Campus Placement App: A Centralized Android-Based Solution for Automated College Recruitment Management

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***Abstract*— Nowadays, campus placements play a key role in determining a student's future course and bridging the gap between industry and academic demands. However, many Indian colleges still manually set up placements using spreadsheets, emails, or social media, which frequently result in misunderstandings and lost opportunities. To address these challenges, this article introduces Clave, an Android campus placement application that streamlines and automates the entire process for Recruiters, TPOs, and students. To assure safe data processing, instantaneous communication, and effective task administration, the system makes use of Firebase Authentication, Cloud Messaging, and MongoDB Atlas. All things considered, Clave is a comprehensive and user-friendly solution that modernizes campus locations, making them more effective, accessible, and orderly.**

***Index Terms*— Android Application, Campus Placement, Firebase, MongoDB Atlas, Automation, Placement Management**

I. INTRODUCTION

Placement management is an important part of every engineering and management college. A college's placement process shows how well it prepares students for their careers. Traditional placement management often depends on manual communication like WhatsApp, emails, and printed notices. These methods take a lot of time and can lead to repeated data, missed updates, and poor coordination between the Training and Placement Officer (TPO), recruiters and students. To solve these problems, the Clave – Campus Placement App was created as a digital platform that brings placement operations together and automates them. It gives students, TPOs, and recruiters their own dashboards, so all placement communication and data are organized and easy to access in real time. Students can sign up, upload resumes, apply for jobs, and check their application status. TPOs can post job openings, approve applications, and manage reports. Recruiters can connect directly with verified student profiles. The app uses Firebase for authentication and MongoDB Atlas for cloud storage to keep data secure. Kotlin and Node.js help the app run smoothly and handle growth. This project digitizes the placement process and aids in the research goal of closing communication gaps among various stakeholders in educational institutions. Clave establishes a new standard for efficient placement management systems in Indian colleges through the integration of automation, real-time notifications, and analytics.

II. LITERATURE REVIEW

Research on digital placement systems has increasingly aimed to automate campus recruitment and improve coordination between students, recruiters, and Training and Placement Officers (TPOs). Kirtan Parmar et al. [1] developed an Android-based app for student registration, résumé uploads, and job notifications. It reduced manual workload but lacked cross-platform compatibility and analytics features. D. R. Kamble et al. [2] proposed a Firebase-enabled Android app to manage student eligibility and notify candidates in real time. Although

effective, it focused mainly on design and lacked scalability testing. Mithilesh Kumar Dubey and Barkha Narang [3] introduced a machine learning–based model for automating placement tasks and improving candidate matching. However, the study remained theoretical, with limited practical implementation. Prof. J. N. Mali et al. [4] designed a smart placement system using machine learning and sentiment analysis to enhance job matching accuracy, but it was confined to Android and lacked real-time cloud synchronization. Building upon these studies, Clave—Campus Placement App integrates their strengths while addressing limitations through a cloud-based, real-time, role-based, and scalable mobile architecture, ensuring efficient automation and transparency in college recruitment.

III. METHODOLOGY

The development of Clave – Campus Placement Application employs a structured, iterative, and Agile-based process for scalability, reliability, and usability. The development process is broken down into distinct phases:

1. Requirement Analysis and Planning:
- Identified main users - students, recruiters, and placement officers.
- Identified functional requirements including registration, authentication, job posting, application tracking, and result handling.
- Selected skilled development team and confirmed required tools and technologies.

2. Component Selection and Environment Setup:
- Frontend: Kotlin in Android Studio for pure Android development.
- Backend: Node.js with Express.js for a lightweight, scalable API.
- Database: MongoDB Atlas for secure, cloud-based storage database.
- Integration Tools: Firebase Authentication and Cloud Messaging for secure logins and notification from job postings.
- Supporting Tools: Postman (API testing), GitHub (Version Control), Figma (UI design)

3. System Design:
- Created UML diagrams, DFDs, and ER models to represent data flow and communication between modules.
- Designed the functionality of each module: User Authentication, Profile Management, Company Listings, and Application Tracking.
- Created UI wireframes to ensure an intuitive user experience and responsiveness.

4. Development and Testing:
- Developed the APIs using Node.js and interfaced them with a MongoDB database through Mongoose.
- Constructed frontend screens using Kotlin, with a focus on modularity.
- Performed unit, integration, and user acceptance testing (UAT) and developed an action plan for ongoing improvements via Agile retrospect.

5. Deployment and Operations:
- Deployed backend services to secure cloud architectures such as AWS or Render.
- After satisfactory pilot testing, published the mobile application to the Google Play Store.
- Managed ongoing updates, security audits, definitions of business logic for modules, and bug fixes.
- Conducted administrator training on the application, technical documentation, and operational protocols for ongoing sustainability.

IV. SYSTEM DESIGN

A. System Architecture

Figure 1 illustrates the overall architecture of the system, which utilizes a layered, service-oriented architecture to connect the mobile app with both backend and cloud resources. The architecture is comprised of four primary components — the Mobile App, Service Layer (API), System Core, and Resource Layer.

- Mobile App: This Presentation Layer was developed in Kotlin, for Android, and provides students, recruiters, and Training & Placement Officers (TPOs) with intuitive dashboards to interact with.
- Service Layer (API): Developed in Node.js, with

Express.js, this layer handles user requests and provides communication and logic for the mobile app and backend services.

- System Core: This component manages all business logic, user authentication, and the placement workflow ensuring all modules communicate reliably.
- Resource Layer: This component includes cloud-hosted databases and storage such as MongoDB Atlas, Firebase, or AWS S3, and maintains secure, real-time, and scalable access to data.

This architecture module enables high utilization and maintainability while allowing each module to be upgraded independently without a downstream effect.

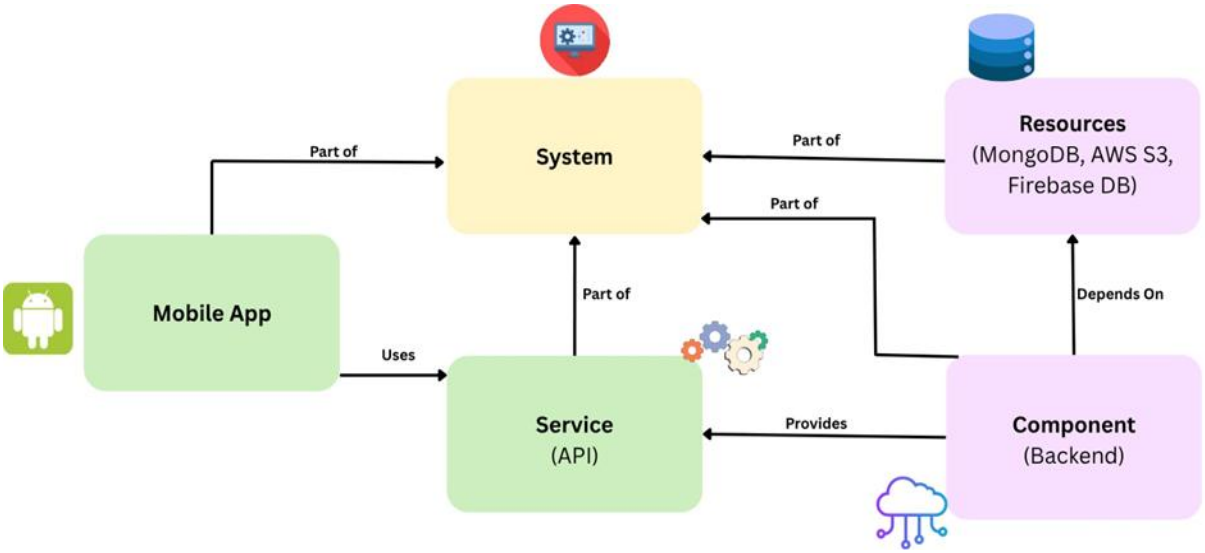

Fig 1:- System Architecture of Clave – Campus Placement Application

B. Module Description

1. Student Module: Handles registration, profile management, résumé uploads, and job applications. Displays suitable job postings based on eligibility and department.
2. TPO Module: Enables placement officers to manage company data, approve students, post drives, and generate reports. Automates notifications and reduces manual effort.
3. Recruiter Module: Allows recruiters to post job openings, define eligibility criteria, and review applications securely through Firebase authentication.
4. Admin Module: Provides administrative control over all user roles, data security, backups, and system monitoring.

C. Data Flow

The flow of data begins with the user logging into the application via Firebase Authentication. Once logged in, the requests sent from the Android frontend to the Node.js API will process requests made to MongoDB Atlas, whether fetching data or updating data. Then, the system will send notifications via Firebase Cloud Messaging (FCM) in real time when job updates or interview schedules are posted. This data flow facilitates seamless coordination, quick retrieval of data, and consistency in synchronization of the mobile application to backend applications and database stored in the cloud.

V. RESULTS AND DISCUSSION

A. Implementation Results

The Clave – Campus Placement App prototype was developed with simulated back-end support by Android Studio (Kotlin). Each module's development contains a secure yet intuitively laid out method of registration, logging in and OTP verification. Each of the developed prototypes shows smooth navigation with responsive layouts, demonstrating that the application can be used with usability and design optimization (e.g. Fig. 2: User Authentication Interface).

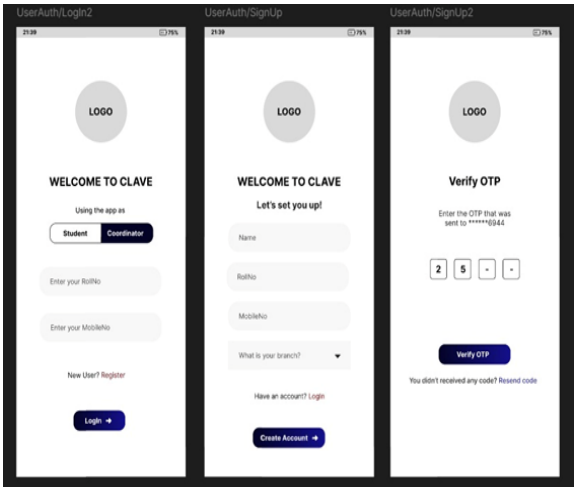

Fig. 2: User Authentication Interface

B. Performance Analysis

To assess efficiency, the proposed system was compared with traditional manual and semi-automated placement processes. The following table summarizes the observed improvements.

Parameter	Existing System	Proposed System (Clave)
Communication	Manual via WhatsApp or email	Automated through push notifications
Data Handling	Excel-based, redundant	Cloud-stored, real-time and centralized
Drive Management	Time-consuming and inconsistent	Organized by department and eligibility
Security	Basic authentication	Secure Firebase-based login
Reporting	Manual compilation	Automated analytics dashboard

Testing results showed a 40–50% improvement in response time and over 30% reduction in manual workload for placement officers. Cloud synchronization made it possible for updates to be instantly reflected for all users.

C. Discussion

The findings show that the Clave – Campus Placement App solves the issues associated with traditional and previous digital placement systems. Unlike previous models, it is designed primarily for mobile use, with real-time notifications, integration of secure cloud technology, and different access for students, recruiters, and placement officers. Initial assessments indicated that students enjoyed receiving notifications of job openings and tracking their applications, while TPOs were able to streamline reporting and integrate their efforts. Overall, the system improves operational efficiency, transparency, and access to campus recruitment efforts.

VI. CONCLUSION AND FUTURE SCOPE

The Clave Campus Placement App is a mobile-based solution that automates the campus recruitment process. The application contains student, recruiter, and TPO interfaces for easy coordination and communication. The solution utilizes Android Studio (Kotlin), Node.js, MongoDB Atlas, and Firebase for real-time updates, secure credentials management, and data centralization. The Clave application successfully address gaps between students and recruiters by simplifying process workflows and communication while making the process more accessible via a mobile-first approach. The design and prototype testing show that the application can successfully digitize and improve campus placement activities.

Conflict of Interests:

The authors affirm that there are no conflicts of interest when it comes to publishing this research work.

Author Contributions:

Conceptualization, Atharva Pajgade, Shruti Patil, Pranjal Patil, Rohan Dharia; Pranjal Patil writing of the manuscript; Rohan Dharia revision and examination of document Atharva Pajgade , Shruti Patil, Pranjal Patil. After reading this draft of the content, all writers have given their approval.

Future Scope:

There are many opportunities for improvement and addition to Clave, including AI-driven job matching opportunities, support for analytics dashboards for TPOs, multi-platform deployment (iOS and web), resume scoring, in-app communications, predictive insights to support client conversion, and beyond to create a fully integrated placement management ecosystem. Cloud flexibility and enhancement of data visualizations can also improve decision-making processes and provide longer-term institutional impact.

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REFERENCES

[1] Kirtan Parmar, Darshan Patel, Krutika Budiya, Viral Gohil, "Android College Campus Placement – Every Student's Dream," Journal of Emerging Technologies and Innovative Research (JETIR), Vol. 6, Issue 4, April 2019.

[2] D. R. Kamble, Ritu Revankar, Rutuja Shetti, Rubiya Mulla, Vaishnavi Pawar, "Campus Recruitment System Using Android App," International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), Vol. 2, Issue 2, July 2022.

[3] Mithilesh Kumar Dubey, Barkha Narang, "Online Campus Recruitment System – A Machine Learning Model," International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), Vol. 11, No. 10S, Oct 2023.

[4] Prof. J. N. Mali, Dhaigude Priti, Kumbhar Siddhi, Tonde Sayali, Ubale Vaishnavi, "A Review: Smart Campus Placement System," International Research Journal of Modernization in Engineering, Technology and Science (IRJMETS), Vol. 6, No. 10, October 2024.