

CHAPTER 1

INTRODUCTION

Nowadays the number of educational institutes is growing day by day. The aim of each higher educational institute is to help their students to get a well-paid job through their placement cell. One of the biggest challenges that higher learning institutes face these days is to uplift the placement performance of scholars. The goal of this system is to predict whether the student will get a campus placement or not based on various parameters such as gender, SSC percentage, HSC percentage, HSC stream, degree percentage, degree type, work experience & e-test percentage. This research focuses on various algorithms of machine learning such as Logistic Regression, Decision Tree, K-Nearest Neighbors and Random Forest in order to produce economical and correct results for campus placement prediction. This system follows a supervised machine learning approach as it uses class labelled data for training the classification algorithm.

In the fast-evolving landscape of recruitment, the integration of machine learning into the campus placement process has emerged as a game-changer. With the advent of advanced technology, the traditional campus placement approach is being revolutionized, offering a more efficient, data-driven, and user-friendly experience for both recruiters and students. One of the pioneering advancements in this domain is the development of a cutting-edge Android application that leverages the power of machine learning to predict campus placement outcomes accurately.

With its innovative use of machine learning and its user-friendly interface, this Android application marks a significant step forward in the realm of campus placement prediction. By fostering transparency, efficiency, and data-driven decision-making, it serves as a catalyst in bridging the gap between aspiring students and prospective employers, ultimately facilitating the seamless transition from academia to the professional world.

In 21st century where mobile and information technology has become an integral of our lives, use of Internet to enable Students and companies to manage the placement process with active participation of Training and placement Officer (TPO) Can be in institutes. This led to unique android based placement management system. This application provides information on placement drives and technical skills or personality development workshops so that student may view and assess their opportunities. The Can access easily to this and the data Can be retrieved in no time. In the student registration form, we can give personal details, qualifications, and professional skills and upload resume. The job details of the places Students will provide by the administrator. The Training and Placement Officer to take effective actions on a follow-on from the information they have viewed. The administrator plays an important role in our He provides approval of student registration and updating.

1.1 Overview

This project is aimed at developing a web application for the Training and Placement Department of the College. The system is a web application that can be accessed throughout the Organization with proper login provided. This system can be used as a web application for the Training and Placement Officers (TPO) Of the college to manage the student information With regard to placement. Students logging should be able to upload their information in the form Of a CV. The key feature Of this project is that it is a onetime registration. Our project provides the facility of maintaining the details of the students. It also provides a requested list of candidates to recruit the students based on given query. Administrator logging in may also search any information put up by the students. This project will aid colleges to practice full IT deployment. This will also help in fast access procedures in placement related activities.

1.2 ABOUT

This project is to facilitate students in college, company to register and communicate with Placement Office. The users can access easily to this and the data can be retrieved easily in no time. In the main page there are options for a new register, a registered student to directly login using username and password, submit resume. In the student registration form, we can give personal details, educational qualifications, and professional skills and upload resume. The job details Of the placed students will be provided by the administrator. The administrator plays an important role in our project. They provide approval Of student registration and updating. In this project we create a search engine for administrator, Who can search everything about the student and company,

1.3 SCOPE OF PROJECT

Our project has a big scope to do. We can store information Of all the students. cv's are categorized according to various streams. Various companies can access the information. Students can maintain their information and can update it. Notifications are sent to students about the companies. Students can access previous information about placement.

1.4 Android Application

Android operating system is the largest installed base among various mobile platforms across the globe. Hundreds of millions of mobile devices are powered by Android in more than 190 countries of the world. It conquered around 71% of the global market share by the end of 2021, and this trend is growing bigger every other day. The company named Open Handset Alliance developed Android for the first time that is based on the modified version of the Linux kernel and other open-source software. Google sponsored the project at initial stages and in the year 2005, it acquired the whole company. In September 2008, the first Android-powered device was launched in the market. Android dominates the mobile OS industry because of the long list of features it provides. It's user-friendly, has huge community support, provides a greater extent of customization, and a large number of companies build Android-compatible smartphones. As a result, the market observes a sharp increase in the demand for developing Android mobile applications, and with that companies need smart developers with the right skill set. At first, the purpose of Android was thought of as a mobile operating system.

Features of Android

- Android is a powerful open-source operating system that open-source provides immense features and some of these are listed below.
- Android Open Source Project so we can customize the OS based on our requirements.
- Android supports different types of connectivity for GSM, CDMA, Wi-Fi, Bluetooth, etc. for telephonic conversation or data transfer.
- Using Wi-Fi technology, we can pair with other devices while playing games or using other applications.
- It contains multiple APIs to support location-tracking services such as GPS.
- We can manage all data storage-related activities by using the file manager.
- It contains a wide range of media supports like AVI, MKV, FLV, MPEG4, etc. to play or record a variety of audio/video.
- It also supports different image formats like JPEG, PNG, GIF, BMP, MP3, etc.
- It supports multimedia hardware control to perform playback or recording using a camera and microphone.
- It provides support for virtual reality or 2D/3D Graphics.

Android Versions

Google first publicly announced Android in November 2007 but was released on 23 SEPTEMBER 2008 to be exact. The first device to bring Android into the market was the HTC Dream with the version Android 1.0. Since then, Google released a lot of android versions such as Apple Pie, Banana Bread, Cupcake, Donut, Éclair, Froyo, Gingerbread, Jellybeans, KitKat, Lollipop, marshmallow, Nougat, Oreo, etc. with extra functionalities and new features.

1.5 Programming Languages used in Developing Android Applications

- Java
- Kotlin

Developing the Android Application using Kotlin is preferred by Google, as Kotlin is made an official language for Android Development, which is developed and maintained by JetBrains. Previously before Java is considered the official language for Android Development. Kotlin is made official for Android Development in Google I/O 2017.

Advantages of Android Development

- The Android is an open-source Operating system and hence possesses a vast community for support.
- The design of the Android Application has guidelines from Google, which becomes easier for developers to produce more intuitive user applications.
- Fragmentation gives more power to Android Applications. This means the application can run two activities on a single screen.
- Releasing the Android application in the Google play store is easier when it is compared to other platforms.

Disadvantages of Android Development

- Fragmentation provides a very intuitive approach to user experience but it has some drawbacks, where the development team needs time to adjust to the various screen sizes of mobile smartphones that are now available in the market and invoke the particular features in the application.
- The Android devices might vary broadly. So, the testing of the application becomes more difficult.

- As the development and testing consume more time, the cost of the application may increase, depending on the application's complexity and features.

1.6 Android Studio

Android Studio is the official Integrated Development Environment (IDE) for android application development. Android Studio provides more features that enhance our productivity while building Android apps.

Android Studio was announced on 16th May 2013 at the Google I/O conference as an official IDE for Android app development. It started its early access preview from version 0.1 in May 2013. The first stable built version was released in December 2014, starts from version 1.0.

Features of Android Studio

- It has a flexible Gradle-based build system.
- It has a fast and feature-rich emulator for app testing.
- Android Studio has a consolidated environment where we can develop for all Android devices.
- Apply changes to the resource code of our running app without restarting the app.
- Android Studio provides extensive testing tools and frameworks.
- It supports C++ and NDK.
- It provides build-in supports for Google Cloud Platform. It makes it easy to integrate Google Cloud Messaging and App Engine.

The Android Studio features make it a popular choice for mobile developers, as it offers a suite of features that are designed to make app development easier. These features include (but are not necessarily limited to) the following.

IntelliJ IDEA-Based

Android Studio is based on the IntelliJ IDEA platform, which is a popular Java IDE. This makes it a good choice for developers who are already familiar with IntelliJ IDEA, as they will feel right at home using Android Studio.

Gradle-Based

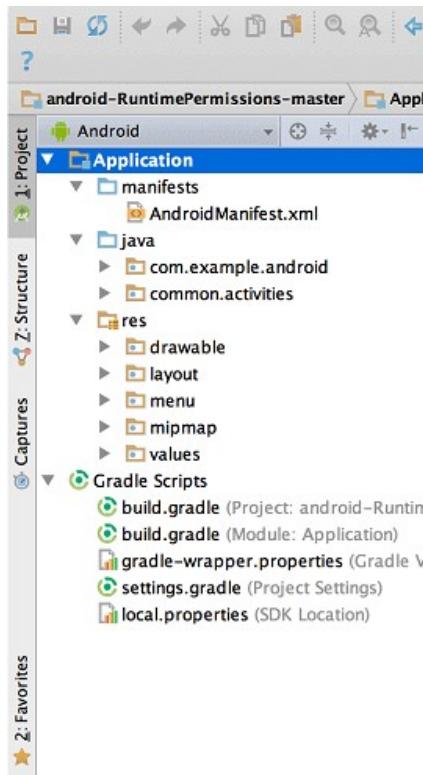
Android Studio uses Gradle, which is a build automation system that helps developers with the compiling and building process of their app. In essence, this helps Android mobile app developers configure different builds, as well as create build variants for multiple mobile devices. **Real-Time Profilers**

The real-time profilers in Android Studio help developers to identify and fix performance issues with their apps. This is done by providing them with real-time data on metrics such as CPU usage, network, memory, battery, and other resources.

Android Studio Project Structure

The Android Studio project contains one or more modules with resource files and source code files. These include different types of modules-

- Android app modules
- Library modules
- Google
- App Engine modules



1.1 Android Studio Project Structure

By default, Android Studio displays our project files in the Android project view, as shown in the above image. This view is formed by modules to provide quick access to our project's key source files. These build files are visible to the top-level under Gradle Scripts. And the app module contains the following folders:

- **manifests:** It contains the AndroidManifest.xml file.
- **java:** It contains the source code of Java files, including the JUnit test code.
- **res:** It contains all non-code resources, UI strings, XML layouts, and bitmap images.

We will see the actual file structure of the project by selecting the **Project** from the **Project dropdown**.

Gradle build system

Gradle build used as the foundation of the build system in Android Studio. It uses more Android-specific capabilities provided by the Android plugin for Gradle. This build system runs independently from the command line and integrated tool from the Android Studio menu. We can use build features for the following purpose:

- Configure, customize, and extend the build process.
- We can create multiple APKs from our app, with different features using the same project and modules.
- Reuse resource and code across source sets.

Advantages of Using Android Studio:-

- One of the main advantages of using Android Studio is that it helps you code faster.
- The new emulator in Android Studio 3.0 is considered to be very fast, which is a considerable advantage, especially considering that the slowness of the emulator used to be one of the things developers complained most about.
- Testing is essential when you create a mobile app. Fortunately, Android Studio provides developers with everything they need to test their apps on a wide range of devices.
- Another big advantage of Android Studio is that it aids team collaboration. For example, it allows developers to share and access code snippets with ease

Disadvantages of Using Android Studio:-

- One of the main problems with Android Studio is that it requires a lot of RAM and CPU power to run properly. This can be a big disadvantage, especially for developers working on a budget or those with older computers.
- Some developers also complain about the system lagging in Android Studio, which may cause events and slow down the development process.
- Another disadvantage of Android Studio is that it uses a lot of RAMS. This can be particularly troublesome for developers with a limited amount of RAM or those working on older computers.
- The Android Studio installation process is not the fastest, which can be a bit of a pain for developers who are in a hurry to get started.

1.7 Google Firebase

Google Firebase is a set of cloud-based development tools that helps mobile app developers build, deploy and scale their apps.

Features of Google Firebase

- Authentication. Firebase provides a secure and easy way for users to sign into their app. Developers can use Firebase Authentication to support email and password login, Google Sign-In, Facebook Login and more.
- Realtime Database. The Firebase Realtime Database is a cloud-hosted NoSQL database that lets organizations store and sync data in real time across all of their users' devices. This makes it easy to build apps that are always up to date, even when users are offline.
- Cloud Messaging. Firebase Cloud Messaging (FCM) is a service that lets businesses send messages to their users' devices, even if they're not using the app. Developers can use FCM to send push notifications, update app content, and more.
- Crashlytics. Firebase Crashlytics is a service that helps organizations track and fix crashes in their app. Crashlytics provides detailed reports on crashes, so they can quickly identify the root cause and fix the problem.

- Performance Monitoring. Firebase Performance Monitoring provides insights into the performance of their app. Organizations can use Performance Monitoring to track metrics like CPU usage, memory usage and network traffic.

Is Google Firebase secure?

All of Firebase's data centres are SOC 2 Type 2 and ISO 27001 certified. Firebase also uses a variety of security measures to protect your data, including the following:

- **Data encryption.** All of Firebase's data is encrypted at rest and in transit.
- **Role-based access control.** Firebase uses role-based access control (RBAC) to give granular control over who can access application data.
- **Audit logging.** Firebase logs all access to data, so businesses can track who has accessed application data and when.

Improve app quality:-

Here majorly all the application performance and testing features are provided. All the features required to check and manage before launching your application officially are provided in this section. Services included are:

- Crashlytics: It is used to get real-time crash reports. These reports can further be used to improve the quality of the application. The most interesting part of this service is that it gives a detailed description of the crash which is easier to analyse for the developers.
- Performance monitoring: This service gives an insight to the performance characteristics of the applications. The performance monitoring SDK can be used to receive performance data from the application, review them, and make changes to the application accordingly through the Firebase console.

Grow your app:-

This feature provides your application analytics and features that can help you to interact with your user and make predictions that help you to grow your app. Services provided are:

- Google analytics: It is a Free app measurement service provided by Google that provides insight on app usage and user engagement. It serves unlimited reporting for up to 500 distinct automatic or user-defined events using the Firebase SDK.
- Predictions: Firebase Predictions uses machine learning to the application's analytics data, further creating dynamic user segments that are based on your user's behaviour. These are automatically available to use for the application through Firebase Remote Config, the Notifications composer, Firebase In-App Messaging, and A/B Testing.

Pros and Cons of Using Firebase:-

Pros:

- Free plans for beginners.
- Real-time database is available.
- Growing Community.
- Numerous services are available

Cons:

- It uses NoSQL so, people migrating from SQL might feel difficulty.
- It is still growing so, it is not tested to an extent.

Companies using Firebase :-

Below are some reputable organizations that rely on a firebase backend for its functioning:

- The New York Times
- Alibaba.com
- Gameloft
- Duolingo

1.8 FEASIBILITY STUDY:-

Feasibility Study is a preliminary study undertaken to determine and document a project's Viability. The term feasibility study is also used to refer to the resulting document. These results Of this study are used to make a decision whether to proceed with the project, or table it. If it indeed leads to a project being approved, it will before the real work of the proposed project starts — be used to ascertain the

likelihood of the project's success. It is an analysis of possible alternative solutions to a problem and a recommendation on the best alternative.

It, for example, can decide whether an order processing be carried out by a new system more efficiently than the previous one.

Operational feasibility

It is to find out whether the current work practices and procedures Support a new system.

Also, social factors i.e. how the organizational changes will affect the working lives of those affected by the system

1.9 Future Prospect:

The future prospects of campus placement prediction using machine learning are promising, with the potential for significant advancements and transformations in the recruitment landscape. Here's a look at some of the key future prospects:

1. Enhanced Personalization: Future developments may include more personalized recommendations and guidance for students, considering their unique skills, preferences, and career aspirations. This could lead to a more tailored approach to matching students with their ideal job roles and organizations.
2. Advanced Predictive Models: Further advancements in machine learning techniques could lead to the development of more sophisticated predictive models that incorporate a wider range of data points, including soft skills, personality traits, and cultural fit, enabling even more accurate and comprehensive predictions of candidate-job fit.
3. Integration of Advanced Technologies: The integration of advanced technologies such as natural language processing and sentiment analysis may enable the system to analyse candidate communication skills, social media presence, and online interactions, providing a more holistic understanding of a candidate's profile and potential fit within an organization.
4. Real-time Market Insights: Future systems could provide real-time market insights to both students and recruiters, offering a comprehensive understanding of current industry trends, emerging job roles, and evolving skill requirements. This real-time information could help students make informed decisions about their career paths and assist recruiters in aligning their hiring strategies with the dynamic demands of the market.

REQUIREMENT ANALYSIS

We are overcoming the difficulty Of student details Which manual in the Current System and here we generate detailed information about the students Which Will save our time to inform each and every batch and section and student profile is maintained.

Functional Requirements:-

This section describes the functional requirements of the system for those requirements which are expressed in the natural language style. A faculty member should be able to login to the system through the first page Of the application, and mention his required roll number and he should get the details Of the student With that roll number. An administrator can login into his account and he Will update the student information.

Non Functional Requirements

Usability

This section includes all Of those requirements that effect usability.

- We get the response within seconds.
- The software must have a simple, user-friendly interface so customers can save time and confusion.

Reliability

- The system is more reliable because of the qualities that are inherited from the chosen platform java.
The code built by using java is more reliable.

Supportability

- The system is designed to be the cross platform supportable. The system is supported on a wide range Of hardware and any software platform which is having JVM built into the system. This application is being developed using J2EE; hence it is extremely portable.

Performance Requirements

- The completely separate business logic at server side from the student interface ensures good performance.
We get the response within seconds.

CHAPTER 02

LITERATURE SURVEY

A literature review on campus placement prediction using machine learning would involve examining existing research, studies, and publications that explore the application of machine learning algorithms in optimizing the campus recruitment process. It provides an introduction that outlines the significance of campus placement and the potential benefits of applying machine learning techniques to enhance the recruitment process. Discuss the growing importance of data-driven decision-making in talent acquisition and the role of machine learning in facilitating predictive analytics for candidate-job fit.

Performing a literature survey for a campus placement prediction system using machine learning can provide valuable insights into the current state-of-the-art techniques and methodologies in this domain. Here is a structured guide that you can use for your literature survey.

1. Introduction to Campus Placement Prediction using Machine Learning:

- Understand the background and significance of employing machine learning for campus placement prediction.
- Discuss the challenges faced by recruiters and candidates during the placement process.

2. General Machine Learning Techniques:

- Explore foundational machine learning algorithms like linear regression, logistic regression, decision trees, random forests, support vector machines, and neural networks.
- Study how these algorithms can be used for classification and regression tasks in the context of campus placement prediction.

3. Feature Selection and Engineering:

- Investigate various feature selection and engineering techniques employed in the literature for campus placement prediction.
- Analyze how different features, such as academic performance, technical skills, extracurricular activities, and soft skills, are used to train the predictive models.

4. Ensemble Learning and Model Stacking:

- Study the utilization of ensemble learning techniques such as bagging, boosting, and stacking to improve

the accuracy and robustness of campus placement prediction models.

2.1 Existing Work:

Examining existing research for campus placement prediction using machine learning involves a thorough analysis of published studies, research papers, and scholarly articles that explore the application of machine learning techniques in optimizing the campus recruitment process.

1. Research Methodologies:

Evaluate the research methodologies employed in the selected studies, including data collection methods, sample sizes, and experimental designs. Analyze how researchers have gathered and processed data to train machine learning models for predicting candidate-job fit and optimizing the recruitment process.

2. Machine Learning Algorithms:

Examine the machine learning algorithms used in the reviewed research, such as regression models, classification techniques, and clustering algorithms. Assess the performance of these algorithms in predicting successful campus placements and their ability to handle different types of data, including categorical and numerical variables.

3. Literature Search:

Utilize academic databases such as Google Scholar, PubMed, IEEE Xplore, and ACM Digital Library to identify relevant research papers, articles, and conference proceedings related to campus placement prediction using machine learning.

4. Selection Criteria:

Define specific criteria for selecting research papers, such as publication date, relevance to machine learning techniques, application to the context of campus placement, and methodology used for prediction.

5. Categorization and Analysis:

Categorize the selected research papers based on the machine learning algorithms and techniques employed, such as classification models, regression models, ensemble methods, or natural language processing (NLP) techniques.

6. Comparative Analysis:

Conduct a comparative analysis of the different approaches and methodologies used in the selected papers, highlighting their strengths, limitations, and performance metrics.

7. Challenges and Limitations:

Identify the challenges and limitations encountered by researchers in their studies, such as data scarcity, imbalanced datasets, model overfitting, or interpretability issues.

8. Ethical and Social Implications:

Assess the ethical considerations and social implications discussed in the literature, including issues related to bias, fairness, and privacy in the context of campus placement prediction using machine learning.

9. Future Research Directions:

Summarize the future research directions and recommendations proposed by the authors of the selected papers, highlighting potential areas for improvement and innovation in this field.

2.2 Previous Analysis:

Here are some examples of studies that have explored the application of machine learning in campus placement prediction:

1. "Predicting Job Placements for Graduating Students using Machine Learning Techniques"

Summary: This study applies various machine learning algorithms to predict job placements for graduating students based on their academic performance, skills, and other relevant attributes. The research evaluates the effectiveness of different predictive models in matching students with suitable job roles and highlights the implications for enhancing the campus placement process.

2. "A Comparative Analysis of Machine Learning Algorithms for Campus Recruitment Prediction"

Summary: This comparative analysis examines the performance of different machine learning algorithms, including decision trees, support vector machines, and neural networks, in predicting campus recruitment outcomes. The study evaluates the predictive accuracy and efficiency of each algorithm and provides insights into the most effective approaches for optimizing the recruitment process.

3. "Mitigating Bias in Campus Placement Prediction using Fairness-Aware Machine Learning Techniques"

Summary: Focusing on the challenge of bias in campus placement prediction, this study proposes the use of fairness-aware machine learning techniques to reduce algorithmic biases and promote a more inclusive and equitable recruitment process. The research assesses the effectiveness of the proposed strategies in mitigating bias and fostering diversity in candidate selection.

4. "Enhancing Campus Placement Success through Personalized Skill Development Recommendations using Machine Learning"

Summary: This study investigates the integration of machine learning algorithms for providing personalized skill development recommendations to students to enhance their employability and increase their chances of successful campus placements. The research explores the impact of personalized learning resources on improving candidate skill sets and matching them with suitable job opportunities.

2.3 Predictive Analysis:

- [1] Sharma et al. AI. We have developed a placement prediction system. H. PPS, using a logistic regression model. He considered characteristics such as entry grade, secondary level II performance, and performance in subjects in different semesters. The dataset used here is from his GuruNanak Dev Engineering College (GNDEC), Ludhiana. The accuracy of this model was approximately 83.33%.
- [2] Elayidom et al. AI. We built a multi-way decision tree using various parameters such as industry, sector, gender, and rank. The datasets used are received from the National Technical Manpower Information System (NTMIS) via the Nodal Center. The accuracy of this model was 80%.
- [3] Nagaria et al. AI. He used his random forest model and took into account various parameters such as degree type, work experience, exam percentage, specialization, and MBA percentage. The dataset used is from his Kaggle. This model had the highest accuracy of 85%.
- [4] S.Venkachalam et al. AI. We designed a fuzzy inference system to predict campus placement using a naive Bayes algorithm. Data sets are created using primary and secondary data collection sources. This model had the highest accuracy of 86.15%.
- [5] Manvitha et al. AI. The random forest model was designed considering various parameters such as credit score, delinquency, payment status, b.tech %, etc. The dataset is collected by the placement department of Sreenidhi University of Science and Technology. This model had the highest accuracy of 86%.

CHAPTER 03

EXISTING TECHNIQUE

3.1 Objectives:

- Prediction Accuracy Improvement: Enhance the accuracy of candidate-job fit predictions by leveraging advanced machine learning algorithms and data analysis techniques, ensuring a more precise and reliable assessment of a candidate's suitability for specific job roles.
- Bias Mitigation and Fairness: Implement strategies to mitigate biases in the recruitment process, promoting fairness, diversity, and inclusivity in candidate selection. Develop algorithms and protocols that reduce the impact of demographic factors and ensure an equitable evaluation of candidates across various backgrounds.
- Efficient Candidate-Role Matching: Develop a comprehensive matching system that efficiently matches candidates with job roles based on their unique skills, qualifications, and preferences, fostering better alignment between candidate profiles and the requirements of different job opportunities.
- Personalized Career Guidance: Provide personalized career development recommendations and guidance to students, offering insights into the skills and competencies needed to enhance their employability and succeed in their desired job roles.
- Streamlined Recruitment Process: Streamline the overall campus placement process for recruiters by automating repetitive tasks, facilitating seamless communication with candidates, and providing real-time insights and analytics for efficient decision-making.
- User-Friendly Interface Development: Create a user-friendly interface that caters to the needs of both recruiters and students, offering intuitive dashboards, personalized feedback, and accessible resources to enhance the user experience and facilitate smooth interaction

3.2 Existing System

The Campus Placement Android App aims to streamline the process of job placements for students and recruiters. It provides a platform where students can register, apply for jobs, and interact with recruiters. Recruiters, on the other hand, can post job openings, view student profiles, and conduct recruitment drives.

Features:

1. Student Registration:

- Students can register with the app using their personal and academic details.
- Details include:
 - Name
 - Contact Information
 - Educational Qualifications
 - Skills
 - Resume Upload
 - Profile Picture (optional)

2. Recruiter Registration:

- Recruiters can register to post job openings and view student profiles.
- Details include:
 - Company Name
 - Contact Information
 - Job Requirements
 - Logo Upload

3. Job Listings:

- Recruiters can post job openings with details such as:
 - Job Title
 - Job Description
 - Required Skills
 - Eligibility Criteria

- Application Deadline

4. Job Search and Application:

- Students can search for jobs based on various criteria like job title, location, and skills required.
- They can apply to jobs directly through the app by submitting their resume and cover letter.

5. Recruiter Dashboard:

- Recruiters have a dashboard where they can:
 - View applications received for their job postings.
 - Shortlist candidates for further evaluation.
 - Schedule interview slots.

6. Student Dashboard:

- Students have a dashboard to manage their applications and track their progress.
 - View applied jobs and their status (pending, shortlisted, rejected).
 - Receive notifications for new job postings and application updates.

7. Chat/Message Feature:

- A built-in messaging system allows students and recruiters to communicate.
- Students can ask questions about job postings, and recruiters can provide clarifications.

8. Recruitment Drives:

- Recruiters can announce recruitment drives and events.
- Students can view details such as date, time, venue, and participating companies.

9. Notifications:

- Push notifications for important updates such as new job postings, application status changes, and upcoming drives.

10. Feedback and Ratings:

- After the recruitment process, students and recruiters can provide feedback and ratings for each other.

11. Secure Authentication:

- Secure login for both students and recruiters.
- Two-factor authentication for enhanced security.

12. Analytics and Reports:

- Admin panel for administrators to view analytics and generate reports.
- Insights on job trends, student engagement, recruiter activity, etc.

Technologies Used

- Frontend: Android (Java/Kotlin)
- Backend: Firebase or custom backend with REST APIs
- Database: Firebase Realtime Database or Firestore
- Authentication: Firebase Authentication (or custom OAuth)
- Storage: Firebase Storage for file uploads (resumes, images)
- Messaging: Firebase Cloud Messaging (FCM) for push notifications
- Chat: Firebase Firestore for real-time chat functionality
- Version Control: Git for code management
- UI/UX Design: Material Design Guidelines for intuitive user interfaces

Benefits

- Efficiency: Simplifies the placement process for both students and recruiters.
- Accessibility: Anytime, anywhere access through mobile devices.
- Engagement: Interactive features like chat and notifications keep users engaged.

- Data-driven: Insights from analytics help in making informed decisions.
- Scalability: Easily scalable to accommodate growing numbers of users and job postings.

3.3 Problem Definition:

The problem addressed in the context of campus placement prediction using machine learning revolves around the need to optimize the recruitment process by efficiently matching students with the most suitable job roles based on their skills, qualifications, and career aspirations. The existing campus placement systems often lack the capacity to effectively evaluate a large pool of candidates and identify the best fit for various job opportunities, leading to inefficiencies and potential mismatches between candidates and roles. Therefore, the aim is to develop a robust machine learning solution that can streamline the selection process, mitigate biases, and foster a more transparent and data-driven approach to campus placement.

The placement prediction model considers only academic performances of the students so that the prediction of the student getting placed or not can be done. We cannot consider the placement of students just by their academic performances because some students may be good at aptitude, technical and communication skills due to their low score in their academic that may tend to be their drawback. For predicting the placement of a student needs parameters like CGPA, logical and technical skills Academic performances may be important but the model is design to predict the placements based on the parameters of the students.

Key Components of the Problem Definition:

1. Candidate-Role Fit Assessment:

Develop a mechanism to accurately assess the compatibility between a candidate's skills, qualifications, and career goals and the requirements of different job roles offered by various recruiting organizations.

2. Data-driven Decision-making:

Implement a data-driven approach to the recruitment process, leveraging historical placement data and candidate profiles to make informed and reliable decisions regarding candidate-job fit and placement opportunities.

3. Bias Reduction and Fairness:

Mitigate biases and promote fairness in the selection process by implementing algorithms and protocols that ensure equal opportunities for all candidates, regardless of their background or demographic characteristics.

3.4 Objectives:

- Prediction Accuracy Improvement: Enhance the accuracy of candidate-job fit predictions by leveraging advanced machine learning algorithms and data analysis techniques, ensuring a more precise and reliable assessment of a candidate's suitability for specific job roles.
- Bias Mitigation and Fairness: Implement strategies to mitigate biases in the recruitment process, promoting fairness, diversity, and inclusivity in candidate selection. Develop algorithms and protocols that reduce the impact of demographic factors and ensure an equitable evaluation of candidates across various backgrounds.
- Efficient Candidate-Role Matching: Develop a comprehensive matching system that efficiently matches candidates with job roles based on their unique skills, qualifications, and preferences, fostering better alignment between candidate profiles and the requirements of different job opportunities.
- Personalized Career Guidance: Provide personalized career development recommendations and guidance to students, offering insights into the skills and competencies needed to enhance their employability and succeed in their desired job roles.
- Streamlined Recruitment Process: Streamline the overall campus placement process for recruiters by automating repetitive tasks, facilitating seamless communication with candidates, and providing real-time insights and analytics for efficient decision-making.
- User-Friendly Interface Development: Create a user-friendly interface that caters to the needs of both recruiters and students, offering intuitive dashboards, personalized feedback, and accessible resources to enhance the user experience and facilitate smooth interaction

3.5 Future Directions :

1. Hybrid Models and Ensemble Learning:

Integrating multiple machine learning models and ensemble learning techniques to create hybrid models can enhance prediction accuracy and robustness, thereby improving the reliability and generalizability of placement predictions.

2. Explainable AI (XAI):

Implementing techniques for explainable AI can enhance the interpretability of complex machine learning models, enabling stakeholders to understand the reasoning behind the predictions and fostering trust in the decision-making process.

3. Dynamic and Real-Time Analysis:

Developing models that can adapt to dynamic changes in the job market and real-time fluctuations in the demand for specific skill sets can ensure that placement predictions remain relevant and responsive to current industry needs.

4. Personalized Career Path Recommendations:

Leveraging machine learning algorithms to provide personalized career guidance and recommendations to students based on their skills, interests, and market trends can facilitate better decision-making and improve overall placement success rates.

5. Ethical AI and Fairness:

Prioritizing the integration of ethical considerations and fairness into the development and deployment of predictive models is crucial for mitigating biases and ensuring equal opportunities for all candidates, fostering a more inclusive and equitable campus placement environment.

6. Longitudinal Data Analysis:

Analysing longitudinal data to track the career trajectories of past graduates can provide valuable insights into the long-term success.

CHAPTER 4

PROPOSED TECHNIQUES

The proposed System meant to give more easiness to the users that they Can add and information quickly. There are mainly three types of users they are TPO, Student. The TPO is the master user; he gets the greatest number of priorities than the other users. The different functions involve the of an T PO are updating, approval. The TPO can view and approve the various application forms. Students can register and view details. The TPO Can View the details Of the Students and approve or reject their applications. The proposed system is intended to avoid all the drawbacks of existing system. It Will add Some more features than the existing system. The proposed system is a Cost effective Way Of doing the manual processes done in the existing system.

1. Rule-Based System:

- Utilize a rule-based system where placement predictions are made based on predefined rules and criteria.
- Rules can be defined by experts in the field of placement and career guidance.
- For example:
 - If the student's academic score is above a certain threshold and they possess specific skills, predict a higher chance of placement.
 - If the student has completed relevant internships or projects, predict a higher likelihood of placement.
 - If the student has participated in extracurricular activities related to the field, predict a positive impact on placement chances.

2. Weighted Scoring System:

- Assign weights to different attributes such as academic performance, skills, extracurricular activities, etc.
- Calculate a cumulative score for each student based on their inputs.
- Higher scores indicate a higher predicted chance of placement.
- This can be a simple mathematical formula where weights are multiplied by corresponding attribute values and summed up.

3. Expert System:

- Develop an expert system where domain experts create a knowledge base of placement criteria.
- Students input their details, and the system matches this against the knowledge base to predict placement probabilities.
- The system can provide personalized recommendations for improvement based on the student's profile.

- **4. Decision Trees:**

- While not strictly a machine learning approach, decision trees can be used without the need for training data.
- Create a decision tree based on known criteria that impact placement (academic performance, skills, etc.).
- As students input their details, the app navigates the decision tree to predict their placement chances.
- Decision trees are easy to interpret and can be customized for different colleges and placement criteria.

- **5. Collaborative Filtering:**

- Although typically used in recommendation systems, collaborative filtering can be adapted for placement prediction.
- Students' profiles are compared to successful placement profiles.
- Based on similarities, the system predicts the likelihood of a student's placement.
- This approach does not involve training a model but rather finding similarities between profiles.

4.1 Admin Module

The T.P.O. is the Admin in this system and has the authority to add the various events of the T.P.O. to notify the Students about the upcoming campus and Off Campus drives, workshops. Admin also has the list of the registered Students. Their qualifications with their skill , hobbies ,marks , dead backlogs ,active backlogs .helps Admin to select suited candidate for current drive. Making T.P.O. work less hectic and more efficient.

4.2 Student module

With student module student can enter a dedicated environment only created for help their placement in mind While registering student needs to enter their name , branch , year and their privies qualifications such as 10th ,12th or diploma marks that makes the work of T.P.O. easy to select the capable student for job post that is requiring at this drive that makes student to worry about the job they are not interested and focus on their Dream job and helps T.P.O. to guid student to get their dream job by telling them what skill they need to develop or learn

4.3 Classification

Classification is done to predict the students who are placed in some company on campus and those who are not placed. To classify the students three well-known machine learning classifiers are used in this paper.

1. Data Collection and Preprocessing

Gather comprehensive data sets comprising student profiles, academic records, skill sets, and historical placement information. Preprocess the data by cleaning, normalizing, and transforming it to ensure consistency and compatibility for analysis.

2. Feature Engineering:

Extract relevant features from the data sets, including academic performance metrics, technical skills, extracurricular activities, and other attributes that contribute to the evaluation of candidate-job fit.

3. Algorithm Selection and Model Development:

Choose suitable machine learning algorithms, such as decision trees, random forests, or support vector machines, based on the nature of the data and the requirements of the campus placement process. Develop predictive models using the selected algorithms and train them on the pre-processed data sets.

4. Model Training and Evaluation:

Train the predictive models using a portion of the data sets and evaluate their performance using various metrics such as accuracy, precision, recall, and F1-score. Validate the models to ensure their effectiveness in predicting candidate suitability for different job roles.

5. Bias Mitigation Techniques:

Implement bias mitigation techniques such as debiasing algorithms and fairness-aware learning to ensure equitable candidate evaluations and reduce the impact of biases on the prediction process.

6. Integration with User Interfaces:

Integrate the predictive models into user-friendly interfaces for both recruiters and students. Develop interactive dashboards that allow recruiters to review candidate profiles and enable students to receive personalized feedback on their suitability for specific roles.

7. Continuous Learning and Improvement:

Enable the system to continuously learn and improve its predictive capabilities by incorporating iterative learning techniques. Update the models regularly based on new data and feedback to enhance their accuracy and relevance over time.

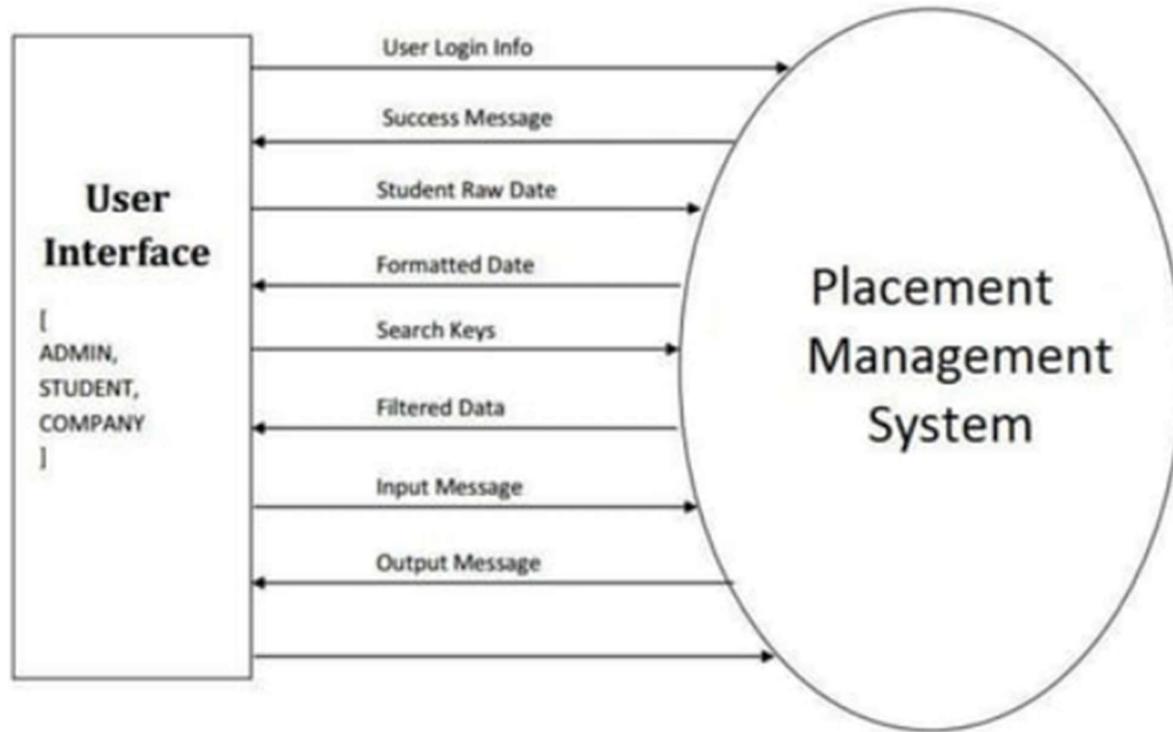
8. Security and Privacy Measures:

Implement robust security protocols to safeguard the confidentiality and integrity of the data throughout the prediction process. Ensure compliance with data protection regulations and employ encryption techniques to protect sensitive information.

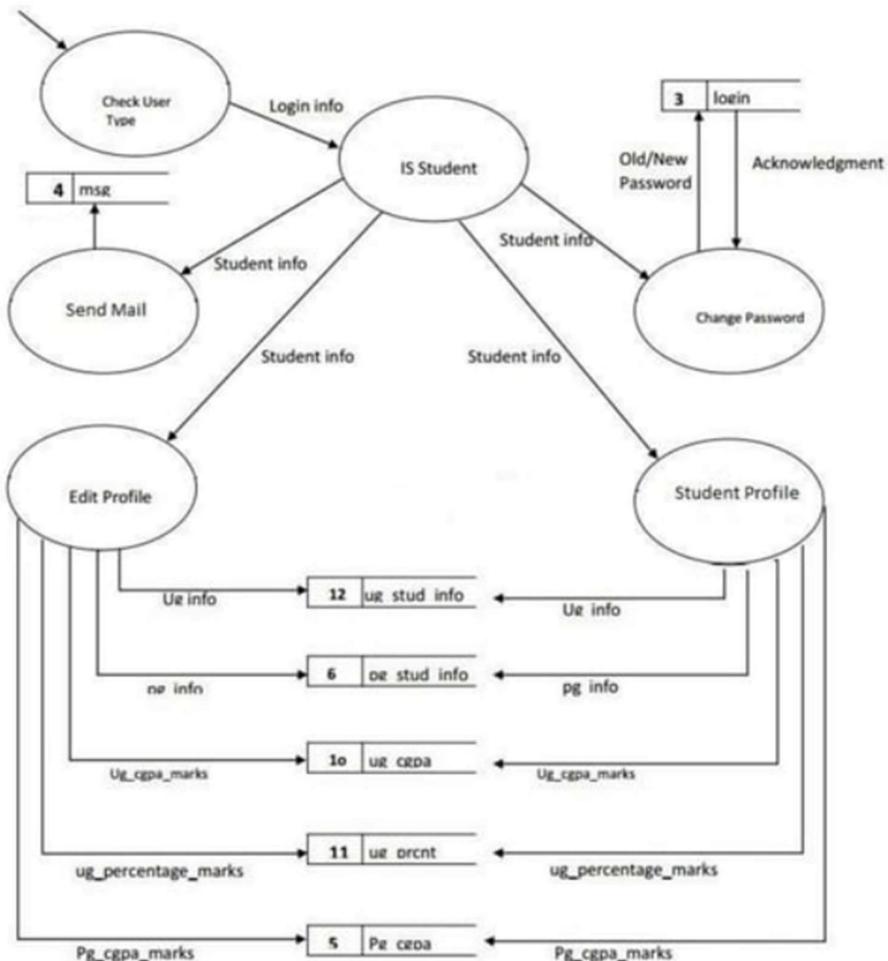
9. Performance Analytics and Reporting:

Generate comprehensive performance analytics and reports for recruiters and students, providing insights into placement trends, candidate success rates, and other relevant metrics. Use these analytics to make data-driven decisions and optimize the recruitment process over time.

FLOWCHART:



4.1 Flowchart of Application works



4.2 Flowchart of Student Side Works

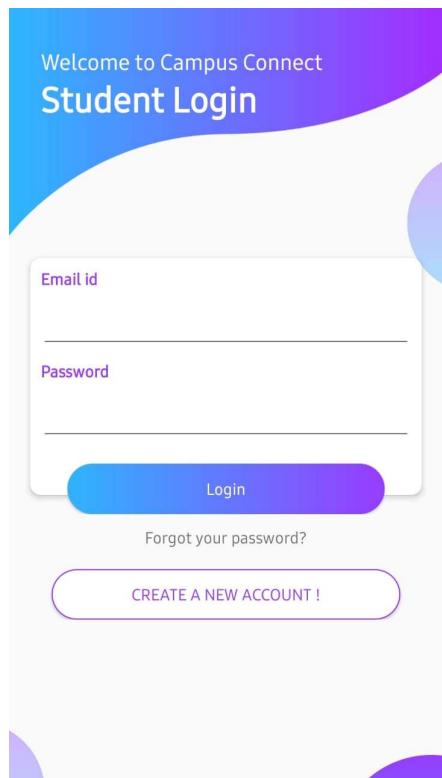
CHAPTER 5

IMPLEMENTED SYSTEM

Our app's objective is to develop a comprehensive android app that will address the specific need of students and placement officer by making their interaction through our app ensuring efficiency, accuracy and transparency, periodizing data integrity and security, and enhancing accountability and transparency through seamless integration and interoperability with existing systems. The objective of our app is to make a platform for all the student to search for their dream job with the help of college. If student is lacking in skills then college should guide the student to improve or learn the skill required for the students dream job. I assure you that our app will create a platform that will make a possibility and doing so it will make getting dream job easier for student as well as college to select best candidate for a drive where is it off campus or on-campus drive. For that purpose we have made two separate app one is for admin (college) and other is for student lets discuss about student app first

5.1 Student app

5.1.1. Login page



The page is designed for new users to create an account. It includes fields for entering an Email, Full Name, Password, Retype Password, ID No., and Mobile Number. There is also a "Register" button at the bottom, which is presumably used to submit the information and create the account. The top of the screen has a header with the text "Sign up" and a back arrow on the top left

As you open our app for first time this page is will shown as you see this is a login page if you already have an ID and Password then you can directly login into the app. if you are new to this then you will need to create a new account. To creating a new account user need to press on "CREATE A NEW ACCOUNT" button. Thus the user will be redirected to sign up page

By any chance the user forgotten their password then there is a feature that is implemented to reset account password that button is between Login and Create new account button.

Fig . 5.1 student login

Sign up

Full Name

Email

Password

Retype Password

Enrollment Number

Mobile Number

Full Address

D.O.B.
Click here to select date

Gender Male Female

Qualifications

Year
F.E.

Branch
Computer Engineering

SSC Marks

HSC Marks

Optional for Diploma Student

Diploma Marks

Optional for 12th Student

FE Aggregate Marks

Optional only for B.E/B.Tech Students

SE Aggregate Marks

Optional only for B.E/B.Tech Students

TE Aggregate Marks

BE Marks

DEAD Backlog
e.g. 2 (optional)

LIVE Backlog
e.g. 2 (optional)

Other Skills

Hobbies
e.g reading,dancing etc..

Internship Info.
e.g Did internship in Tech-Mahindra for 3 months...

Achievement Info.
e.g Played Cricket at Statelevel, Performed an Act in Movie ..

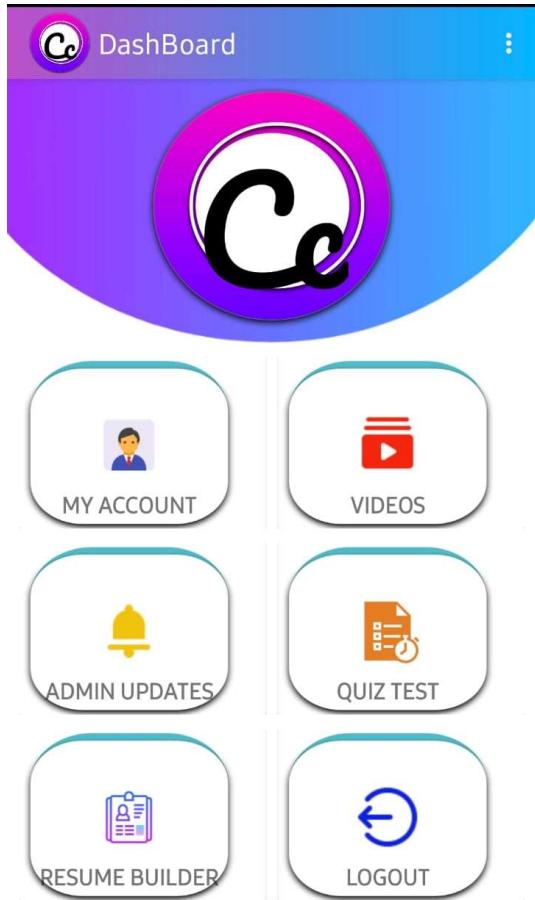
Sign up

5.1.2.sign up

This is sign up page for our app that will collect some information from student for signing up by providing this information it will make an easy task for college to get students skills and other qualifications such as 10th marks , 12th marks ,diploma percentage as well as their full name , email address ,PRN number ,mobile number, gender and their full address . This information will be stored on web to show in students profile to check and can be changed afterwards

Qualifications are stored for college to get students skill as well as their current year of study ,branch and also past qualifications such as SSC , HSC and DIPLOMA marks also with the aggregate marks for 1st,2nd,3rd and final years with also dead and live backlog. This information can be modified later for correction and it is shown to admin to see students skill and guide them to where they should focus for getting a job.

Fig . 5.2 student signup

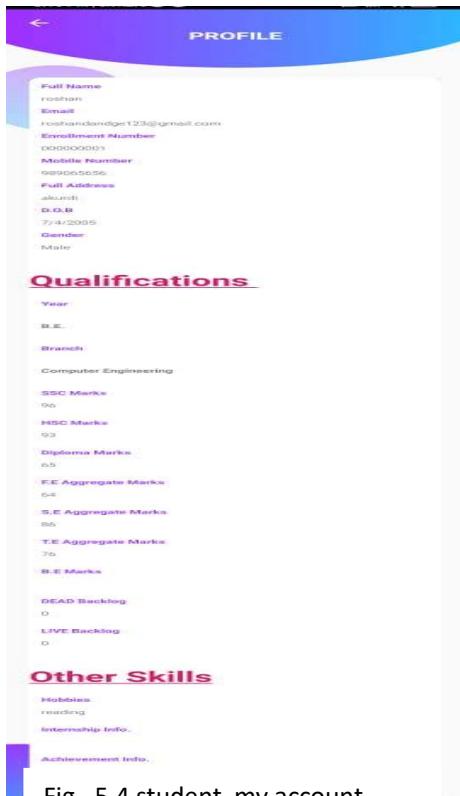


5.1.3. STUDENT DASHBOARD -

This is Home screen of our app that include six options that is my account ,admin updates , resume builder ,videos ,quiz test and logout option.

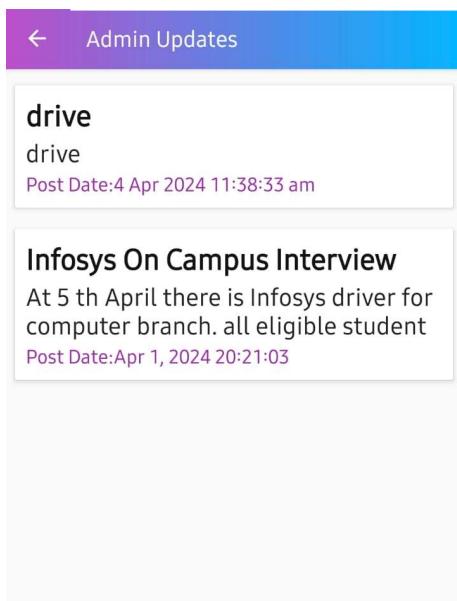
In my account you can see your account and there you can also update the profile; In admin update section you can see all the updates that is provided by admins that can be like recrement drive as well as seminars etc. In resume Builder section user can create his resume which the help of a web site that is Canva. It is an easy to use website that can be used to create resume with eye catching them and there are hundreds of templets that can be used to create resume. In videos section the app is redirected to YouTube that can be used by student learn skills and learn to make resume, In Quiz test section user will be redirected to **assessmentday** website that is an online free quiz site this will score a student's skill in an online test and Logout section is used to logout of the application

Fig . 5.3 student dash board



5.1.4 MY ACCOUNT

In my account section the information about student is displayed to the student to verify the details and if the information is incorrect then student can update his profile correcting the information



5.1.5 ADMIN UPDATES

in admin update section student can see updates that is posted by admins that can be include upcoming drives and seminar and also their information can be there

Fig . 5.4 student my account

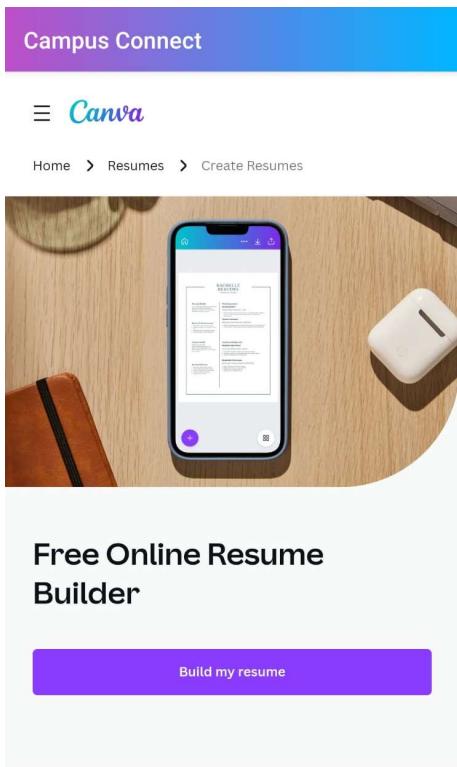


Fig . 5.6 resume builder

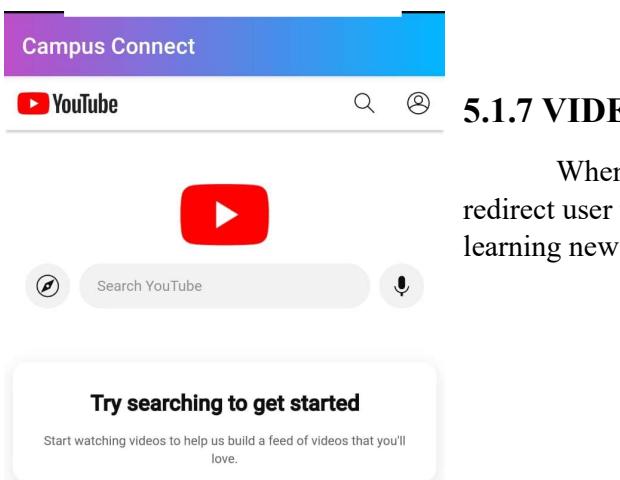


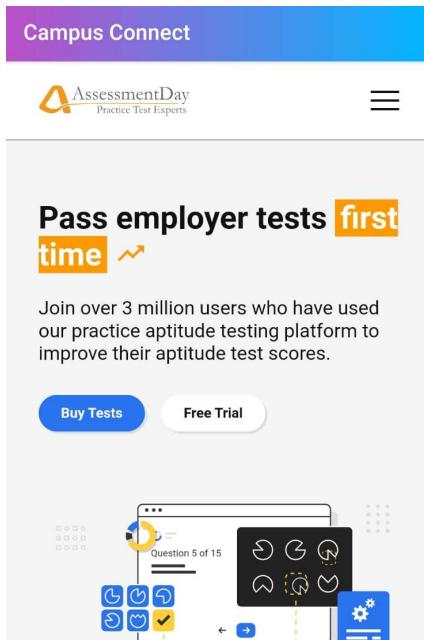
Fig . 5.7 video

5.1.6 RESUME BUILDER

In resume builder section students can create his own resume with the help of Canva website . there are thousands of free to use templets that can be used to create an eye catching resume

5.1.7 VIDEOS

When user click on videos button on home screen this will redirect user to YouTube website here user can learn new skills like learning new languages solving problems and learn to create resume



5.1.8 QUIZ

When user click on quiz tab user will be redirected to a website that is **assessmentday.com** this is a free quiz site. User can take a free quiz test to test themselves to check their knowledge of field and learn where they are lacking and improve themselves

Fig . 5.8 quiz

5.2 ADMIN APP

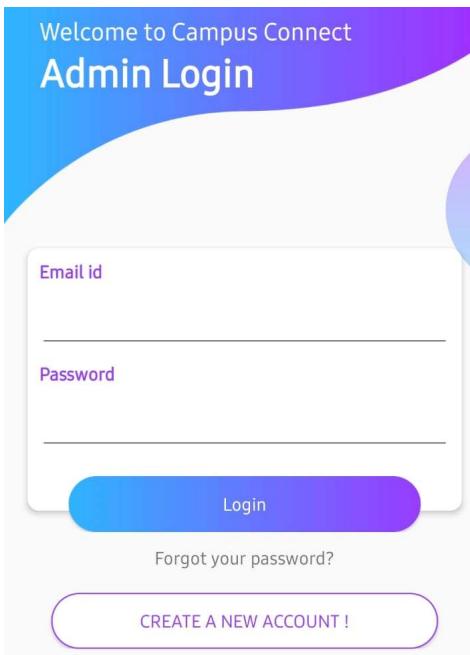


Fig . 5.9 admin login

5.2.1 Login

This screen is displayed when admin freshly install the app and to login admin required to enter email and password to login and if admin not has the registered before then he must create a new account that can be created using create new account button.

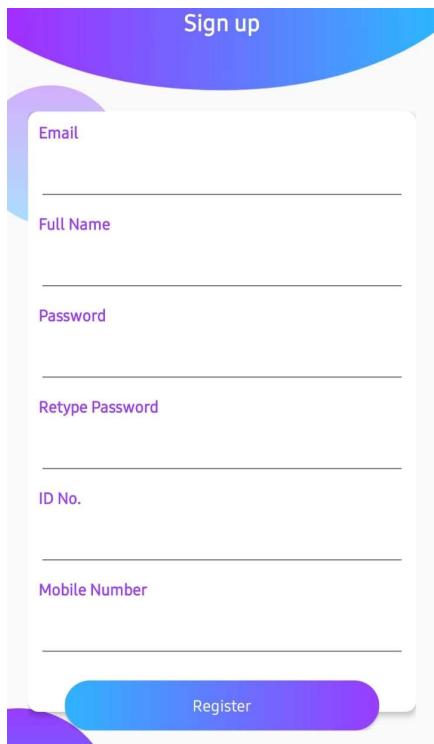


Fig . 5.10 admin sign up

5.2.2 Sign up

This page is used for sign up a new admin and it required to admin to enter his email, full name ,password, ID number, mobile number. This information is stored in a database and email and password is used as a login details

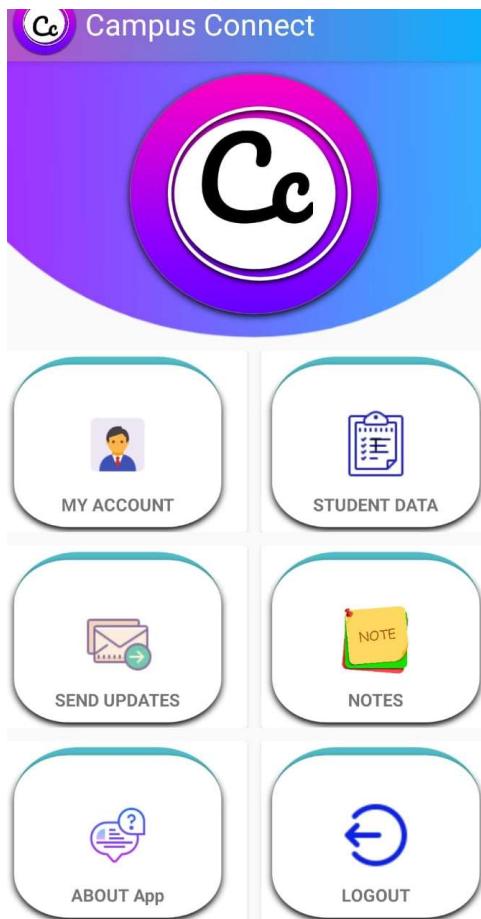


Fig . 5.11 admin dashboard

5.2.3 dashboard

After admin login, this screen is displayed on this there are six buttons that are my account ,send updates , about app, student data, notes, and logout. Each buttons leads to separate tabs and it also called as home screen of app.

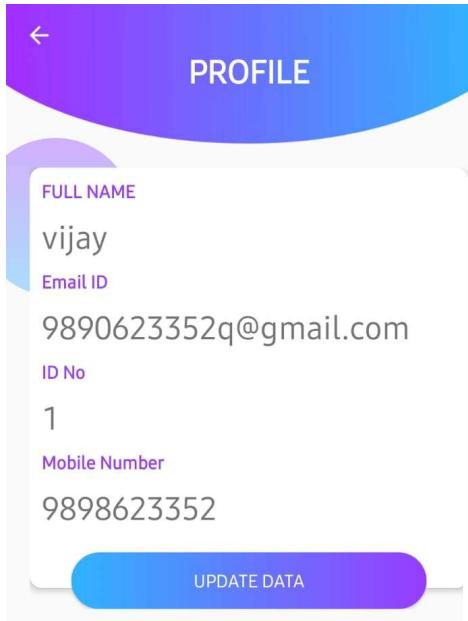


Fig . 5.12 admin profile

5.2.4 MY ACCOUNT

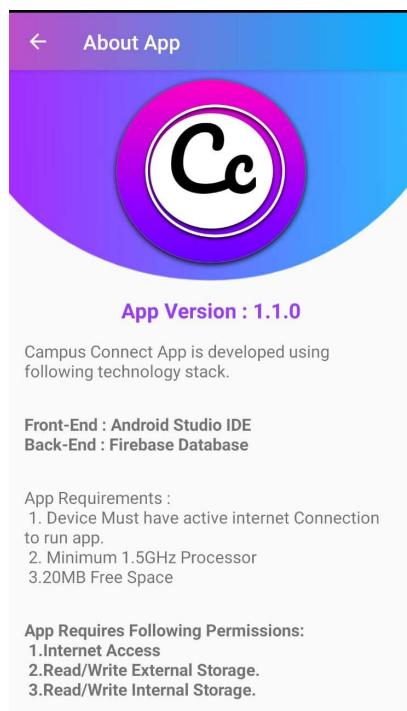
This tab is of profile of admin here admin can see his information that he provided during sign up process here admin can see his full name as well as his email ID with ID no..and mobile number



5.2.5 SEND UPDATES

In this section admin can see his previously posted post and also write new post that can be seen in students app this can be very use full for sending post that can be like an on campus drive or a seminar this section can be used to contact student and inform them about upcoming drives

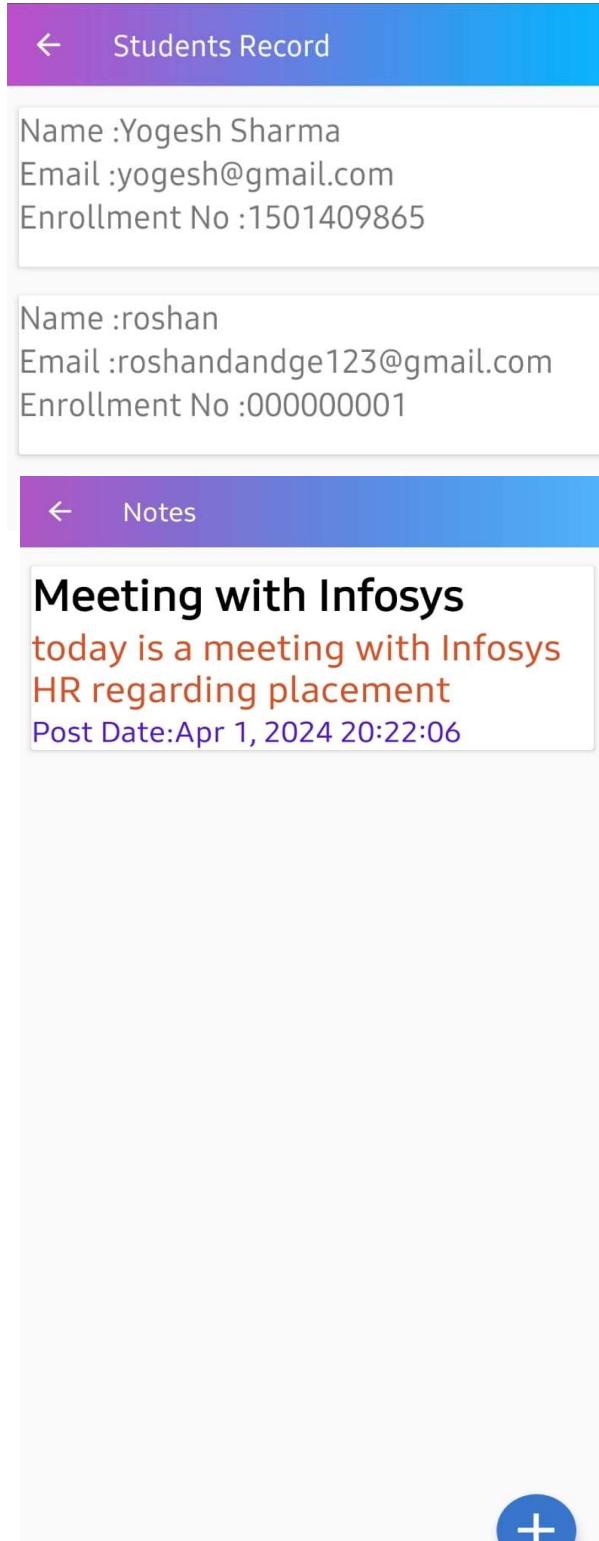
Fig . 5.13 send updates



5.2.6 About app

In this section of app we can see information about application such as name and technology used for building app at front end we used Android studio IDE and in back end database we used firebase .with some requirements for app such as internet connection ,processor speed and storage used by app and permissions requires for running app

Fig . 5.14 about



5.2.7 STUDENT DATA

In this section of app admin can see all information about student such as name , email, enrollment no . for addition information admin needs to click on student name that will give all the information about the student

Fig . 5.15 student data

5.2.8 NOTES

In this section admin can create notes to remind himself about his upcoming meeting and schedule his time for next meeting as well as important information.

The button in bottom right corner to crate note

Fig . 5.16 admin notes

Future Scope

The future scope for a campus placement prediction system is promising, especially with the advancements in technology and the increasing demand for efficient and effective recruitment processes. Here are some potential areas of growth and development for a campus placement prediction system:

The future of campus placement prediction and analysis is promising, driven by advancements in AI, machine learning, and data analytics. These technologies are poised to improve the accuracy of placement predictions, offering personalized recommendations based on students' skills and career goals. Real-time market analysis will provide insights into evolving job trends, guiding students towards in-demand industries. Skill gap analysis will help institutions tailor curricula to industry needs, while AI-powered tools can promote diversity and inclusion in hiring. The rise of NLP enables better job-student profile matching, while blockchain ensures secure credential verification. Virtual career fairs and interviews could become more prevalent, expanding global opportunities for students. However, challenges such as data quality, ethical considerations, and adoption hurdles need addressing for the full potential of these advancements to be realized. Overall, the future of campus placement prediction and analysis holds the promise of more efficient, transparent, and personalized connections between students and job opportunities.

The future scope for a campus placement prediction system is promising, especially with the advancements in technology and the increasing demand for efficient and effective recruitment processes. Here are some potential areas of growth and development for a campus placement prediction system:

1. Integration of AI and Machine Learning:

Further integration of advanced AI and machine learning algorithms can enhance the accuracy and efficiency of the prediction system. Implementing natural language processing (NLP) can also help in analysing resumes and candidate profiles more effectively.

2. Data Analytics and Visualization:

Developing comprehensive data analytics and visualization tools can help in interpreting the data collected during the placement process. This can provide valuable insights for recruiters and educational institutions to make informed decisions regarding future placement strategies.

3. Personalization and Customization:

Creating a more personalized experience for both recruiters and students can significantly improve the overall efficiency of the placement process. Tailoring recommendations based on individual preferences and skill sets can enhance the chances of successful job placements.

4. Blockchain Integration for Verification:

Integrating blockchain technology can help in verifying the authenticity of candidates' credentials and educational qualifications. This can ensure transparency and credibility in the recruitment process, thereby building trust between employers and educational institutions.

5. Enhanced Security Measures:

Implementing robust security measures to safeguard sensitive data and prevent unauthorized access is crucial. Utilizing advanced encryption techniques and multi-factor authentication can help in maintaining the integrity and security of the placement system.

6. Mobile Compatibility and Accessibility:

Developing a user-friendly mobile application can provide easy accessibility for both recruiters and students. This can facilitate real-time updates, communication, and seamless interaction between all stakeholders involved in the placement process.

7. Continuous Learning and Development:

Incorporating features for continuous learning and skill development can help students improve their competencies and stay updated with industry requirements. Providing access to online courses, workshops, and resources can contribute to the overall employability of the students.

8. Collaboration with Industry Experts: Establishing collaborations with industry experts and professionals can provide valuable insights into the latest trends and requirements of the job market. This can help in aligning the curriculum with industry demands and enhancing the overall employability of students.

By considering these potential developments, a campus placement prediction system can evolve into a comprehensive and efficient platform that benefits both students and recruiters in the long run.

CONCLUSION

The problem of campus placement prediction can be solved with the help of different machine learning algorithms such as Logistic regression, Decision Tree, KNN & Random Forest. Here, the Logistic Regression algorithm gave the highest accuracy of 95. 34 % for campus placements prediction.

While the application of machine learning in campus placement prediction shows promise, there are persisting challenges related to data quality, interpretability, and ethical considerations. Addressing these challenges and embracing future technological advancements will pave the way for more accurate, transparent, and equitable campus placement predictions, benefiting both students and educational institutions.

Provide a concise summary of the main findings and results obtained from the analysis and implementation of the machine learning model for campus placement prediction. Discuss the effectiveness of the developed predictive model in accurately predicting the placement outcomes based on the relevant features and data points related to student profiles and academic performance.

Suggest potential areas for future research and development, such as incorporating additional data sources, refining the predictive model with advanced algorithms, or addressing ethical considerations and biases in the recruitment process.

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Survey Paper Details

| | |
|---------------------|--|
| Project Name | “Placement Prediction and Analysis using Machine Learning” |
| Journal Name | Journal of Emerging Technologies & Innovative research (JETIR) Volume 11, Issue 02, 419 |
| Sr.no | Authors |
| 01 | Mr. Rushikesh Dattatray Joshi |
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Survey Paper

“Placement Prediction and Analysis using Machine Learning”

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ABSTRACT:

We have designed a campus placement prediction system aimed at assessing a student's likelihood of securing employment through campus recruitment. This predictive model incorporates multiple parameters to gauge a student's skill level. Some of these parameters are drawn from the college's records, including academic performance, CGPA, attendance, and more, while others are derived from assessments conducted within the placement management system. By amalgamating these data points, our model can provide accurate predictions regarding a student's potential placement in a company.

Furthermore, we leverage data from previous group of students to train our model, employing educational data mining techniques to access authentic historical data from our college's alumni. This approach enhances the efficacy of our machine learning model when making predictions specific to our institution.

Keywords— Machine Learning, Classification, Result based instruction, Placement Prediction Introduction.

INTRODUCTION

Placements are crucial for colleges as they reflect the institution's success. Our approach focuses on predicting and analyzing these essential campus placements to enhance students' chances. The primary goal is to forecast whether students will secure campus recruitment. To achieve this,

we consider students' academic performance in key subjects such as Data Structures and Algorithms, Object-Oriented Programming, Database Management System, Operating System, Computer Network Security, and Cloud Computing, which are pivotal for campus placements. This approach encourages students to excel academically and develop additional skills for better placement opportunities. Additionally, it helps institutions improve their placement records, attract new admissions, and enhance their reputation.

Our proposed system maintains student details and generates lists of candidates for companies seeking recruits with specific skills. The project's objective is to minimize errors associated with manual processes, save time, and empower students to identify their strengths and weaknesses to optimize their placement prospects.

Machine Learning :

Machine learning, on the other hand, is an automated process that enables machines to solve problems with little or no human input, and take actions based on past observations. While artificial intelligence and machine learning are often used interchangeably, they are two different concepts.

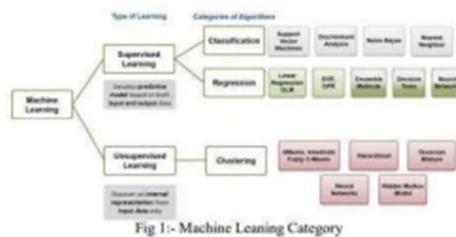


Fig 1:- Machine Learning Category

From the previously mentioned AI models Supervised learning is utilized in this undertaking.

2. LITERATURE SURVEY

Sharma et al. Al. We have developed a placement prediction system. H. PPS, using a logistic regression model. He considered characteristics such as entry grade, secondary level II performance, and performance in subjects in different semesters. The dataset used here is from his Guru Nanak Dev Engineering College (GNDEC), Ludhiana. The accuracy of this model was approximately 83.33%. [2]

Elayidom et al. Al. We built a multi-way decision tree using various parameters such as industry, sector, gender, and rank. The datasets used are received from the National Technical Manpower Information System (NTMIS) via the Nodal Center. The accuracy of this model was 80%. [5]

Nagaraj et al. Al. He used his random forest model and took into account various parameters such as degree type, work experience, exam percentage, specialization, and MBA percentage. The dataset used is from his Kaggle. This model had the highest accuracy of 85%. [6]

S. Venkachalam et al. Al. We designed a fuzzy inference system to predict campus placement using a naive Bayes algorithm. Data sets are created using primary and secondary data collection sources. This model had the highest accuracy of 86.15%. [7]

Manvitha et al. Al. The random forest model was designed considering various parameters such as credit score, delinquency, payment status, b.tech %, etc. The dataset is collected by the placement department of Sreenidhi University of Science and Technology. This model had the highest accuracy of 86%. [8]

OVERVIEW OF THE SYSTEM

Under the current system, India trains 1.5 million engineers every year and the need for experts in the IT field is increasing. However,

many students are unaware of industry needs, leading to a low number of graduates meeting business requirements. The student's position poses a significant challenge. Educational institutions should maximize internship opportunities, and recruiting departments and teachers should prepare students to meet specific company requirements. The job placement prediction system can evaluate a student's suitability for a specific job. In the proposed system, IT companies invest huge amounts of money in recruiting students. To reduce these costs, effective student filtering can be achieved using deep learning tools. Deep learning involves identifying patterns in data through various analytical methods. Educational institutions can leverage this data mining capability to understand the company's recruitment history and student data, thereby allowing the attribution cell to predict current student placement. This article studies different models of location prediction systems and their applications for students.

II. METHODOLOGY

The steps involved in this system are as follows,

A. Data Acquisition:

The campus placement dataset is collected from Kaggle website. Here is the link for the dataset: https://www.kaggle.com/benroshan/factors-affecting-campus-placement?select=Placement_Data_Full_Class.csv. The dataset consists of various attributes such as serial number, Gender, SSC Percentage, SSC Table . - Central/Other, HSC Percentage, HSC Specialization, Diploma Percentage, Diploma Specialization, Work Experience, E-Test Percentage and Salary Expectation.

B. Handling categorical data:

Since we cannot deal with categorical values directly ,mapping is done for attribute. Handling categorical data in machine learning is a crucial step, as most machine learning algorithms work with numerical data. Categorical data represents discrete, non-numeric values such as names, labels, or categories.

C. Pre-processing the data:

Data preprocessing is a critical step in machine learning, as the quality of your data and how it's prepared can have a significant impact on the performance of your models. Data preprocessing involves various tasks aimed at cleaning, transforming, and organizing data to make it suitable for training machine learning models.

Educational Institutions," 2020 11th International Conference on Computing, Communication and Networking Technologies(ICCCNT), 2020, pp. 1-7, doi: 10.1109/ICCCNT49239.2020.9225441.

[7] S.Venkatachalam, "Data Mining Classification and analytical model of prediction for Job Placements using Fuzzy Logic," 2021 IEEE International Conference on Trends in Electronics and Informatics (ICOEI), 2021.

[8]] Pothuganti Manvitha, Neelam Swaroopa "Campus Placement Prediction Using Supervised Machine Learning Techniques," 2019 International Journal of Applied Engineering Research, pp. 2188-



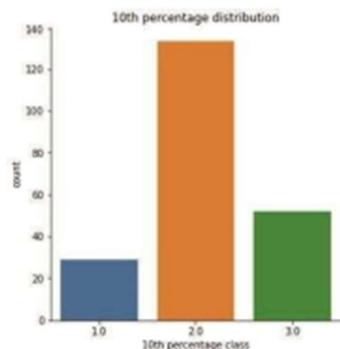


Fig. 4. 10th standard percentage distribution

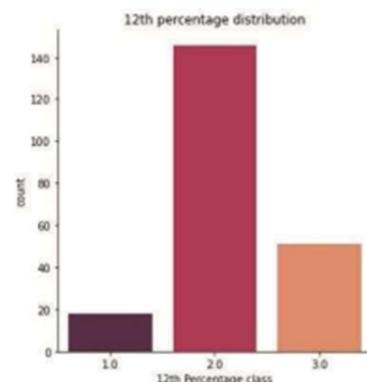


Fig. 6. 12th standard percentage distribution

In the above graph, class 1 represents students having scores between 80-100%, class 2 represents students having scores between 60-80% and class 3 represents students having less than 60% score in 10th standard.

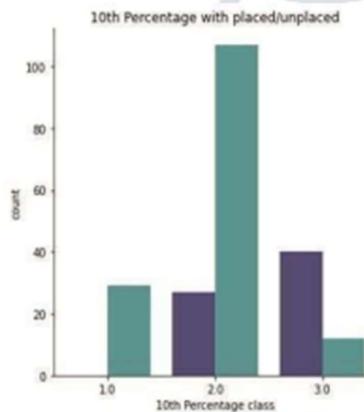


Fig. 5. Placement count vs. 10th percentage

From the above graph, it's observed that all the students having scores between 80-100% in 10th standard got placed.

Very few students having scores between 60-80% in 10th standard couldn't get placed. Whereas, most of the students having below 60% score in 10th standard couldn't get placed.

In the above graph, class 1 represents students having scores between 80-100%, class 2 represents students having scores between 60-80% and class 3 represents students having less than 60% score in 12th standard.

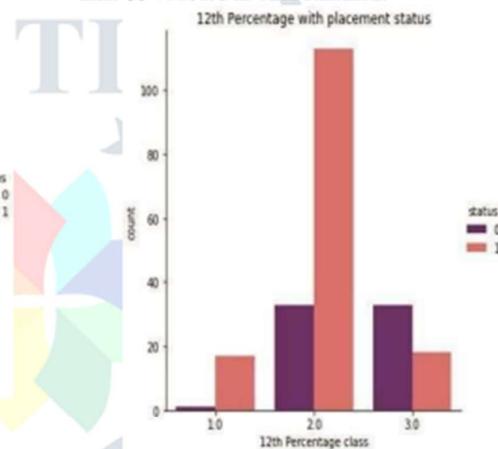


Fig. 7. Placement count vs. 12th percentage

From the above graph, it's observed that all the students having scores between 80-100% in 12th standard got placed. Very few students having scores between 60-80% in 12th standard couldn't get placed. Whereas, most of the students having below 60% score in 12th standard couldn't get placed.

G. Split Data:

Here the data is divided into two parts, i.e. training data and testing data. where 80% of the data is used to train our machine learning algorithm and the remaining 20% of the data is used to test whether our trained machine learning model is performing

well or not.

Machine learning algorithm:

- **Logistic regression:**

Logistic regression is a statistical method used to determine the outcome of the dependent variable (y) based on the values of the independent variable (x). In our problem, the dependent variable is the position state and the independent variables are the characteristics we selected in the previous step. This algorithm is mainly used for binary classification problems.[1]

- **Decision tree:**

A decision tree is a graph like a tree in which the nodes represent the location from which we select the feature and ask the question, the edges represent the answer to the question; and the leaves represent the final output or label of the layer.[1]

- **Random Forest:**

The Random Forest classifier consists of several decision trees applied to different subsets of our dataset, and the outputs of all decision trees are averaged to improve accuracy. accuracy of prediction.[1]

- **KNN:**

K-NN stores all the training data into different classes based on the class labels and classifies new data by checking its similarity with data in the available classes.[1]

CONCLUSION

The problem of predicting campus locations can be solved using various machine learning algorithms such as Logistic Regression, Decision Trees, KNN, and Random Forests. Here, the logistic regression algorithm gives the highest accuracy of 95.34% for campus location prediction. Selected characteristics e.g. serial number, Gender, SSC Percentage, SSC Table . - Central/Other, HSC Percentage, HSC Specialization, Diploma Percentage, Diploma Specialization, Work Experience, E- Test Percentage and Salary Expectation lead to higher classification accuracy.

FUTURE SCOPE

Accuracy can be further increased through applying more advanced techniques such as deep learning and testing different neural network activation functions such as linear, sigmoid, tan h and ReLU.

We can also test different cross-validation techniques like 3-fold, 5-fold, 10-fold, 15-fold cross-validation to analyse the change in accuracy.

This model can be further improved according to the growing competition and can also be offered in a modifiable manner according to company specific criteria. It can then be added to the institute's website for students to check whether they are eligible for internship preparation or not.

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Confirmation Paper

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Title of Paper : Placement Prediction and Analysis using Machine Learning
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DOI :
Published in : Volume 11 | Issue 2 | 2024-02-22
Publication Date: 2024-02-22

Page No : e145-e150
Published URL : <http://www.jetir.org/view?paper=JETIR2402419>

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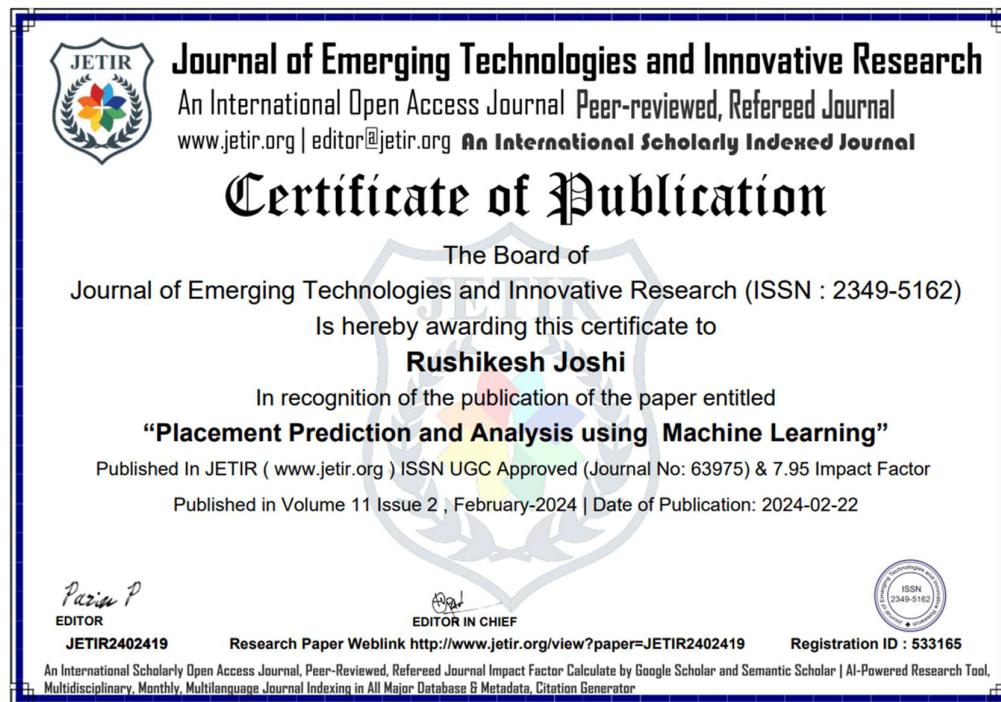
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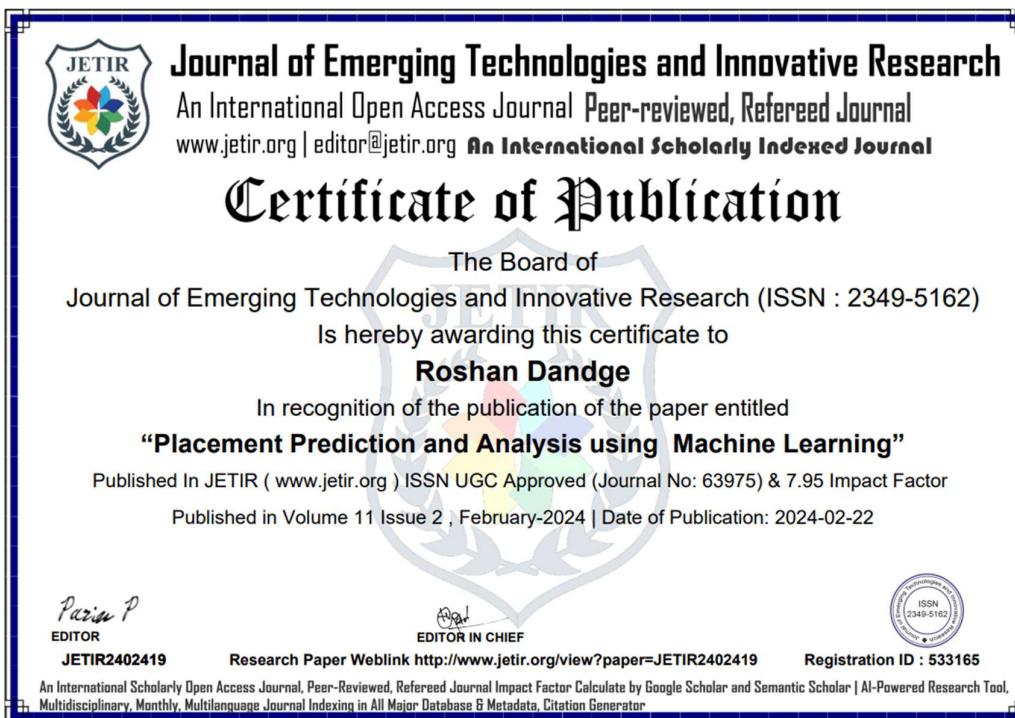
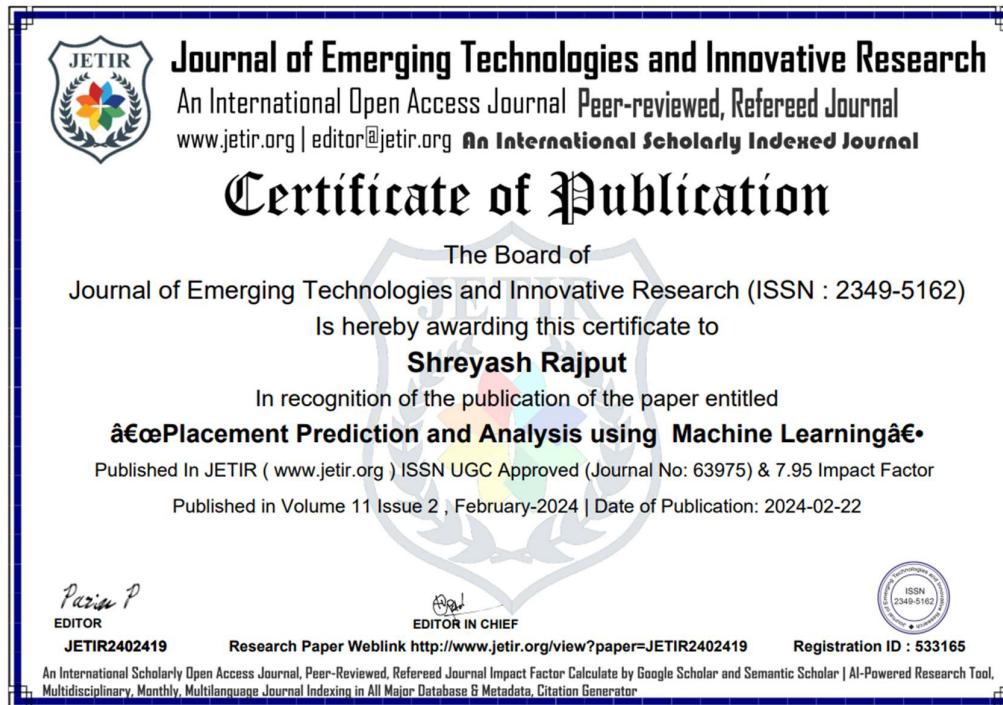
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| | |
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| Project Name | “CAMPUS PLACEMENT PREDICTION AND ANALYSIS” |
| Journal Name | |
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