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Development of a Web Portal for the Training and Placement Cell of the College

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Abstract: ***This research paper presents the development of a web portal for the Training and Placement Cell of the college, aiming to enhance the efficiency and effectiveness of the placement process. The web portal automates various activities, including student registration, job postings, resume submissions, and interview scheduling. The project adopts a Waterfall SDLC model for sequential development and incorporates performance, safety, security, and software quality requirements. The results demonstrate improved communication, streamlined processes, and increased accessibility to job opportunities for students. The developed web portal offers a centralized platform for students, recruiters, and TPC administrators, facilitating efficient placement management and data analytics. This research contributes to the advancement of placement processes in educational institutions, improving the student experience and strengthening industry connections.***
Keywords: Training and Placement Cell, Placement Process, Job Opportunities, Web Portal, Performance Evaluation

I. INTRODUCTION

The existing manual systems employed by TPCs lack the scalability and agility required to meet the evolving demands of the placement process. Tedious paperwork, data redundancy, and reliance on physical communication methods hinder the ability to efficiently manage large volumes of student information and effectively collaborate with recruiters.

The proposed web portal will address these issues by offering a centralized and automated platform for all placement-related activities. It will eliminate the need for manual data entry, reduce paperwork, and enhance data accuracy and integrity. The portal's features will include student registration, job posting, resume submission, interview scheduling, and result announcements, all accessible through a secure and user-friendly interface.

By developing this web portal, we aim to revolutionize the way our college's Training and Placement Cell operates. The portal will not only improve the efficiency and effectiveness of the placement process but also provide valuable insights and analytics for informed decision-making. Furthermore, it will enhance communication and collaboration between students, recruiters, and TPC administrators, fostering a dynamic ecosystem that nurtures successful placements and long-lasting industry-academic partnerships.

II. LITERATURE SURVEY

A. Placement Cell Android Application and Admin Portal

The paper discusses that with the development of cloud technology, android, and web applications, auto-scaling the servers is made simpler, which could result in more efficient ways to host and store data. Students may easily apply to any organization with a few clicks. Thanks to Android applications. The administrator can concurrently broadcast announcements via remote access using an admin panel. All of this is done using web applications using Firebase as the database on the administrator’s end and an Android application for the students.

B. Review on Training & Placement Cell System

The primary goal of this paper is to convey placement information appropriately. It features a variety of modules, including student, administrative and company modules. By utilising this module, TPO can manage student profile information with ease while acting as an admin module.

With the use of this technology, students and industry institutes may communicate intelligently. Additionally, it features databases, a common method of organising student data. It takes a lot of time to construct databases of student information using paperwork in various institutions. A variety of technologies, including Python, Java, Android, .NET, and Android, are used to handle all of these issues, including online systems, Android-based applications, and Web-based systems.

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C. A Real-Time Application to Predict Student Placement Status

This paper suggests a methodology for recommendations that predicts students' placement status. This strategy helps a company's placement department find potential students while also focusing on and enhancing their technical and interpersonal skills. They will therefore be able to work harder to be hired by more prestigious organisations. This approach offers a framework for suggestions for predicting students' placement status. Data science approaches are utilised to forecast student placement, and the system uses the most effective algorithms, like the Naive Bayes algorithm and the KNN algorithm. The C programming language is used to create both algorithms. After comparing the findings, the system chooses the more effective algorithm, with 85 percentage the Naive Bayes algorithm and 95 per cent for the KNN approach our system produced fantastic results. KNN technique outperforms the Naive Bayes algorithm in terms of output.

D. Campus Recruitment Management (Online) System

The paper offers three logs in the campus recruitment management system's registration option for students, businesses, and Training Placement Officers. Students can register by entering their information into the system, and then they can apply for campus drives. Additionally, it enables businesses to post job openings and other relevant information about incoming drives. The Training Placement Officer (TPO) is granted complete authority to view all information regarding the number of companies that have registered and the number of students that have registered or not. He may also post advertisements for students that include information about workshops, study materials, and other topics that will help students and employers establish strong communication. It makes it simpler for the placement officer to view or manage student data. Additionally, we offer a single point of contact option so that users can easily post their inquiries.

III. MODULES

A. Admin Module

The TPO is the administrator of the system. TPO views student and company details and communicates with them. The TPO also sends notifications regarding upcoming activities.

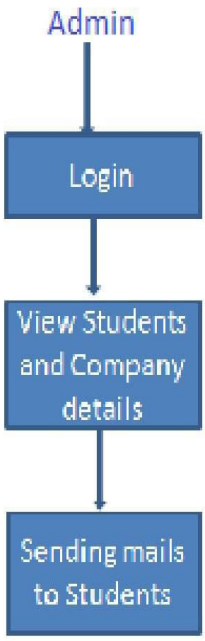


Fig. 1 Admin Module

B. Student Module

Students create a profile on the portal by providing personal and academic information. Students are notified about the upcoming placement drives, and important announcements are made on the platform.



Fig. 2 Student Module

C. Company Module

Companies create a profile on the portal and post vacancies in their organization. They can also view student profiles and resumes.

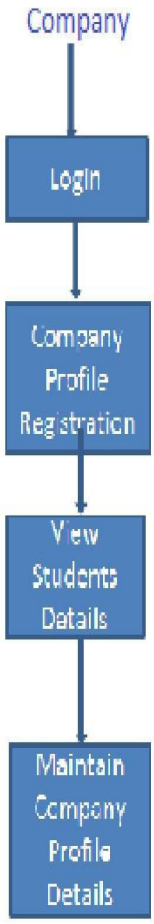


Fig. 3 Company Module

IV. ALGORITHMS

A. *K-Nearest Neighbours*

1) Load the dataset: First, we start by loading the dataset containing student performance data, including features such as current grades, previous grades, number of internships and any other relevant factors.
2) Preprocess the data: We perform any necessary preprocessing steps on the dataset, such as handling missing values, normalizing features, or encoding categorical variables.
3) Split the data: We divide the dataset into a training set and a test set. We allocate a larger portion of the data (e.g., 70-80 %) for training the KNN algorithm and the remaining portion for testing its performance
4) Choose the value of k: We determine the value of k, representing the number of nearest neighbours to consider for analyzing student performance. This is a hyperparameter that we used to tune based on the specific requirements and the characteristics of the dataset.
5) Calculate distances: For each student instance in the test set, we calculate the distance between that instance and all the student instances in the training set.
6) Select k nearest neighbours: By selecting the k student instances with the shortest distances to the test instance. These instances will serve as the nearest neighbours for analyzing the student's performance.
7) Analyze performance: For student performance analysis, we considered various factors. If the target variable is categorical, we determine the class of the test instance based on the majority class of its k nearest neighbours. Alternatively, if the target variable is continuous, we calculate the average or weighted average of the target variable for the k nearest neighbours to estimate the student's performance
8) Evaluate the model: Then, we repeat steps 5 to 7 for all student instances in the test set. We compare the predicted performance with the actual performance to evaluate the accuracy and effectiveness of the KNN algorithm for student performance analysis.
9) Tune and optimize: Iterating and refining are used in the next step in the algorithm by experimenting with different values of k, distance metrics, or preprocessing techniques to improve the model's performance
10) Make predictions: Once we have tuned and optimized the KNN algorithm for student performance analysis, we can use it to make predictions on new, unseen student instances. By applying the same preprocessing steps used on the training and test sets and using the trained model to determine their predicted performance.

B. *Naïve Bayes Classifier*

1) Collect the training dataset: First, we gathered a dataset with labelled examples that represent student performance. Each example should have a set of features related to students (e.g., their academic performance, internships, etc.) and a corresponding class label indicating performance level (e.g., high, medium, low). Corresponding plays a great role in the estimation of students getting a job.
2) Preprocess the data: We performed any necessary preprocessing steps on the dataset, such as removing missing values, handling outliers, or normalizing features.
3) Separate the dataset by class: We split the dataset into separate subsets based on the performance level labels (e.g., high, medium, low).
4) Estimate the prior probabilities: We calculated the prior probability for each performance level by dividing the number of instances in each level by the total number of instances.
5) Calculate the likelihood probabilities: For each feature in the dataset, we calculated the likelihood probability of that feature given each performance level. This step involves estimating the probability distribution of each feature for each performance level.
6) Make predictions: Given a new student instance with a set of features, we used Bayes' theorem to calculate the posterior probability of each performance level given the features. The performance level with the highest posterior probability is predicted as the output.
7) Evaluate the model: Assessing the performance of the Naive Bayes model using appropriate evaluation metrics, such as accuracy, precision, recall, or F1 score, is the next step. This step helps understand how well the model predicts student performance.
8) Iterate and improve: Based on the evaluation results, we then iterate on the model by adjusting parameters, feature selection, or applying other techniques such as smoothing or handling imbalanced data. We repeat steps 3-7 until we achieve satisfactory performance.

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9) Use the trained model: Once we are satisfied with the model's performance, we can use it to analyze student performance on new, unseen data. This can help identify students who may need additional support or intervention.

V. RESULTS

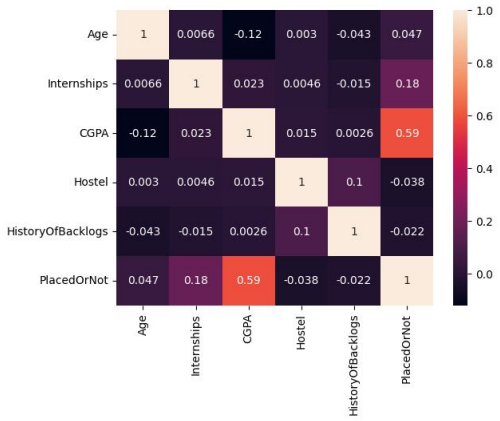


Fig. 4 Heat Map

A correlation matrix heat map is a visual representation of the correlation between different variables or features in a dataset related to student information. It helps to identify relationships and patterns among the variables and provides insights into how they are interconnected. The heat map is colour-coded to represent the strength and direction of the correlation. Typically, a gradient of colours ranging from cool to warm is used. Strong positive correlations are shown in warmer colours, while strong negative correlations are shown in cooler colours.

The cells in the heat map display the correlation coefficients between pairs of variables. The correlation coefficient ranges from -1 to +1, where -1 indicates a perfect negative correlation, +1 indicates a perfect positive correlation, and 0 indicates no correlation. When two variables have a positive correlation, it means that as one variable increases, the other tends to increase as well. In the heat map, you will see warmer colours for such pairs of variables. When two variables have a negative correlation, it means that as one variable increases, the other tends to decrease, and vice versa. In the heat map, you will see cooler colours for such pairs of variables. The intensity of the colour in the heat map indicates the strength of the correlation. Darker or more intense colours represent a stronger correlation, while lighter or more faded colours indicate a weaker correlation. By examining the heat map, you can identify clusters or groups of variables that are strongly correlated. Variables that have a high positive correlation might indicate dependencies or relationships between different aspects of student information. Similarly, variables with a high negative correlation may indicate opposing factors or trade-offs. The heat map can help identify highly correlated variables. If two variables have a very high positive or negative correlation, it suggests redundancy in the data. In such cases, you might consider removing one of the variables to avoid multicollinearity or improve model interpretability.

VI. CONCLUSION

Our job prediction project successfully utilized Naive Bayes and K-Nearest Neighbors (KNN) algorithms for the classification. Through this project, we aimed to assist students in identifying potential job opportunities based on their skills and interests. By applying these machine learning techniques, we were able to build models that effectively classified job types, providing valuable insights and recommendations. Naive Bayes, a probabilistic classifier, demonstrated its effectiveness in this project. It assumes independence among the features and calculates the probability of getting the job based on the occurrence of different feature values. The Naive Bayes algorithm efficiently processed and learned from our training dataset, allowing it to make accurate predictions on new data. Its simplicity, speed, and scalability made it an ideal choice for our job classification task.

Additionally, we employed the K-Nearest Neighbors (KNN) algorithm, which classifies unknown data points based on their similarity to neighbouring data points. KNN utilizes a distance metric to determine the K nearest data points and assigns the class label based on the majority vote. By leveraging this algorithm, we considered the characteristics of similar job profiles to predict the job type for a given student. KNN's flexibility and ability to handle non-linear relationships made it a suitable choice for our project.

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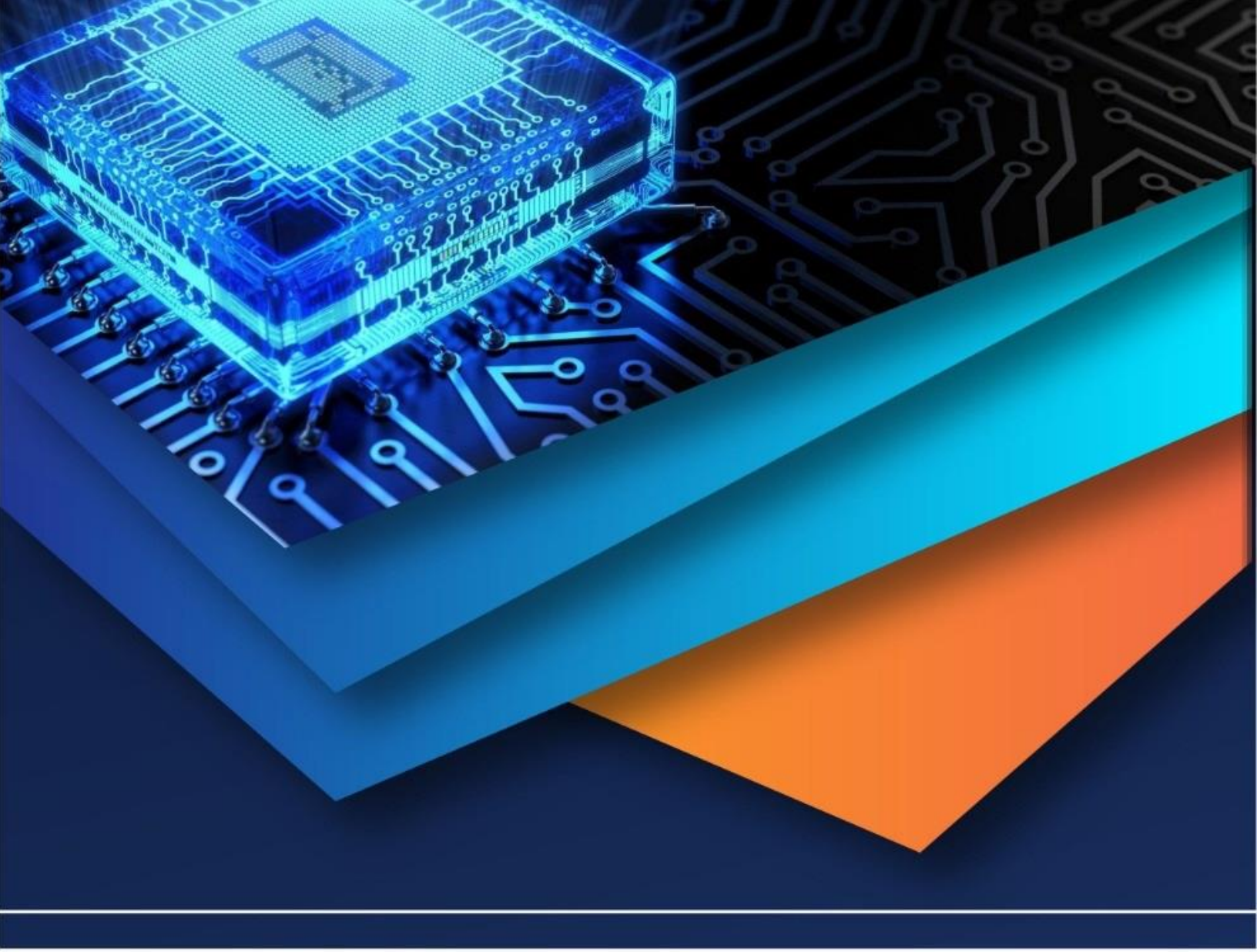
Our evaluation metrics indicated that both Naive Bayes and KNN performed well in predicting job types for students. The accuracy, precision, and recall values were 87.04, 0.84, and 0.95, respectively, indicating the model's ability to classify job types with a reasonable level of confidence.

In summary, our student job prediction project successfully utilized Naive Bayes and KNN algorithms for the classification of job types. These machine learning techniques, along with thorough data analysis and feature engineering, enabled us to provide valuable insights and recommendations to students seeking suitable job opportunities. As the field of machine learning continues to evolve, further advancements and improvements can be made to enhance the accuracy and reliability of job predictions for the benefit of students and job seekers alike.

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