

Campus Placement Prediction Using Machine Learning

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ABSTRACT

This project aims to develop a predictive system for campus placements to help students and institutions assess employability and improve placement outcomes. By analysing data from academic records, skills, and extracurricular achievements, the system predicts placement success with high accuracy. The data is pre-processed and transformed into meaningful features, ensuring robust model training and evaluation. A user-friendly web application is developed, allowing students to input their details and receive instant placement predictions. The platform also provides actionable insights for skill enhancement and performance improvement. Designed to support students, educators, and career counsellors, the system fosters a data-driven approach to placement preparation. Future improvements include incorporating additional data sources and real-time analytics to enhance its effectiveness and adaptability. For this we have experimented with six different machine learning algorithms i.e. Decision Tree, Hist Gradient Boosting Classifier, Gradient Boosting Classifier, XGB Classifier, Catboost, Random Forest. Catboost algorithm gives more accuracy comparatively to other algorithms for the dataset we used.

KEYWORDS:

Text detection, Inpainting, Morphological operations, Connected component labelling.

I. INTRODUCTION

Greetings from Placement Predictor, a website that assists you in calculating your chances of being hired by the company of your dreams. This website can offer you helpful insights and advice to enhance your profile and abilities, regardless of whether you are a student or a newbie. Placement Predictor's dynamic and intuitive interface is made possible by Flask, a lightweight Python web framework. The web pages are also designed and styled using HTML and CSS. Your placement probability is predicted by the website using a machine learning model after you enter your information, including your education, work experience, skills, certifications, etc. A sizable dataset of prior placement records from multiple sources is used to train the model.

Paper is organized as follows. Section II describes literature study. About the techniques that were used to state whether the student have chances to get placed or not is given in Section III. Section IV presents experimental results showing results of images tested. Finally, Section V presents conclusion.

II. LITERATURE REVIEW

1. TITLE: PLACEMENT PREDICTION AND ANALYSIS USING RANDOM FOREST CLASSIFIER

There are numerous considerations when selecting a college. Students frequently concentrate on one goal: placement. To assist with this, every college desires a capable placement team. By introducing a student placement prediction system, this research paper seeks to improve that system. The primary objective? to increase placement prediction accuracy. We can predict a student's placement based on a number of factors. We examined various machine learning algorithms, including SVM, KNN, Random Forest, and Logistic Regression. To determine which algorithm performs best in terms of accuracy, each will be tested separately on the same database. Finding and employing young talent for internships and entry-level positions is the main goal of campus placement. Annual admissions and a college's reputation are frequently dependent on how well their students get placed. In our study, we analyse last year's placement data to figure out how likely this year's students will get placed. To do this, we've played around with four machine learning algorithms: Logistic Regression and Decision Tree among them.

2. TITLE: STUDENT PLACEMENT PREDICTION

India is a major player in the pharmaceutical and information technology industries worldwide, and top businesses are looking to hire excellent college students. Through its connections with reputable companies and industrial establishments, the Training and Placement Cell plays a vital role in helping students find employment after graduating from college. Improving students' placement performance is currently the largest challenge facing institutions. Educational institutions seek out more effective technology that supports decision-making processes, helps with better management, or helps develop new

tactics. It is possible to determine a student's suitability for a given job by using a placement prediction system.

3. TITLE: COLLEGE PLACEMENT PREDICTION AND ANALYSIS USING DATASCIENCE

College placement is a crucial term in any educational institution where a student's future is determined. At that point, various businesses come to the camps to hire the students or offer them jobs, and they use a variety of selection procedures to choose the students. In addition to helping students enhance their academic performance, this placement prediction system aims to help them acquire additional soft skills that will increase their chances of being placed. Such a study will assist the college's faculty in providing students with appropriate instruction and enhancing their placement department. It can assist the department and analyse student data.

III. METHODOLOGY

The machine learning methodology for campus placement prediction takes a methodical approach. Computer languages like HTML, CSS, and the FLASK framework are used to create the model. Python is used to process the data set and import machine learning algorithms like decision trees, random forests, catboost, and gradient boosting. The results from every algorithm are also used to perform an accuracy test.

1. **Data Gathering:** Methods To improve the effectiveness of our forecasting efforts, we have collected a wide variety of data from various sources and carefully compiled this abundance of data into a single, comprehensive file.
2. **Handling Missing Data:** Since the dataset contains a variety of data value types and some entries are null, it is our responsibility to handle the missing values in an appropriate manner. This is essential to guaranteeing that our analysis yields accurate results.

3. **Feature Selection:** When we start the process of creating a predictive model, we are able to strategically select from a wide range of features, each of which has a unique function.
4. **Algorithm Application:** To begin our project, we apply algorithms to the dataset, carrying out various operations to process and refine the data. This entails handling missing values, feature engineering, and exploratory data analysis.
5. **Displaying Prediction:** Following the previously mentioned procedures, we are left with outcomes that we can share with users. This gives them the insight to improve themselves based on their outcomes and permits them to take the required actions in accordance with their preferences.
6. **Deployment and Monitoring:** The predictive model is put into production settings so that it can be used to generate predictions in real time after it has been judged adequate. The deployment procedure doesn't stop there, though; in order to keep the model accurate and dependable in its forecasts, it must be continuously monitored for drift or deterioration over time .

IV. EXPERIMENTAL RESULTS

After implementing campus placement predictor, we evaluated the performance of all 5 algorithms which we have used:

1. Decision Tree Classifier
2. Random Forest Classifier
3. XGB Classifier
4. Catboost Classifier
5. HGB Classifier

To measure the performance of model we use 4 Evaluation Metrics for all the above algorithms.

Evaluation Metrics:

- **Accuracy** – a quick snapshot of how well the model is performing in terms of correct predictions.

Accuracy = No.of Correct Predictions / Total No.of input samples

- **Precision** - a measure of a model's performance that tells you how many of the positive predictions made by the model are actually correct.
Precision = TP / (TP+FP)
- **Recall** - Lower recall and higher precision give you great accuracy but then it misses a large number of instances.
- **F1 – Score** - It is a harmonic mean between recall and precision. Its range is [0,1].

1) Accuracy results of Decision Tree Classifier

ACCURACY	PRECISION	RECALL
F1-SCORE		
88.151175	94.250513	83.912249
88.781431		

2) Accuracy results of Random Forest Classifier

ACCURACY	PRECISION	RECALL	F1-SCORE
88.151175	93.711968	84.460695	
88.846154			

3) Accuracy results of XGB Classifier

ACCURACY	PRECISION	RECALL
F1-SCORE		
88.559755	95.983087	82.998172
89.019608		

4) Accuracy results of Catboost Classifier

ACCURACY	PRECISION	RECALL
F1-SCORE		
88.661900	97.186147	82.084095
88.999009		

5) Accuracy results of HGB Classifier

ACCURACY	PRECISION	RECALL
F1-SCORE		
88.151175	95.178197	82.998172
88.671875		

Observation:

Among all the classifiers, Catboost got highest Accuracy which is: **88.66**

V. USER INTERFACE

1) GOALS OF DESIGNING A WEB PAGE

The main point of interaction for users is the User Interface (UI), which provides important platform features and a variety of career options in an easy-to-use and in a way that is visually appealing. The interface, which was created with HTML, CSS, and JavaScript, guarantees smooth navigation through interactive elements, search bars, and carousels.

By making individualized career recommendations and real-time insights easily accessible, the design aims to improve usability and user satisfaction.

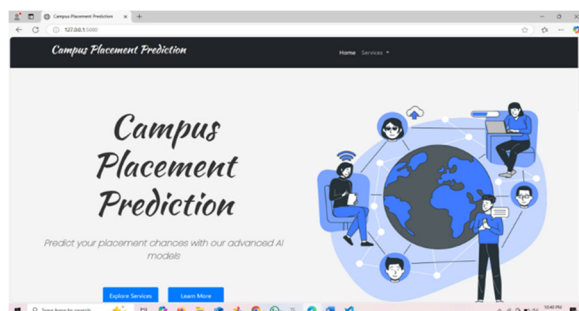
Intuitive Navigation: Users can easily navigate the platform thanks to the UI's clear headings like "Home," "Recommendations," and "Features."

Visual Appeal: To keep a contemporary and captivating look, a dynamic carousel that highlights suggested careers uses few animations.

Responsiveness: The design ensures a consistent user experience across platforms by adjusting to different screen sizes, including desktops, tablets, and mobile devices

2) SEGMENTS AND GENERAL CHARACTERISTICS OF WEB PAGE

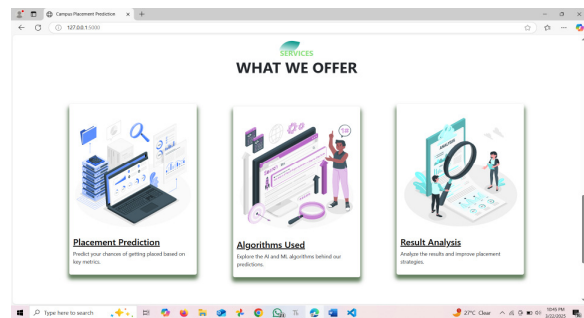
Segment1: HOMEPAGE



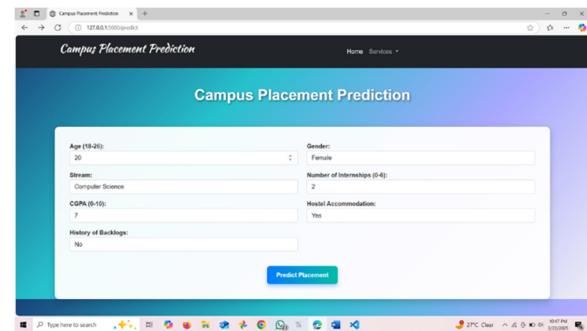
The above picture shows the home page of our site. It has 2 options like: 1) Explore Services 2) Learn more

When explore services is clicked then the services offered option will be generated.

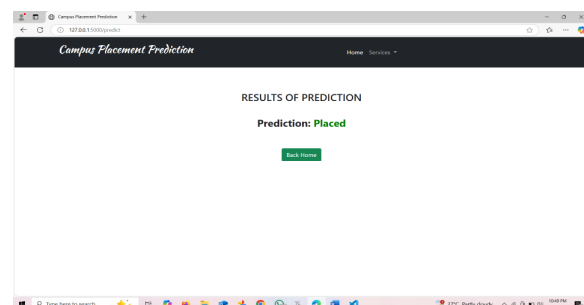
Segment2: Services Offered



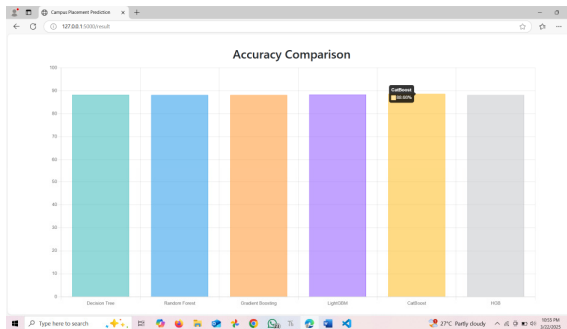
IV. OUTPUT AND ANALYSIS



Users can evaluate their chances of being placed on campus by entering their personal and academic information in the Placement Prediction Form. Important details like age, gender, stream, CGPA, number of internships, backlog history, and hostel accommodation status are gathered.



The Prediction Result Page displays the outcomes of the placement prediction made using the input data. There is a clear and concise indication of whether the student is expected to be "Placed" or "Not Placed." The outcome is highlighted in an easy-to-read format, and there is a button to go back to the homepage for more actions.



The above figure is accuracy comparison page displays which algorithm has highest accuracy for the data set that has been used for training the model as well as testing the model.

VII. CONCLUSION

We have implemented campus placement predictor using machine learning algorithms like Decision Tree Classifier, Random Forest Classifier, XGB Classifier, Catboost Classifier, HGB Classifier. According to the data set we have used for training and testing the model we got highest level of accuracy and precision to an algorithm called catboost ie., 88.66, 97.18 respectively. To sum up, this project effectively uses data-driven insights to create a predictive system that improves campus placement results. Based on a thorough examination of academic, skill, and extracurricular data, the system exhibits great accuracy in forecasting students' placement success by leveraging machine learning techniques, specifically the CatBoost classifier. By offering immediate forecasts and useful feedback for skill development and performance enhancement, the user-friendly web

tool gives students even more power. For students, teachers, and career counselors, this platform is an invaluable resource that promotes an active, knowledgeable approach to placement preparation. Future improvements, such as adding more data sources and real-time analytics, could improve the system's predictions even more and broaden its applicability, making it a valuable tool for enhancing employability outcomes more broadly.

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