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A Mobile Platform for Alumni-Student Networking and Career Support Using Flutter and Firebase

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Abstract : In the modern digital era, maintaining strong connections between academic institutions and their alumni is increasingly recognized as a valuable asset. Alumni can serve as mentors, employers, collaborators, and sponsors to current students. Despite this potential, most technical institutions in India, particularly those governed by the state, lack a structured system to facilitate such interactions. This paper proposes the development of a comprehensive mobile application aimed at bridging this gap. The platform allows verified alumni and students of technical colleges in Rajasthan to connect, communicate, and collaborate. Built using Flutter for cross-platform frontend development, Firebase for scalable real-time data handling, and Node.js for backend API services, the application ensures secure authentication, effective communication, and easy usability. This system represents a step forward in utilizing technology to strengthen academic communities, increase employment opportunities, and promote a culture of knowledge sharing.

IndexTerms – Mobile App, Mentorship, Flutter, Node

I.INTRODUCTION

The importance of alumni in shaping the academic and professional development of students cannot be overstated. Alumni represent a rich source of knowledge, professional experience, and opportunities that current students can benefit from. However, most government institutions in India still rely on outdated or informal channels of communication such as WhatsApp groups or occasional reunions to maintain connections with alumni. This fragmented communication fails to leverage the full potential of alumni networks.

To address this issue, we propose a dedicated, secure, and intelligent mobile platform specifically designed for the alumni and students of government technical institutions under the Department of Technical Education, Government of Rajasthan. This system promotes formal interaction, encourages mentorship, and provides a space for sharing job opportunities, projects, and entrepreneurial initiatives.

I. FUNDAMENTAL TECHNIQUE

To successfully implement Direct Market Access (DMA) and empower farmers to directly connect with consumers or businesses, a set of fundamental techniques is essential. These techniques focus on utilizing technology, optimizing logistics, ensuring market readiness, and fostering farmer education. Below are the key strategies that can enable DMA to function efficiently and sustainably:

- Digital Platform Development:

Mobile Applications & Online Marketplaces: Leveraging user-friendly digital platforms is vital for connecting farmers with buyers. These platforms should support features like real-time pricing, product listings, and digital payments. They can also include integrated tools for communication, negotiation, and order management.

E-commerce & social media: Utilizing e-commerce websites and social media channels allows farmers to reach a wider audience, including urban consumers and niche markets. This approach helps bypass traditional intermediaries

and reduces marketing costs.

- Data Analytics & Market Intelligence:

Real-Time Market Insights: Providing farmers with access to market data, such as demand trends, pricing fluctuations, and consumer preferences, helps them make informed decisions on crop selection, harvesting, and sales timing.

Predictive Analytics: Using predictive tools can help farmers anticipate market needs and optimize production schedules, reducing surplus and maximizing profitability.

- Capacity Building & Training:

Digital Literacy Programs: Farmers need training in using digital tools, mobile apps, and online platforms to effectively participate in direct market access. Workshops and digital literacy programs can empower them to embrace new technologies.

Financial Literacy & Negotiation Skills: Educating farmers on financial management, pricing strategies, and negotiation can increase their confidence in dealing directly with buyers, ensuring fairer prices.

- Quality Assurance & Standardization:

Grading & Packaging Standards: Ensuring consistent quality through proper grading, sorting, and packaging increases buyer trust and can command better prices in the market.

Certification & Traceability: Leveraging blockchain and QR code technology for traceability can certify the authenticity of produce, appealing to health-conscious consumers and premium markets.

II. LITERATURE SURVEY

Over the past decade, several attempts have been made globally to integrate alumni engagement with digital platforms:

- **Chakraborty et al. (2021)** developed a Flutter-based alumni portal that integrated Firebase but lacked a clear verification mechanism for user authenticity.
- **Jain and Ramaswamy (2020, IEEE)** emphasized the need for real-time, role-based networking between professionals and students but faced challenges with scalability and performance.
- **LinkedIn**, while widely used, does not offer institutional-specific networking features tailored to academic mentorship or government-aligned employment schemes.
- **NASSCOM (2022)** highlighted that over 75% of students lack structured career mentoring, which could be resolved through digital alumni interactions.

These studies and platforms provide insights but often lack a focused, regional, and institution-verified model like the one proposed in this project.

III. PROPOSED SYSTEM

The mobile application is built to establish a secure and interactive digital ecosystem that strengthens the connection between alumni and students. It incorporates **role-based access**, ensuring that users have appropriate functionalities depending on their status. The **Alumni Module** enables alumni to register by providing their institutional roll number, mother's name, and full name, which undergo a verification process before access is granted. Meanwhile, the **Student Module** facilitates easy search and discovery of alumni based on name, batch, company, or area of specialization.

A central feature of the platform is the **Feed Section**, where alumni can dynamically share valuable opportunities such as job openings, internships, freelance projects, and mentorship offerings. These posts are accessible to students, who can engage with them through likes, comments, and direct messaging.

The application also includes a robust **Messaging System** that supports both one-to-one and group communications. Notifications are managed via Firebase Cloud Messaging, and optional restrictions can be applied to chats to prevent spam or misuse. Users have detailed profiles with a **verification badge** for institution-approved alumni. Profiles are searchable using various filters including batch, branch, company, and skills, enhancing discoverability and networking.

A future enhancement includes an **Admin Panel**, which will allow college administrators to manage and verify alumni accounts, monitor user-generated content, and access insightful analytics to measure engagement and impact. This comprehensive platform thus aims to foster meaningful alumni-student interaction and support professional growth in the technical education domain.

IV. Methodology

The application development followed an Agile software development approach, with iterative design, testing, and deployment. The key components of the system are:

A. Technology Stack

Module	Technology Used
UI/UX	Flutter + Material Design
Backend API	Node.js with Express.js
Real-Time Data	Firebase Firestore
Authentication	Firebase Auth
Messaging	Firebase Realtime DB
Notifications	Firebase Cloud Messaging
Media Storage	Firebase Storage
Deployment	Firebase Hosting (Web), Netligy (Mobile)

B. Data Flow and Logic

1. **User Registration**
   Alumni enter roll number, name, and mother's name. Backend verifies these details with preloaded institutional data.
2. **Authentication**
   Firebase Auth handles sign-in using email/password or OTP.
3. **Posting a Job/Opportunity**
   Alumni create a post, which gets saved in Firestore and updates the feed in real-time.
4. **Searching & Filtering**
   Querying through indexed Firestore collections for instant results.
5. **Chat System**
   Each chat thread is identified by user pair IDs, with data stored in Firebase Realtime DB.

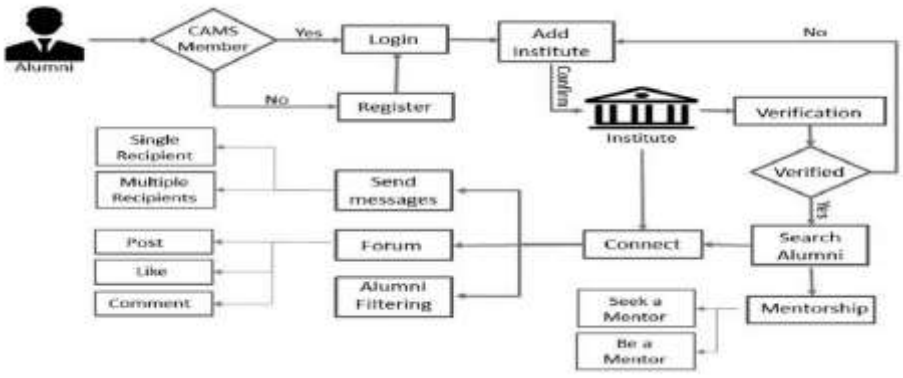
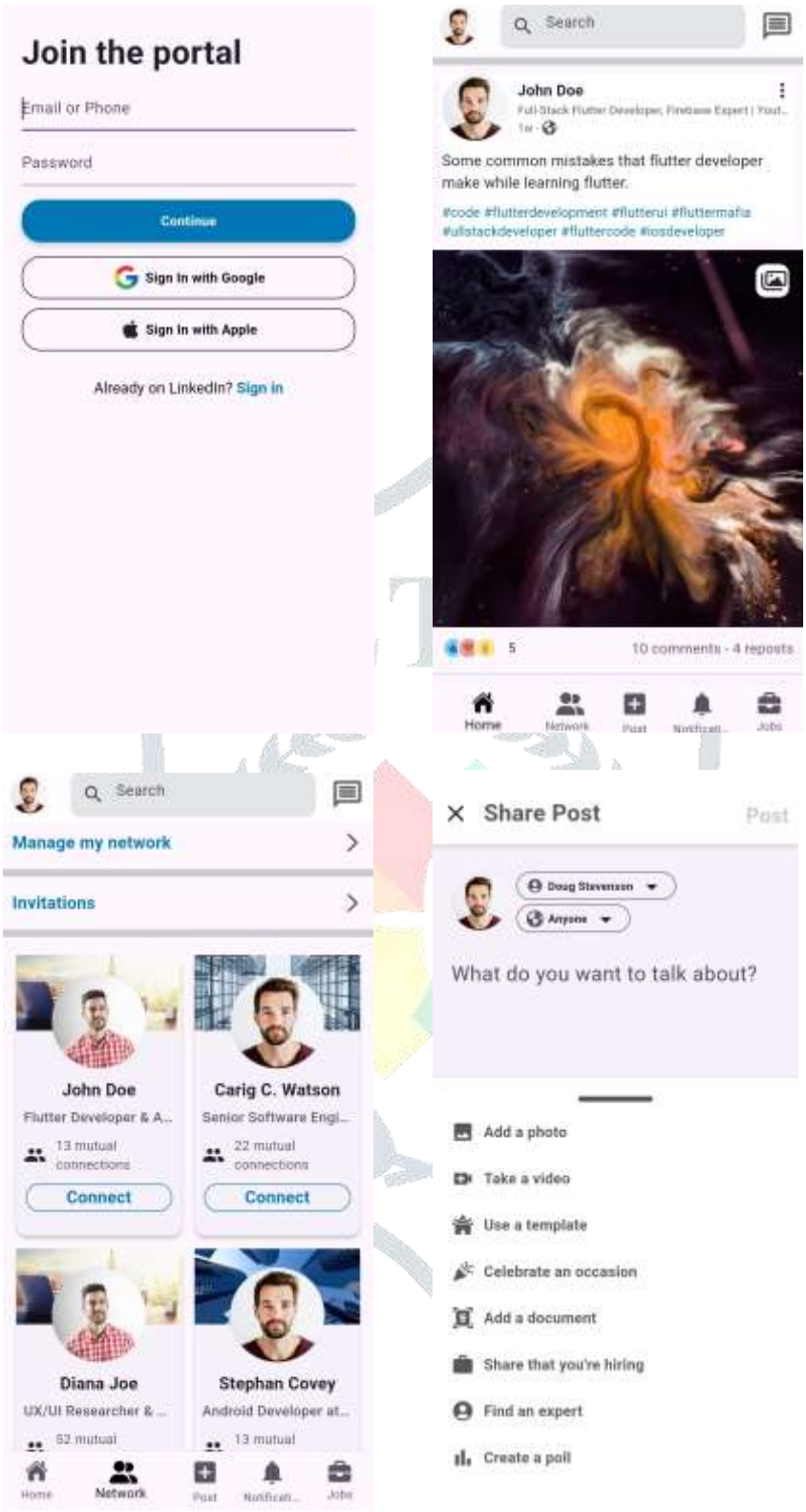


Fig1.1 Working Flowchart of the application

Fig 1.2 Screenshots of Application



V.RESULTS

Initial testing of the **Intelligent Platform to Interconnect Alumni and Students** showed promising performance across all core modules. The system enabled **real-time connectivity between alumni and current students**, facilitating seamless interaction, mentorship, and opportunity sharing. The use of **Firebase real-time database** allowed instant syncing of messages, notifications, and user updates, significantly reducing latency and improving responsiveness across devices.

Students could access a dedicated feed to explore internship, project, and job opportunities posted by alumni. This dynamic listing was found to be intuitive, and the search and filter features helped students navigate postings based on

their interests and skills. **Alumni**, on the other hand, were able to share experiences, conduct mentorship sessions, and guide students through career-building phases using in-app features like chat, video call integration, and event scheduling.

The platform's **authentication system**, powered by Firebase Auth, ensured secure access and role-based control. Admins could verify alumni credentials, manage abuse reports, and moderate content effectively. The **Node.js backend** efficiently handled requests, stored user profiles, and managed application logic without noticeable performance drops, even under concurrent user activity.

Pilot deployment at selected technical institutes within Rajasthan revealed high engagement rates from students. Feedback indicated that students felt more connected, motivated, and guided after interacting with alumni. Additionally, alumni expressed satisfaction in being able to give back to their institutions and network with fellow professionals.

However, the testing phase also highlighted areas for improvement. Some institutions faced **connectivity issues** that limited real-time interaction, and a few users reported **difficulty navigating the app's UI on older devices**. These concerns are being addressed in the next development cycle, with a focus on **progressive web app compatibility**, **offline caching**, and **UI optimization** for low-end devices.

Overall, the project has successfully demonstrated the potential of digital platforms in bridging the gap between **students and alumni**, creating a collaborative ecosystem that supports professional growth, knowledge sharing, and institutional development.

VI. CONCLUSION

This research demonstrates that an intelligent mobile platform can significantly enhance alumni-student engagement in technical education institutions. By providing a structured, real-time, and secure system, the proposed application not only fosters professional relationships but also contributes to student career growth and institutional branding.

Future Enhancements:

- Integration with LinkedIn API to import experience.
- AI-based mentor recommendations.
- Resume builder and job application tracker.
- Admin dashboard with analytics for each college.
- Chatbot for student queries.

The system is ready for pilot implementation and scalable across all government technical institutions in Rajasthan.

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