

Optimizing Student Placement Through Cross-Platform Solutions

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Abstract— In the present era, there has been a notable increase in the number of Educational Institutions. The primary aim of higher education establishments is to support students in securing employment through their training and placement office. However, a major challenge currently faced is the assessment and enhancement of student performance. Our developed system is designed to tackle this challenge by analyzing students' historical data, including their academic and extracurricular activities, and predicting their expected placement package. This system proves advantageous for both the institute and the students as it enables them to strategize and improve their performance prior to actual placement drives conducted by companies. We have gathered a real-time dataset comprising of more than 600 records from the training and placement office of Ramrao Adik Institute of Technology (RAIT) in Navi Mumbai, India, covering the past two years. The analysis of this dataset involved the utilization of well-known algorithms such as Random Forest Regression, Multilinear Regression, and Decision Tree Regression. Three distinct models were developed, and the most effective algorithm was chosen. The model was then saved using pickle and deployed on the cloud. With an accuracy rate exceeding 95% after conducting 10+ trials and experiments, it is evident that this system greatly assists the placement cell in identifying promising students and focusing on nurturing the essential skills for their success.

Index Terms— Educational Institutes, Engineering Graduates, Internships, Pareto Principle, Placements.

• Introduction

Our system has been carefully designed to provide unique opportunities for each student to connect with their desired careers. Through the use of advanced technology, we have created a platform that incorporates cutting-edge technologies such as React Native, NoSQL, and AWS to deliver seamless functionality across different platforms, efficient data management, and exceptional performance. This positions our platform as a game-changer in the field of campus placement. Our primary goal is to simplify the placement process and ensure that students, recruiters, and the training and placement management cell are all connected on a unified platform. To achieve this, we have utilized React Native and Spring Boot to develop an application that optimizes resource allocation and offers an aesthetically pleasing interface. The application caters to the specific needs of students, administrators, and super admins by automating essential tasks and providing engaging features such as personalized logins, instant messaging, application tracking, resume creation, and document verification. It also facilitates seamless communication and information exchange among all parties involved. By automatically converting Excel files to PDFs, our application improves accessibility in data management. The efficient NoSQL database schema ensures efficient storage and retrieval of student and job placement data. Our cross-platform application is poised to revolutionize the job search process for students and enhance the overall educational journey. With a focus on automation, security, and cross-platform functionality, our system is carefully crafted to meet the demands of today's students.

• Literature Analysis

1. The section outlines the methodology used for the literature review, discussing articles that delve into the advancements within the academic field.
2. During the 2016 World Conference on Computer Systems and Information Systems, Professor Ashok M and Assistant Professor Apoorva A delivered a paper titled "Student Forecast Data Method and the Patentage Institution's

Pensionent." The paper employs a knowledge discovery in databases approach to forecast student placement, divided into training and current student data phases. Various mining techniques and algorithms are utilized to create a statistical algorithm for placement opportunities, supported by a confusion matrix.

3. Abijith Sankar's presentation at the International Meeting on Computer and Communication Systems (ICCCS - 2018) focused on a paper titled "Student Placement Coordinator: A Recommendation for Machine Learning System." The paper suggests that machine learning can effectively address prediction challenges in student placement, utilizing algorithms like Naïve Bayes, Decision Trees, and Support Vector Machines (SVM) for classification. Students are categorized into base companies, dream companies, or support services based on the predictions.

4. Animesh Giri and M Vignesh V Bhagavath's paper, presented at the International Computer Meeting on Understanding Knowledge Processing (CCIP), centers on a placement prediction system using the Nearby Neighbours Classifier. The paper emphasizes the importance of accurate placement predictions.

- **Methodology**

1. Inventory control offers various methods to evaluate the value of inventory based on their importance. A research study conducted at an engineering institute in the western region of Maharashtra State, India, utilized ABC analysis to categorize the companies that visited the institute. The primary objective of this study was to improve the quality and quantity of job placements at the institute, which offers undergraduate, postgraduate, and doctoral programs in engineering, as well as MBA and MCA courses. However, the focus of this particular research was on the industries visiting the institute for undergraduate engineering courses.

Data Collection:

The institute regularly hosts numerous companies for job placements and aims to attract new companies every year. The Training and Placement Cell of the institute collected data on 300 industries that visited over an eight-year period. This data included the number of students recruited by these companies and the salary packages they offered. The companies visiting the institute were categorized for the academic years 2020-21 and 2021-22.

ABC Analysis:

A unique approach was used to assign a value to each company. The value of a company was determined by multiplying the total number of placements made by the company in the past eight years with the average salary package offered. This value represents the overall worth of the company.

To calculate the percentage value, the total value of a company was divided by the sum of the total values of all companies. This percentage value serves as a measure of the company's significance compared to others.

- **Existing System**

Wilton WT FOK, Y.S. H, H Au Yeug, and K. Law conducted a research study to determine the most appropriate course for individual students based on their behavior using Neural Network Strategies. The study involved comparing the average node value in the Tensor Flow Engine while adjusting the number of deep learning layers. Machine learning is focused on developing, analyzing, and exploring various algorithms to effectively analyze patterns from historical data and utilize them for predicting future data or making decisions. The main objective of machine learning is to construct a model from the data. Machine learning continues to be widely used and plays a vital role in various fields such as computer vision, robotics, search engines, bioinformatics, and financial computing.

- **Proposed System Methodology**

In the admission process of Engineering colleges, students are categorized as regular or diploma students, each group evaluated based on specific criteria. To enhance efficiency, we have designed a user interface with two buttons: "Diploma Student" and "Regular Student". Upon selection, you will be prompted to input relevant details. Regular students must provide their 10th and 12th grade percentages, while diploma students should input their diploma program percentage. Additional information required includes B.E. semester-wise CGPA, overall B.E. CGPA, any year drop, workshops attended and organized, workshop resource person experience, projects developed, and internships completed.

After entering all necessary information, a "Predict" button will appear on the same page. Clicking this button will input the data into the model, which will then predict the outcome and display the offered package in LPA on the interface. The model's accuracy will also be displayed, aiding users in assessing their performance.

The system architecture for this process is illustrated in Figure 1.

Data preprocessing is crucial in this system, involving the transformation of raw datasets with irrelevant attributes and missing values into a suitable format for analysis. The raw dataset from the training and placement cell of the 2020 batch necessitated the elimination of attributes like first name, last name, college roll number, department, contact number, and email id. Additionally, words were converted into integer values, and missing values were replaced with the median.

- **Implications and future directions :**

The development and use of skills-based learning portals have a significant impact on education and improve student learning and outcomes by providing opportunities for change. First, the educational impact of AI-based learning portals lies in their ability to provide personalized support and guidance based on students' needs and preferences. Using artificial intelligence to analyze user data and create personalized recommendations, these portals enable students to improve their learning strategies, achieve educational impact, and successfully complete training.

Additionally, the potential applications of AI-based learning portals are expanding beyond traditional learning to cover a wide range of subjects and backgrounds. For example, AI technology can be used in job training, professional development, and lifelong learning programs to provide personalized learning tailored to the needs of adult learners. Additionally, AI-supported education portals have the potential to eliminate inequalities in access to education by providing people with efficient, affordable and accessible education systems instead of relying on international aid.

But despite the great potential of intelligence-based learning portals, there are still some challenges and opportunities for further research. One of the challenges is the need to address data privacy, security and ethics issues when collecting and analyzing user data. Additionally, more research is needed to explore the impact of AI-based learning portals on student motivation, engagement, and skill development. Additionally, collaborative efforts among educators, researchers, and professionals are needed to ensure that AI-based learning technologies are designed, developed, and implemented responsibly.

Next, future research directions in the field of artificial intelligence based on educational portal research may include evaluating the task benefits of different recommendation algorithms, exploring new ways of user interaction and participation, and analyzing the impact of personal learning interventions. Long-term benefits for student learning and retention. There is also a need for research to explore the integration of new technologies such as virtual reality, augmented reality and gaming with artificial intelligence-based learning portals to create dialogue with education.

In summary, the results and future directions of AI-based learning portals demonstrate the evolution of AI technology in education by providing personalization support, expanding learning, and encouraging innovation in teaching practices. AI-based learning portals have the potential to transform learning and help students succeed in the digital age by solving critical problems and freeing up time for further research.

DATA ANALYSIS AND OUTCOME :

The establishment was visited by a total of 268 companies. Out of these, 20 companies belonged to category 'A', which accounted for approximately 65% of the placement value and 7.46% of the visiting industries. These specific companies require thorough engagement and further analysis to strengthen the partnerships between the industry and the institution. Category 'B' consisted of 74 companies, contributing 25% of the placement value and representing 27.61% of the visiting industries. The remaining 174 companies were categorized under 'C', contributing 10% of the placement value and accounting for 64.92% of the total number of companies.

Table II displays the distribution of companies among categories A, B, and C.

In the following year, there was an increase in placements and average packages for most companies, resulting in a change in the overall value of each company. As a result, there was a rise in the number of industries falling under categories 'A' and 'B' in the subsequent year.

Figure 1 visually presents the breakdown of companies visiting the establishment.

After categorizing industries into ABC analysis, the institution implemented initiatives to enhance the quantity and quality of placements. The primary focus was on improving the quality of placements for 'A' category companies and elevating the ratings of those placed in categories 'B' and 'C'. These initiatives are explained in detail below.

- **Conclusion**

To summarize, this literature review presents a detailed analysis of online training and placement systems. Through a thorough examination of previous research, the review identifies various aspects of these systems, including their advantages, characteristics, and overall performance. The literature emphasizes the benefits of these systems, such as improved efficiency, organized data, accuracy, security, data validation, and enhanced communication between the placement office and students compared to traditional manual methods. These systems streamline multiple tasks related to training and placement management, such as student enrollment, profile management, job postings, progress tracking, employer registration, and resume submissions. They establish effective communication channels between the placement office and students, while also showcasing efficient data management and storage of student information. Job postings are effectively handled and monitored. These systems offer a comprehensive solution that caters to various stakeholders, including students, alumni, administrators, and employers, from enrollment to

placement supervision. However, there are challenges that need to be addressed, such as system security, protection of confidential student data, validation of uploaded student information, and successful integration of automation through AI. In conclusion, online training and placement systems are valuable assets for educational institutions, enhancing the efficiency and effectiveness of the training and placement process for all parties involved. They also present an intriguing avenue for future exploration and improvement.