- Upload college information brochure
- Upload college last year cutoff, campus recruitment details etc.

3) College's Recommendation

- Take CET percentage, percentile, and 12th marks details
- Apply K Nearest Neighbor algorithm
- Recommend most suitable colleges

4) Notes Circulation Module

- College students will be able to do registration in this system
- After registration, students will be able to login into the system
- After login, students will upload their notes that they want to sell/donate for juniors



B. Admin Panel

The admin panel serves as the central hub for managing various aspects of the University Information Application. It provides administrators with a dashboard where they can access different functionalities and oversee the entire system's operation. The login module enables administrators to securely access the admin panel by entering their credentials, such as username and password. his module allows administrators to view a list of colleges that are pending approval or review. administrators have the authority to approve pending colleges after reviewing their information. View College-wise Students enables administrators to view a list of students associated with each college within the application.

C. College Admin Panel

The college admin panel serves as a dedicated interface for individual colleges to manage various aspects of student registrations, information updates, and document uploads. The login module enables college administrators to securely access the college admin panel by entering their credentials, such as username and password. This authentication process ensures that only authorized personnel from the respective college can access the panel's functionalities. This module allows college administrators to view a list of students who have applied for registration but are pending approval. Administrators can review the details of each pending student, including their application information, documents, and registration status. College administrators have the authority to approve pending student registrations after reviewing their application details. Upon approval, students are officially registered with the college and gain access to relevant resources and services. Administrators may also have the option to reject pending registrations if necessary. This module enables college administrators to view a comprehensive list of all registered students affiliated with their institution. Administrators can access information about each student, including their profile, contact details, academic records, and other relevant information. This module allows college administrators to upload and manage the college's information brochure within the admin panel. The brochure may contain details about the college's history, facilities, academic programs, faculty, extracurricular activities, and admission procedures. Uploading the brochure ensures that prospective students have access to comprehensive information about the college. college administrators can upload and update important information such as last year's cutoff marks, campus recruitment details, placement statistics, and other relevant data. By providing up-to-date information, colleges can effectively communicate their academic standards, placement opportunities, and overall performance to prospective students and stakeholders.

D. College's Recommendation

he colleges recommendation module is designed to assist students in selecting suitable colleges based on their academic performance and preferences. It utilizes various data points, including CET (Common Entrance Test) percentage, percentile scores, and 12th-grade marks, to generate personalized recommendations. This module is responsible for collecting input data from students, including their CET percentage, percentile scores, and marks obtained in the 12th-grade examinations. The K Nearest Neighbor (KNN) algorithm is employed within this module to determine the similarity between the student's academic profile and the profiles of colleges in the database. KNN is a machine learning algorithm used for classification and regression tasks, where the algorithm identifies the K nearest data points (colleges) to the student's profile based on their academic attributes. Based on the output of the KNN algorithm, this module generates a list of the most suitable colleges for the student. Colleges that are deemed to be the closest match to the student's academic profile and preferences are recommended as potential options for admission.

E. Notes Circulation Module

The notes circulation module facilitates the exchange of study materials among college students within the system. It provides a platform for students to share, sell, or donate their notes to fellow students, promoting collaboration and knowledge sharing within the academic community. In this module, college students can register themselves within the system by providing necessary details such as name, email address, student ID, and other relevant information. Registration enables students to create an account and access the system's functionalities. After successful registration, students can log in to the system using their credentials, typically consisting of a username/email and password. The login process verifies the authenticity of the user's identity and grants access to the system's features, including the ability to upload and share notes. Upon logging in, students gain access to a feature that allows them to upload their notes to the system. Students can specify whether they intend to sell or donate their notes to juniors. They provide details such as the subject, topic, description, and pricing (if applicable) for each set of notes they upload. Additionally, students may choose to categorize their notes by academic year or course to facilitate easier navigation for other users.

VI. FUTURE SCOPE

In this application we proposed college recommendation system for engineering admissions; in future we can increase the scope of the project for higher studies also. This system will prove invaluable to students due to the absence of any existing platform aiding in the selection process for engineering colleges. Presently, the system exclusively caters to engineering college admissions. However, in subsequent iterations, we plan to broaden its scope by incorporating additional disciplines and features, thereby rendering it beneficial to a wider range of students. Future iterations of the application will introduce advanced note-sharing capabilities, facilitating seamless collaboration and knowledge exchange among engineering students. Features like version control, collaborative editing, and topic-specific forums will empower students to create, share, and discuss engineering-focused notes, study materials, and project resources effectively. The application will expand its database of engineering colleges, programs, and opportunities globally. Through partnerships with academic institutions, industry organizations, and alumni networks, the application will provide comprehensive and up-to-date information on engineering colleges, including admission criteria, faculty profiles, research opportunities, and campus facilities. Recognizing the importance of career readiness, the application will integrate career resources tailored specifically for engineering students. By collaborating with industry partners and career advisors, the application will offer students access to internship opportunities, job placement services, and industry insights to prepare them for successful careers in engineering and related fields.

VII. CONCLUSION

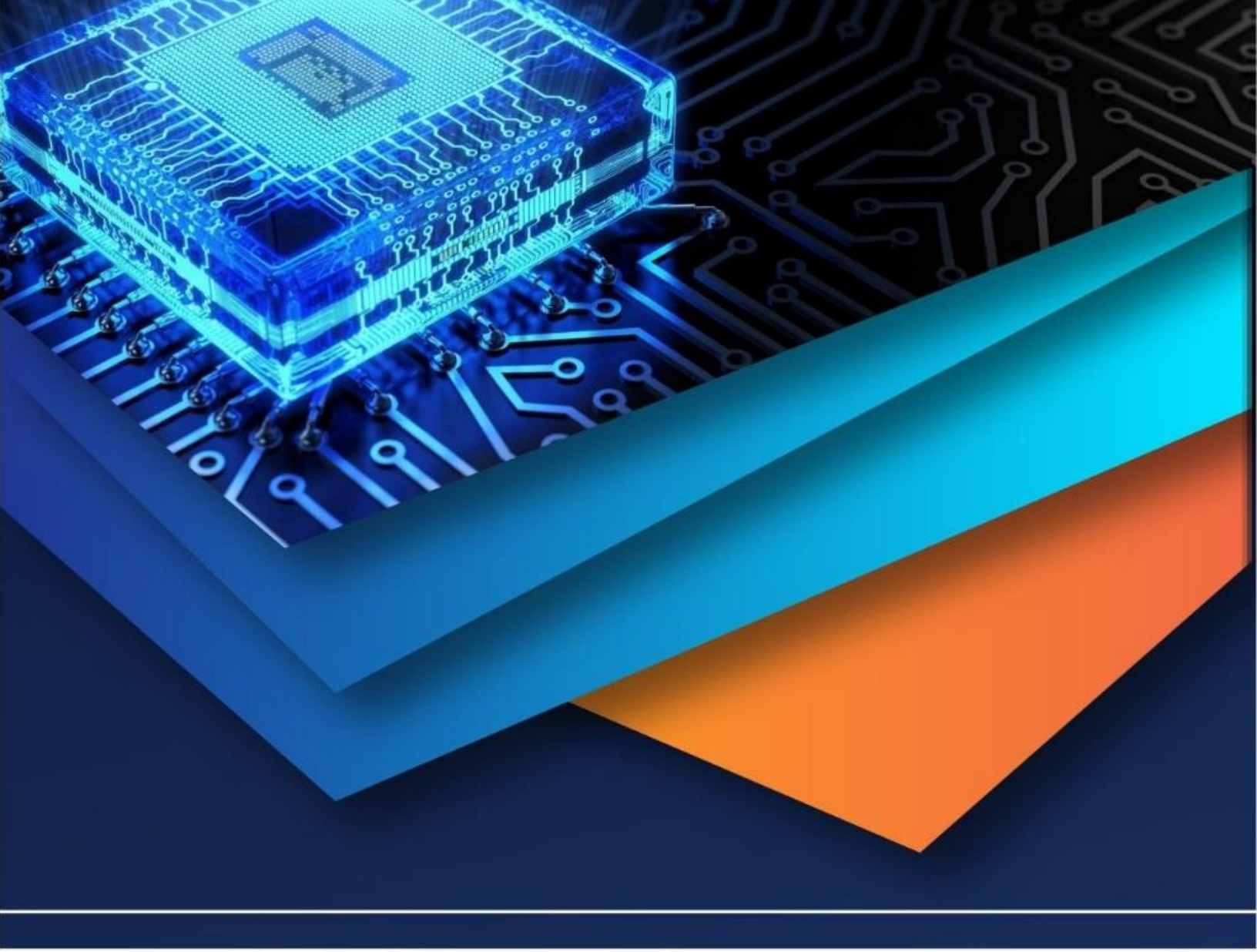
The University Information Application represents a pivotal advancement in empowering students to make informed decisions about their academic futures. By providing a comprehensive platform for exploring universities, accessing personalized recommendations, and sharing educational resources, the application revolutionizes the college selection process. Its user-friendly interface, advanced recommendation algorithms, and commitment to continuous improvement ensure that students have access to the tools and support they need to thrive in higher education. As we look to the future, we remain dedicated to enhancing the application's functionality, expanding its scope, and fostering a collaborative learning community that empowers students to achieve their academic and career aspirations. With the University Information Application, the journey to higher education is not just simplified – it is transformed into an enriching and fulfilling experience for students around the world. An intuitive University Information Application aims to alleviate students' burdens and streamline the college selection process. This system presents students with a curated list of colleges, allowing them to easily identify and choose the institution that best aligns with their preferences. Utilizing a combination of data mining and machine learning techniques, our project ensures accurate recommendations tailored to each student's unique needs. This innovative solution provides invaluable guidance to students navigating the complex landscape of higher education.

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