Forecasting Foreign University Admissions: Leveraging Google Vertex AI for Predictive Insights

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ABSTRACT

Shortlisting colleges can be a daunting task for a prospective graduate student. College undergraduates frequently consider whether their profile meets the college's standards. In terms of decision-making, computer programs outperform humans. Furthermore, the cost of admission to a college is high, making it critical for a student that their profile be shortlisted for university admission. A university prediction machine learning algorithm can help college undergraduates choose their preferred schools while also matching their resumes. The proposed strategy takes into account a variety of characteristics connected to the student's performance on several assessments. The dataset comprises LOR, GRE scores, CGPA, TOEFL scores, university ratings, SOP, and so on. Based on all of these characteristics, an undergraduate's admission to a specific university will be projected.

Keywords: Prediction System, Stacked Ensemble Model, Deep Learning, University Admission

1. INTRODUCTION

Students struggle to choose institutes. They should remember additional requirements for entrance to graduate school. Because of the high level of competition, admittance to highly ranked institutes is extremely difficult to obtain. The Prediction System will recommend institutes based solely on their profile [1] to obtain admission to a specific institute. As a result, the Machine Learning version will predict the share of college students who will be admitted to institutes.

Student profile includes GRE score, achievements, skills, etc.

Because the software is so dynamic, students frequently wonder if their profile is still appropriate for college. Due to intense competition, the majority of college students are no longer admitted to highly ranked colleges. Admission to a college can be quite valuable, thus it is critical for students to shortlist universities based on their profile.

In the shifting environment of global education, the process of international university admissions serves as

a key gateway for aspiring students while also posing a complicated decision-making challenge to institutions. The goal of this research is to use machine learning to streamline and optimize this complex process. The project's goal is to create a predictive model for foreign university admission outcomes using a dataset enhanced with key applicant factors such as GRE score, TOEFL score, university rating, SOP, LOR, CGPA, and research experience.

As the demand for international education continues to surge, universities face the challenge of efficiently evaluating a diverse pool of applicants. Traditional methods often fall short in providing a comprehensive and data-driven approach to this task. The integration of machine learning algorithms into the admission process represents a paradigm shift, offering the potential for more accurate and transparent predictions.

The dataset, a repository of varied applicant profiles, serves as the foundation for the project's predictive model. The inclusion of features spanning academic achievements, recommendation letters, and research experience ensures a holistic representation of an applicant's qualifications. The selection of multiple machines learning algorithms, including XGBoost, Decision Tree, Random Forest, Gradient Boosting, k-Nearest Neighbours (KNN), Linear Regression, and Support Vector Machine (SVM), reflects a comprehensive exploration to identify the most effective model for admission prediction. Reflects a comprehensive exploration to identify the most effective model for admission prediction.

This initiative has substantial ramifications for prospective students and academic institutions. It provides applicants with a tool for estimating their prospects of admission using quantifiable indicators, allowing them to make more informed decisions about their further education overseas. Meanwhile, institutions will profit from a more simplified and data-driven admissions process, optimizing resources and improving the overall efficiency of their academic intake procedures.

This project's path includes not only the creation of a high-accuracy predictive model, but also an in-depth analysis of several machine learning methodologies. The nuanced examination of algorithms seeks to uncover the

advantages and disadvantages of each strategy in the context of international university admissions.

As we go deeper into the complexities of this research, our goal is not just to develop a strong prediction model, but also to contribute to the larger landscape of machine learning applications in education. By shedding light on the transformative potential of data-driven insights, this initiative hopes to pave the way for future breakthroughs in optimizing important decision-making processes within the field of international higher education admissions.

2. LITERATURE SURVEY

A. Prediction System for University Admission based on Stacked Ensemble Learning

In this research, S. Sridhar suggests that for a graduate student, shortlisting universities is a challenge. Because the software is so dynamic, college students tend to focus on tailoring their profiles to the needs of a specific college. Furthermore, the value of attending a preferred/chosen college is quite important, making it critical for undergraduates to shortlist universities based on their distinctive profile. College admission prediction tools help students determine their chances of admission to a specific college. To estimate an applicant's probability of being admitted to a given college, Sashank Sridhar, Siddartha Mootha, and Santosh Kalagadi presented a stacked ensemble classifier.
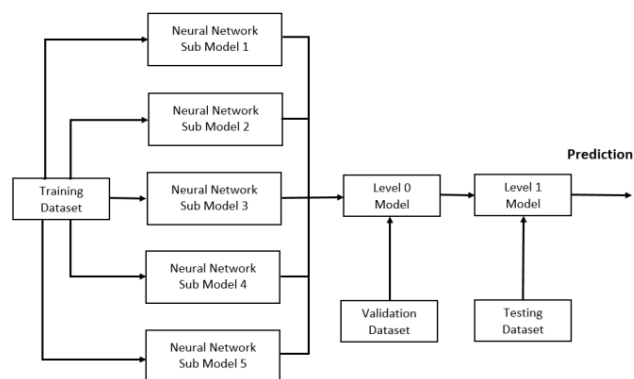
Figure 1. Stack ensemble model technique
Techniques Used

The proposed method makes advantage of layered generalizations. Stacking is divided into two phases: level zero models (base models) and level one models (meta models). The proposed gadget considers twenty attributes, which include CGPA, Topper CGPA, TOEFL, GREQ, GREV, GREA, IELTS, etc.

Result and Discussion

The proposed approach's final findings show that multiple algorithms outperform the proposed strategy in forecasting admissions. Observations were made accordingly. The proposed approach, a stacked ensemble model, has an overall accuracy of 91%. With an increasing number of college students aspiring to graduate from a prestigious institution, the field of college admission prediction serves an additional role. This paper presents a strong approach to predict the probability of a pupil's admission to a particular college.

B. Institute Recommender System: To Choose the Best Institute for Students to Apply for Graduate Admission.

In this work, M. Hasan presents a completed study on designing and creating a recommended device.

This helps students seeking admission to graduation programs choose the ideal graduating institute that matches their overall educational profile. We've developed a method for converting a relational and MySQL database for college students with all types of relevant data into a standard database format of the educational records of a few college students who've already been offered the opportunity to study abroad.
Shibbir Ahmed, Mahamudul Hasan, and Md. Shamimur Rahman4; Deen Md. Abdullah The proposed recommender gadget has built and advanced an android app as a good technique to endorse students seeking admission in graduation programs to choose the ideal university for their profile.
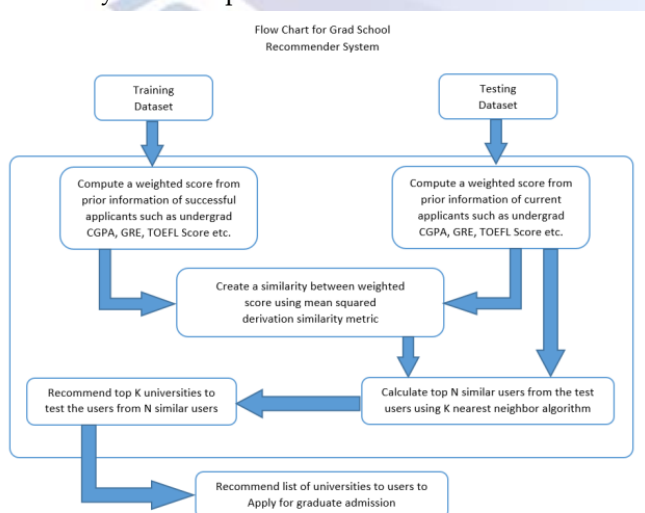

Figure 2. Block diagram for Graduate School Recommender System

Techniques Used

The dataset used includes parameters such as IELTS Overall Scores, Undergrad Department, Gender, Research Area, Undergraduate University, CGPA, GRE, TOEFL, and Research & Job Experience. Following data pretreatment, training and testing were carried out using the KNN method. It determined the top N similar users for the test users and recommended the top K universities based on those results. This is essential for college students who have great choices, as well as individuals wishing to take examinations abroad with monetary assistance.

Result and Discussion

The proposed technique's results reveal the overall performance of several gadgets learning algorithms to demonstrate approach in forecasting student admission. KNN is proven to be 91% accurate [4].

After graduation, college students from diverse backgrounds will have the opportunity to pursue a higher chance of studying at an abroad university.

3. SYSTEM ANALYSIS
A. EXISTING SYSTEM

The existing method for international university admissions is based primarily on manual processes and human judgment, with comprehensive reviews of application documents such as GRE scores, TOEFL scores, and reference letters. Admission decisions are frequently subjective, vary by school, and lack a uniform framework. Prospective students submit their credentials, and screening committees manually review these materials before making admission decisions. This manual approach is time-consuming, prone to errors, and may induce biases. Furthermore, it does not fully realize the potential of data analytics to deliver precise predictions and insights regarding admission results. The absence of a systematic and automated approach in the current system poses obstacles for both applicants and universities, necessitating a more efficient and objective way for determining admission possibilities.

DISADVANTAGES OF THE EXISTING SYSTEM

The existing system for foreign university admissions suffers from several limitations:

1. **Subjectivity and Bias:** The manual review procedure is inherently subjective, which may result in biases in admission decisions. Personal perspectives might impact this subjectivity,

leading to inconsistencies among evaluators and institutions.

2. **Lack of Transparency:** The criteria and decision-making processes are frequently opaque, leaving applicants with a vague knowledge of how their applications are evaluated. This lack of transparency can lead to frustration and uncertainty among potential pupils.

3. **Resource Intensiveness:** Manually evaluating a large number of applications requires a lot of resources and time. This inefficiency may cause delays in the admission process and higher workloads for university admissions staff.

4. **Inconsistency Across Institutions:** Various colleges may use different criteria and techniques to evaluate candidates, resulting in an unequal playing field for potential students. The absence of consistency can make it difficult for applicants to appropriately calculate their chances.

5. **Limited Predictive Power:** The current approach does not use data analytics or machine learning, which limits its capacity to make accurate predictions about admission results. This limits the possibility of discovering patterns and trends in previous data to better decision-making.

6. **Neglect of Diverse Data:** The manual system may ignore the holistic representation of applicants since it may not efficiently analyse the number of elements such as GRE scores, TOEFL scores, and recommendation letters simultaneously, potentially ignoring crucial information.

7. **Inefficiency in Handling Large Volumes:** As the number of international applicants grows, the manual system struggles to manage huge volumes of applications, resulting in longer processing delays and potential errors.

8. **Limited Adaptability:** The old system may struggle to adapt to shifting trends and developing factors affecting the admissions landscape, making it less responsive to the changing needs of both universities and candidates in the dynamic sector of global education.

B. PROPOSED SYSTEM

Our proposed suggestion tool will provide a list of universities for students wishing to pursue admission abroad and will undoubtedly assist them in applying for graduate admission in congruous colleges with first-rate probable financial support. In this model development, the dataset is divided into two sets: 80% and 20%. Data preparation is a critical component in this strategy. The purpose is to clean up the data and make it available to the model for training. The variable to be predicted is Chance of Admission. Steps in Model Development.

ADVANTAGES OF THE PROPOSED SYSTEM

1. **Increased Accuracy:** Using machine learning algorithms enables for more accurate prediction of admission results by discovering complex patterns and linkages within heterogeneous candidate data.

2. **Objective Decision-Making:** The suggested technique lowers subjectivity and biases associated with manual evaluations, providing an objective and uniform approach to assessing applicant qualifications.

3. **Efficiency and Time Savings:** The automation of the application evaluation process improves workflows by drastically decreasing the time and resources necessary for manual assessments. This results in speedier and more efficient admission procedures.

4. **Transparency in Evaluation:** The method improves openness by providing information about the factors impacting admission predictions. Transparency aids both applicants and universities by providing a clearer knowledge of the decision-making process.

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4. SYSTEM DESIGN
SYSTEM ARCHITECTURE

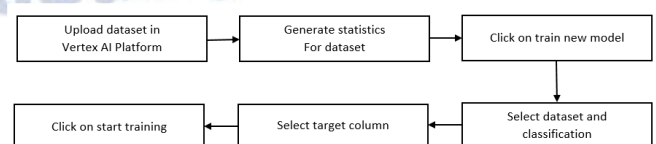Below diagram depicts the whole system architecture.

Figure 3. Flowchart for proposed system

5. SYSTEM IMPLEMENTATION

Techniques Used

The proposed model has eight features. SOP (Statement of Purpose); GRE (General Record Exams); TOEFL score; LOR (Letter of Recommendation); university ranking; research experience; and access opportunities. This article will employ the proposed model, which is based on numerous Machine Learning supervised learning techniques, to estimate the percentage acceptance rate. Regression, Support Vector Machines (SVM), Linear Regression, Decision Trees, and Random Forest. To improve precision, ensemble methods like as boosting and stacking were applied.

6. RESULTS AND DISCUSSION

Result and Discussion

This study reported numerous model performance metrics, including the coefficient of determination for regression and the accuracy and AUC for classification. Ensemble approaches were also used to improve precision, particularly with weak or unstable classifiers. This predictor works beautifully, but given the dataset, it solely considers the applicant's educational background and ignores personal information. This predictor has the potential to significantly affect admissions procedures around the world. The predictor offered can be used in a variety of scenarios, including university admissions offices, recruiting organizations, and human resource departments.

Graph Analysis :
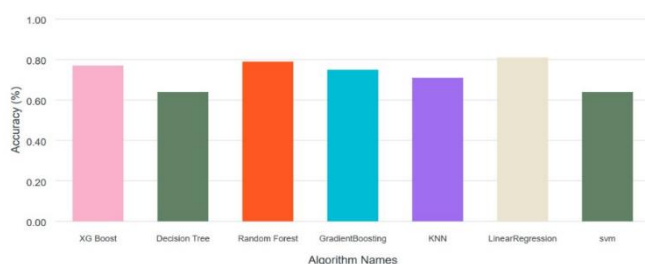
7. CONCLUSION AND FUTURE WORK

In conclusion, this foreign university entrance prediction project uses machine learning to transform the traditional admissions process. The project successfully developed and fine-tuned a prediction model by analyzing candidate data comprehensively, including GRE score, TOEFL score, university rating, SOP, LOR, CGPA, and research experience. The chosen Linear Regression approach produced good findings, with an accuracy of 81%, providing useful insights into admission chances. The user-friendly interface helps prospective students to make educated decisions about pursuing foreign education. Academic institutions gain from optimized and transparent admission procedures.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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