CHAPTER 50
An Analysis of University Admission Prediction using Machine Learning

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ABSTRACT

University admission prediction using Google Vertex AI involves using machine learning in SVM algorithms and models to predict the likelihood of an applicant being admitted to a particular university base done various factors such as their academic performance , standardized test scores , extra curricular activities , and personal background. The process involves collecting and pre-processing data, selecting relevant features, training and evaluating different models, and deploying the best model for making predictions. Google Vertex AI isa cloud-based platform that provides pre-built tools and services for building and deploying machine learning models at scale. It offers arrange of services for data preparation, model training, and deployment, and provides a user-friendly interface for managing the entire machine learning work flow.The using Google Vertex AI, university admission prediction models can be developed more quickly and accurately, allowing universities to make more informed decisions about admissions and providing applicants with more personalized and fair evaluations of their candidacy.

Keywords: *Employee Compensation, Affective commitment, Continuous commitment, and Normative Commitment.*

INTRODUCTION

University admission prediction is a crucial task for universities, as it helps them select the best candidates for their programs. In recent years, machine learning models have been used to predict university admissions by analysing the vast amounts of data available on applicants. The popular machine learning algorithm for classification tasks likeuniversity admission prediction is the Support Vector Machine (SVM). SVM is a powerful algorithm that can handle both linear and nonlinear classification problems and is often used in applications where the number of features is high. Google Vertex AI is a cloud-based platform that provides pre-built tools and services for building and deploying machine learning models at scale. It offers a range of services for data preparation, model training, and

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deployment, and provides a user- friendly interface for managing the entire machine learning workflow. By using Google Vertex AI, universities can build and deploy SVM models for university admission prediction more easily and efficiently, as the platform handles many of the technical aspects of building and deploying machine learning models. In this project, we will explore the use of SVM and Google Vertex AI to predict university admissions. We will start by collecting and pre-processing the data, selecting relevant features, and building and training the SVM model using Google Vertex AI. Finally, we will evaluate the model's performance and deploy it to make predictions on new data.

With today's huge volumes of data accessible, computers may be educated to do needed activities rather than being explicitly programmed. Machine learning (ML) has cleared the way for a whole new universe of applications, ranging from self-driving vehicles to chatbots, in recent years. Massive volumes of data can be analyzed using ML to make conclusions. These findings can be utilized to makedecisions. Making predictions is one of the applications of machine learning. Predictive analytics uses data, statistics, and machine learning algorithms to forecast future outcomes based on historical data. The goal is to go beyond knowing what happened in order to make better predictions about what will happen in the future. An admissions predictor is provided using logistic regression, which might be a beneficial tool to prospective students to aid them in determining which universities they should apply to, since they will get a sense of which colleges are 'Safe' and which are a 'Reach'. Such predictors are seldom available online for every university, but those that are offer findings based on a certain score threshold. Such predictors may, for example, state that a school is 'Safe' if your scores are higher than the average of all approved candidates. This, however, may not produce correct results.

RELATED WORK

Students applying for university admissions have a tough time determining whether they have a strong likelihood of acceptance or not. Keeping this in mind, we applied logistic regression techniques, which have gained popularity in the software engineering area due to their ability to forecast. This is a revolutionary effort on a university admissions predictor that allows students to assess their competitiveness for admission to a university. This is created by gathering genuine student data. The data is saved as useable training data for the logistic regression classifier created to predict admissions. We gathered the information from the Internet using a Selenium web scraper. The article delves further into the methodologies, implementation, and issues encountered during the process.

Accurate prediction of college entrance test (CEE) outcomes is critical for applicants filling out applications and doing necessary CEE analysis. At the moment, CEE score prediction is based on data analytics, a probability model, and various weighted combination models. Because the model for predicting college entrance lines utilises far too few reference factors and the error is pretty big, the reference value is extremely low. Machine learning approaches are employed in this study to conduct college entrance research and prediction. In particular, the Adaboost method, which belongs to ensemble learning, is utilized to explore and forecast in this research. Finally, the model's output is shown, which outperforms the existing prediction approach.

Predicting university admission is a complex decision-making process that involves more than just exam results. Researchers know that students' backgrounds and other variables influence theirtertiary education achievement. This research provides a hybrid model of neural network and decision tree classifier that predicts the likelihood of a student's admittance to which institution based on his academic qualities, background, and university admission standards based on historical data. Our prototype solution was tested using real-time data from Macau secondary school pupils. Aside from the high forecast accuracy rate, the system's flexibility is a benefit since it can anticipate potential colleges that meet the students' profiles as well as suitable channels via which the students are encouraged to attend. When compared to

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utilizing a neural network alone, our model can be generalized with other characteristics and performs quicker.

The third generation (3G) cell phone technologies is universal mobile telecommunications system (UMTS). The capacity of UMTS is restricted by interference. As a result, radio resource management (RRM) functions are employed. They are in charge of delivering optimal coverage, guaranteeing the effective use of physical resources, and providing the maximum anticipated capacity. This article discusses UMTS admission control mechanisms. This study presents a UMTS system model as well as many variants of admission control techniques. These algorithms are based on fuzzy logic and employ basic approaches for predicting user movement. Simulations are used to compare the algorithms.

A university admission prediction method can help students assess their chances of entrance to a certain university. The system might make use of prior applications to various colleges, as well as their accept or reject status. Earlier versions of such prediction systems had various flaws, such as failing to take into account essential criteria such as GRE (Graduate Record Exam) results or research experience. Furthermore, the accuracy indicated by previous models is insufficient. A stacked ensemble model that predicts a student's odds of admission to a certain university is proposed in this research. The suggested model takes into account a variety of student-related parameters such as research experience, industrial experience, and so on. Furthermore, the suggested system has been tested against a variety of different machine learning techniques, including deep learning methods. The suggested model clearly beats all previous models and gives extremely high accuracy.

We presented a deep neural network (DNN) to forecast a student's chances of admission to a university based on their portfolio. To forecast the likelihood of admission, all selection criteria are assessed. In terms of performance criteria such as mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), and R- squared score, the DNN model was compared tocurrent approaches. It produced the most promising results, with an R-squared score of 0.8538 and an MSE of 0.0031. In each benchmark, the suggested technique beat all existing methods.

Prediction is possible after carefully examining previous year's records. Because our system contains a large quantity of data, we administer it on the cloud, and anyone may access it from any remote place. For prediction, a neural network-based model called Artificial neural network is utilized in this article. Artificial neural systems (ANN), a subset of AI, are models that employ historical patterns to generate data models by recognizing hidden patterns in input data. ANN can recall information from previous years and anticipate future information based on that knowledge. The ANN with Back propagation algorithm is employed in our suggested system to anticipate the total number of competitors in the following year.

PROPOSED SYSTEM

The university admission process is a critical and highly competitive process, with many qualified applicants vying for limited spots. The process typically involves a review of an applicant's academic performance, standardized test scores, extracurricular activities, and personal background. However, with the increasing number of applications, it can be challenging for admission officers to make informed and fair decisions. To address this challenge, machine learning models have been developed to assist in the university admission prediction process. Support Vector Machines (SVM) is one of the most widely used machine learning algorithms for classification tasks, including university admission prediction. Google Vertex AI, on the other hand, is a cloud-based platform that provides a range of tools and services for building and deploying machine learning models at scale. In this project, we propose a university admission prediction system that leverages SVM and Google Vertex AI. The proposed system would involve collecting and pre-processing data on university applicants, selecting the most relevant features,

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training an SVM model using Google Vertex AI, evaluating the model's performance, and deploying it for real-time prediction. The power of SVM and Google Vertex AI, the proposed system would provide a more accurate and efficient way ofpredicting university admission decisions. It would enable universities to make more informed and fair decisions while providing applicants with more personalized evaluations of their candidacy. The algorithm is used SVM stands for Support Vector Machine, which is a type of machine learning algorithm used for classification and regression analysis. The basic idea behind SVM is to find the best hyperplane that separates the data into different classes. In the case of linearly separable data, this hyperplane is a line, while in the case of non-linearly separable data, the hyperplane can be a curved surface. The SVM algorithm finds the hyperplane by maximizing the margin, which is the distance between the hyperplane and the nearest data points of each class.SVMs are particularly useful when dealing with high-dimensional data or when the number of features is larger than the number of samples. SVMs can also be used for classification of non-linearly separable data by transforming the data into a higher-dimensional space, where a linear hyperplane can be used for separation.SVMs are a powerful and flexible algorithm with applications in many different fields such as image recognition, text classification, and bioinformatics. In this project modules is data Collection and Pre-processing: The first step would be to collect data on university applicants, including their academic performance, standardized test scores, extracurricular activities, and personal background. The data would then be pre-processed to remove any missing or erroneous data and normalize the features. Feature Selection: The next step would be to select the most relevant features that would influence the admission decision. This would be done using techniques such as correlation analysis or feature importance ranking. Model Training: The selected features would then be used to train an SVM model using Google Vertex AI. The platform would handle the training process, including hyper parameter tuning, and generate the best model based on the given data. Model Evaluation: The trained model would be evaluated using a hold-out dataset or cross-validation to assess its performance. Metrics such as accuracy, precision, and recall would be used to evaluate the model's performance. Model Deployment: The final step would be to deploy the model on Google Vertex AI for real-time prediction. The model would be integrated with the university's admission system, and applicants' data would be fed into the model to generate the probability of admission.

SYSTEM ARCHITECTURE

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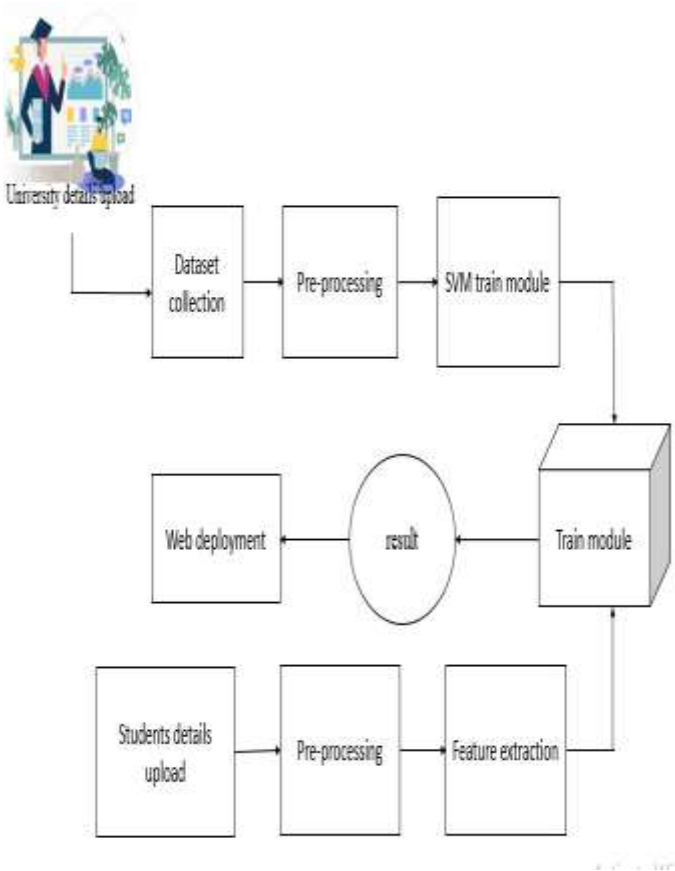

1) Vertex AI

Vertex AI is a machine learning (ML) platform that enables the development and deployment of ML models and AI applications. Vertex AI blends data engineering, data science, and machine learning engineering workflows, allowing your teams to interact with a single set of tools.

Vertex AI offers multiple model training options: AutoML enables you to train data from tabular, picture, text, or video sources without writing code

or creating data splits. Custom training allows you entire control over the training process, including the ability to use your choice ML framework, write your own training code, and select hyper parameter tweaking options. Use Vertex AI's end-to-end .

MLOps tools to automate and expand projects across the ML lifecycle once you've deployed your models. These MLOps solutions run on fully- managed infrastructure that you can tailor to your specific performance and budget requirements. You may execute the complete machine learning workflow in Vertex AI Workbench, a Jupyter notebook-based development environment, using the Vertex AI SDK for Python. The Google Cloud Console, the gcloud command line tool, client libraries, and Terraform (with limited support) are also available. Currently, data scientists must manually piece together ML point solutions, resulting in a gap in model creation and experimentation, with just a few models making it into production. To solve these difficulties, Vertex AI combines Google Cloud resources for generating machine learning models into a single UI and API, simplifying the work of building, training, and deploying machine learning models at scale. In this unified environment, customers may transition

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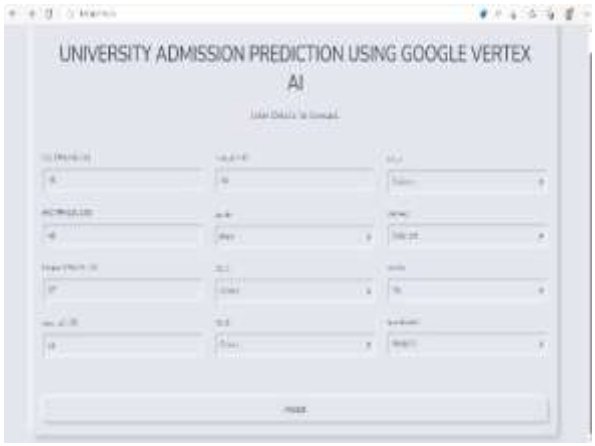
models from experimental to production more rapidly, see trends and anomalies more quickly, make better forecasts and judgements, and be more robust in the face of changing market dynamics.

RESULT



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CONCLUSION

In conclusion, using SVM and Google Vertex AI for university admission prediction can provide accurate and efficient results. SVM is a powerful machine learning algorithm that can handle classification tasks, including university admission prediction. Google Vertex AI provides a comprehensive platform for building and deploying machine learning models, making it easier and more efficient to develop admission prediction models. By using SVM and Google Vertex AI, universities can make more informed decisions about admissions and provide applicants with more personalized and fair evaluations of their candidacy. The process involves collecting and pre-processing data, selecting relevant features, building and training theSVM model using Google Vertex AI, and evaluating the model's performance. This project demonstrates the potential of machine learning and cloud-based platforms like Google Vertex AI in improving university admission prediction and highlights the importance of leveraging these technologies to make fair and informed decisions.

REFERENCES

1) R. V. Mane and V. R. Ghorpade, "Predicting student admission decisions by association rule mining with pattern growth approach", 2016 International Conference on Electrical Electronics Communication Computer and Optimization Techniques (ICEECCOT), pp. 202-207, 2016.

2) AlGhamdi, A. Barsheed, H. AlMshjary and H. AlGhamdi, "A machine learning approach for graduate admission prediction", Proceedings of the 2020 2nd International Conference on Image Video and Signal Processing, pp. 155- 158, 2020.

3) M. S. Acharya, A. Armaan and A. S. Antony, "A comparison of regression models for prediction of graduate admissions", 2019 International Conference on Computational Intelligence in Data Science (ICCIDS), pp. 1-5, 2019.

4) N. Chakrabarty, S. Chowdhury and S. Rana, "A statistical approach to graduate admissions' chance prediction" in Innovations in Computer Science and Engineering, Springer, pp. 333- 340, 2020.

5) Baskota and Y. Ng, "A Graduate School Recommendation System Using the Multi- Class Support Vector Machine and KNN Approaches", 2018 IEEE International Conference on Information Reuse and Integration (IRI), pp. 277-284, 2018.

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6) P. K. Binu, A. Chandran and M. Rahul, "A Cloud-Based Data Analysis and Prediction System for University Admission", 2019 2nd International Conference on Intelligent Computing Instrumentation and Control Technologies (ICICICT), pp. 1327-1332, 2019.

7) S. Sridhar, S. Mootha and S. Kolagati, "A University Admission Prediction System using Stacked Ensemble Learning," 2020 Advanced Computing and Communication Technologies for High Performance Applications (ACCTHPA), 2020.

8) AlGhamdi, A. Barsheed, H. AlMshjary and H. AlGhamdi, "A machine learning approach for graduate admission prediction", Proceedings of the 2020 2nd International Conference on Image Video and Signal Processing, pp. 155- 158, 2020

9) M. S. Acharya, A. Armaan and A. S. Antony, "A comparison of regression models for prediction of graduate admissions", 2019 International Conference on Computational Intelligence in Data Science (ICCIDS), pp. 1-5, 2019.

10) N. Chakrabarty, S. Chowdhury and S. Rana, "A statistical approach to graduate admissions' chance prediction" in Innovations in Computer Science and Engineering, Springer, pp. 333- 340, 2020.

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