

CampusQuery- A Student Community Platform

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1. Abstract :

In educational institutions, students frequently encounter academic and administrative queries that remain unresolved due to the lack of a structured peer-to-peer knowledge-sharing platform. Traditional communication channels such as informal messaging groups and notice boards are unorganized, lack searchability, and fail to preserve valuable knowledge shared by seniors and experienced peers for future reference.

This research paper presents **CampusQuery**, a community-driven mobile application designed to facilitate structured query resolution among college students across all academic years. The proposed system provides a unified platform where students can post questions, receive answers from seniors or fellow batch mates.

The system features a general feed for posting academic and non-academic queries, a tag-based categorization mechanism that associates questions with subjects or fields, and a search and filtering system that surfaces similar previously answered questions to reduce redundancy. Role-based interaction

allows seniors to share domain expertise while juniors benefit from accumulated institutional knowledge. Notifications alert users to responses on their queries and trending discussions.

The proposed system reduces dependency on scattered communication platforms, improves query resolution time, and creates a persistent, searchable repository of student knowledge. CampusQuery provides a reliable, student-friendly solution that fosters academic collaboration and strengthens the learning community.

2. Introduction :

Communication and knowledge sharing play a significant role in colleges and universities because they help students navigate academic challenges, understand institutional processes, and build meaningful peer connections. In a typical college environment, students across all years — from freshmen to final-year students — encounter countless academic and administrative queries every day. These range from subject-specific doubts and examination patterns to college procedures,

internship guidance, and career advice. Timely and accurate resolution of such queries directly impacts student performance, confidence, and overall academic experience.

In many institutions, students currently rely on informal communication channels such as WhatsApp groups, Telegram channels, and personal contacts to get their questions answered. While these platforms serve basic communication needs, they are poorly organized, lack searchability, and fail to preserve knowledge for future students. A question answered in a group chat today becomes impossible to find a month later. Seniors who have valuable institutional knowledge graduate, leaving juniors to repeatedly ask the same questions with no structured way to access past answers.

Existing informal platforms face several challenges such as:

1. Lack of organized, searchable question and answer history
2. No categorization or tagging of queries by subject or field
3. Valuable knowledge lost when senior students graduate
4. Duplication of the same questions.
5. No role-based knowledge sharing between seniors and juniors
6. Absence of a centralized platform specific to college.

To overcome these problems, **CampusQuery** is proposed — a community-driven application designed for college students to post queries, share knowledge, and collaboratively

resolve academic doubts in a structured environment.

The proposed system provides a general feed where students can post questions visible to the entire college community. A tag-based categorization system allows questions to be labeled by subject, department, or topic, enabling efficient filtering and discovery of relevant content. An intelligent search mechanism surfaces similar previously answered questions, reducing repetition and saving time.

3. Problem Statement :

College students today lack a dedicated, structured platform for resolving academic and institutional queries. Despite being surrounded by peers and seniors with relevant knowledge and experience, there is no organized system to connect those seeking answers with those who can provide them. Informal platforms like WhatsApp and Telegram groups are temporary, unstructured, and unsuitable for building a lasting knowledge base.

The absence of a tag-based or searchable system means students frequently ask the same questions repeatedly, with no way to discover whether their query has already been answered. Knowledge shared by senior students is never preserved — once they graduate, that institutional understanding is permanently lost to incoming batches.

The major problems in existing informal communication channels include:

1. No searchable history of past questions and answers.
2. Repeated duplication of the same queries across groups.
3. Loss of senior knowledge after graduation.
4. No subject or topic-based filtering mechanism.
5. Absence of a college-specific, structured community platform.

Therefore, there is a clear need for a dedicated community application like CampusQuery that provides organized query posting, tag-based categorization, peer-to-peer knowledge sharing across academic years, and a persistent, searchable answer repository accessible to all students within an institution.

4. Objectives of the App :

The main objectives of the proposed CampusQuery application are:

1. To provide a dedicated community platform for college students.
2. To implement a tag-based categorization system.
3. To enable knowledge sharing across all academic years.
4. To build a persistent, searchable repository of answered questions.
5. To reduce duplication by giving previously answered questions during search.
6. To send notifications to users for responses on their queries.

5. Literature Survey :

Several researchers have studied online knowledge-sharing platforms, community-based Q&A systems, and peer learning applications in educational environments. The following works provide valuable insights into the design, functionality, and user behavior aspects of systems similar to CampusQuery.

Wen et al. (2022) conducted a study on social Q&A communities to understand what influences users to share knowledge. Their research identified six key factors — perceived ease of use, perceived usefulness, perceived behavioral control, subjective norms, perceived security, and perceived privacy — that affect how users browse, post questions, and reply to others. The study concluded that users are more likely to actively participate in a Q&A community when the platform is easy to use, delivers useful answers, and ensures the safety of their personal information. These findings are highly relevant to CampusQuery, as designing a simple, useful, and secure interface is essential to encouraging college students to post queries and contribute answers regularly.

A UX case study on college campus engagement (Assembly app) highlighted that students across institutions consistently

struggle with discovering events, joining clubs, and staying updated due to fragmented communication channels. Research conducted through surveys and user interviews revealed that the absence of a unified, student-focused

platform leads to poor event participation and information overload on existing platforms like WhatsApp and email. The proposed solution, Assembly, was designed as a mobile application to centralize campus activity and connect students around shared interests. This study reinforces the need for dedicated college community platforms like CampusQuery, where a single organized space can replace scattered informal channels and improve student engagement and awareness.

Researches on peer learning and collaborative learning in higher education consistently highlight the effectiveness of student-to-student knowledge exchange without direct teacher intervention. Studies on platforms like TUT Circle — a social media based web service built for university students — demonstrated that peer learning through digital communities encourages networking, collaboration, and resource sharing among students. Further research on P2P-based learning systems showed that grouping learners with similar interests significantly improves engagement and knowledge retention. Collaborative learning studies also confirmed that student-driven platforms increase critical thinking, problem-solving, and overall satisfaction compared to traditional classroom approaches. These findings strongly support the design philosophy behind CampusQuery, where students learn from and help each other through a structured community platform.

6. Existing Systems :

Several platforms and applications currently exist that partially address the need for student interaction, query resolution, and knowledge sharing. The following are the most notable existing systems relevant to CampusQuery:

Quora is a widely used public Q&A platform where users can post questions and receive answers from the community using topic-based tags. However, being a general public platform, it has no institution-specific filtering, making it difficult for students to find answers relevant to their specific college. Answers from unknown individuals also lack credibility and context.

Stack Overflow is a tag-based Q&A community with a strong upvoting mechanism that ensures answer quality and discoverability. However, it is strictly limited to programming and technical topics, making it unsuitable for the broader academic, administrative, and campus-related queries that college students encounter daily.

Yahoo Answers was one of the earliest public Q&A platforms allowing users to ask and answer questions across domains. Despite building a large knowledge base, it lacked institutional focus, suffered from poor content moderation, and was eventually shut down in 2021 due to declining answer quality and an inactive contributor base.

Assembly App was a mobile application concept designed to centralize college event discovery and

student engagement on campus. It was limited to campus activities only and provided no mechanism for academic query resolution or interaction between seniors and juniors.

TUT Circle was an institution specific web platform developed for students at Tampere University of Technology to promote peer learning and collaboration within small groups. While it demonstrated the value of college-specific communities, it was limited to a single university and lacked a structured Q&A mechanism.

7. Proposed System :

The proposed CampusQuery application is a community-driven academic platform designed to automate and streamline query management among students. The system is built using modern mobile technologies with real-time cloud database services.

The proposed system consists of four main modules:

A. Admin / Authentication Module

The Authentication Module manages secure access and user identity, performing operations such as:

1. Secure email & password authentication
2. Email verification support
3. User profile creation and management
4. Storing name, college, and department details
5. Tracking activity stats including questions, answers, and saved queries

B. Query Management Module

The Query Management Module provides functionalities such as:

1. Creating detailed queries with title and description
2. Subject and category selection
3. Community feed to view all queries
4. Filtering queries by subjects
5. Searching queries by keywords or tags

C. Interaction & Notification Module

The Interaction Module allows students to:

1. Post answers to community questions
2. View responses in real-time
3. Receive notifications when someone answers their question
4. Get activity alerts on their posts
5. Access a dedicated Alerts screen with smart empty state UI

D. Dashboard & Settings Module

The Dashboard Module allows students to:

1. Track personal questions and answers
2. View and manage saved queries
3. Toggle push notifications on or off
4. Enable compact mode and hide solved questions
5. Save and sync user preferences

8. Comparison :

Paper Title / System	Primary Technology	Core Feature	Best For
Stack Overflow	Web Platform	Q&A Threading	Developer community
Quora	Web & Mobile App	Topic-based Q&A	General knowledge
Discord Study Servers	Chat & Voice	Real-time messaging	Informal discussion
Google Classroom	Cloud & LMS	Assignment management	Structured learning
Assembly App	Mobile App	Event & community feed	Campus engagement
Chegg	Mobile App	Expert answers	Paid academic help

Fig 1: Comparison Table

Paper Title / System	Primary Technology	Interaction Method	Best For
Brainly	Mobile & Web	Peer answering	School-level queries
Reddit (r/college)	Web & Mobile App	Upvote-based threads	Open discussions
TUT Circle (Research)	Web Platform	Group collaboration	Peer learning
Microsoft Teams EDU	Cloud & Mobile	Channel-based Q&A	Institutional use
Slack EDU	Mobile & Web	Workspace messaging	Team collaboration
Proposed System (CampusQuery)	Flutter & Firebase	Email Auth + Community Feed	College-specific queries

Fig 2: Comparison Table

9. System Architecture :

The system architecture of the proposed CampusQuery application is designed to provide a secure, scalable, and efficient platform for college students to post queries, share knowledge, and engage with their campus community digitally. The architecture integrates a cross-platform mobile frontend with cloud-based backend services to ensure real-time synchronization, persistent data storage, and seamless user experience across devices.

The system architecture consists of the following major components:

1. React Native Mobile Application
2. Expo (SDK 51) — Build Tooling and OTA Updates
3. React Navigation — Stack and Tab Navigation
4. AsyncStorage — Local Preference Caching
5. Expo Notifications — Push Notification Handling
6. Firebase Authentication — Email/Password Auth and Session Management
7. Firestore Database — NoSQL Real-time Database for Questions and Answers

8. Cloud Functions — Server-side Logic and Notification Triggers
9. Firebase Storage — Media and Attachment Storage

- 10.FCM (Firebase Cloud Messaging) — Push Notification Delivery

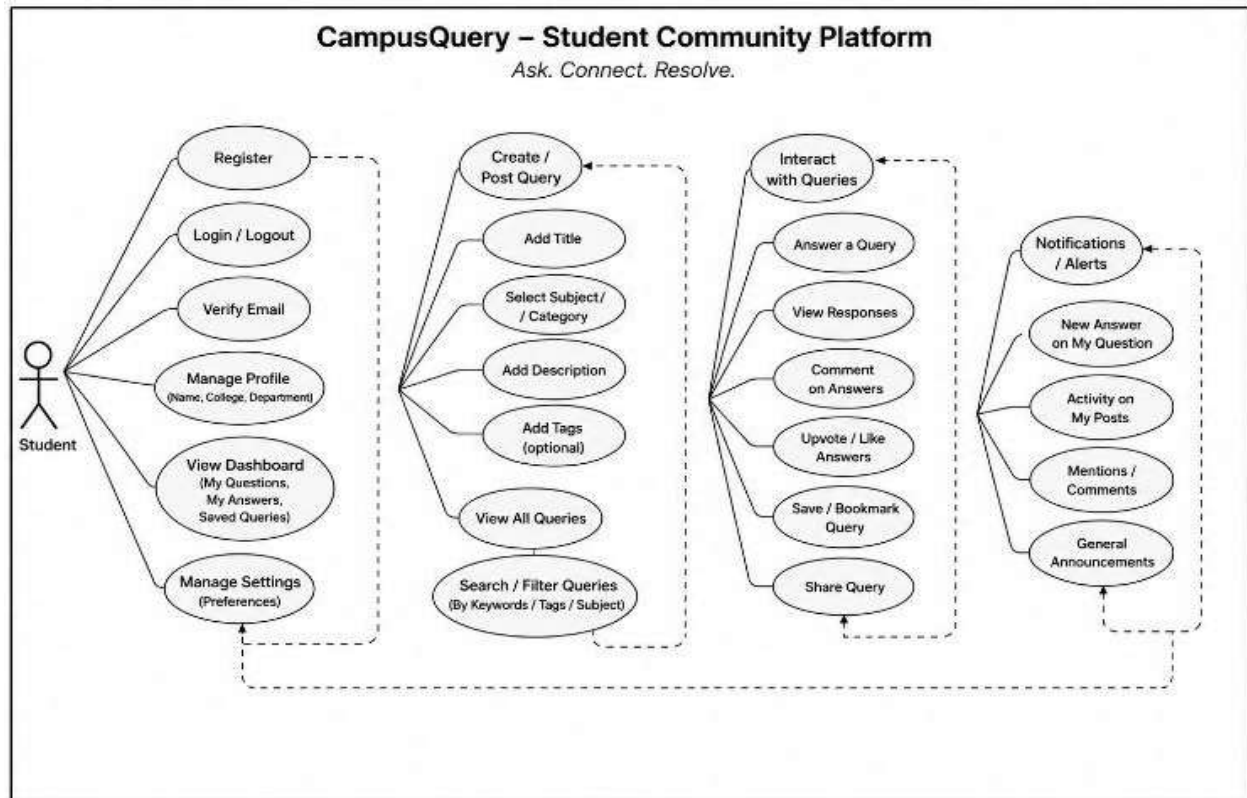


Fig 3: Systematic use case diagram of the Student Community Platform

10. Flow Charts :

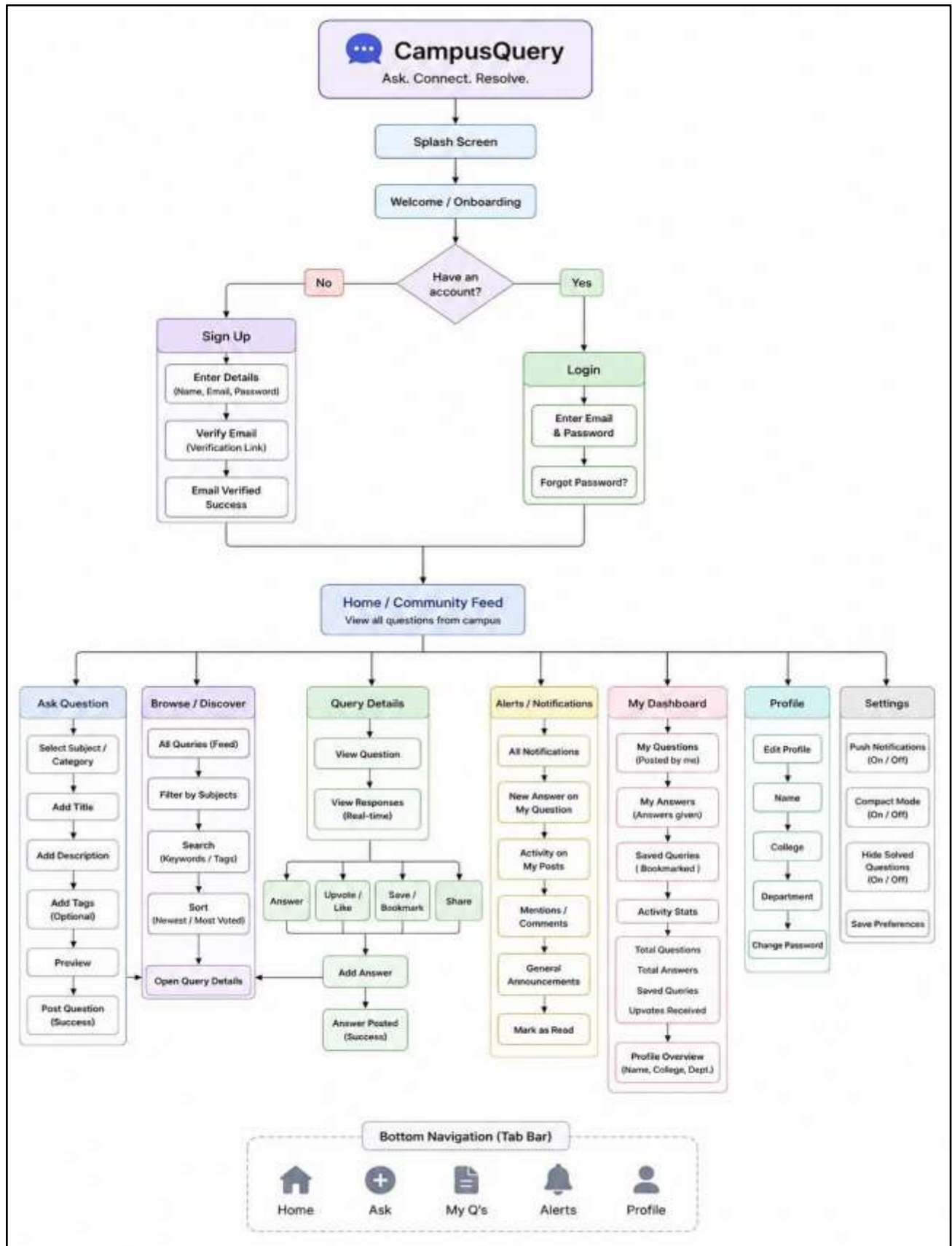


Fig 4: Overall flow diagram of mobile application of CampusQuery.

11. Implementation :

The CampusQuery application is developed using React Native with Expo framework for the frontend and Firebase as the complete backend infrastructure. The system is built to run on both Android and iOS platforms from a single codebase, ensuring broad accessibility across devices used by college students.

A. Software Requirements

1. React Native (with Expo SDK 51)
2. Visual Studio Code (Development Environment)
3. Node.js and npm
4. Firebase Firestore (NoSQL Cloud Database)
5. Firebase Authentication
6. Firebase Cloud Functions
7. Firebase Cloud Messaging (FCM)
8. Expo CLI

B. Hardware Requirements

1. Android or iOS Mobile Device
2. Active Internet Connection
3. Firebase Cloud Storage and Database Access
4. Development Machine with minimum 8GB RAM for running Expo build environment

C. Functionalities Implemented

12. Results and Discussions :

The proposed CampusQuery application successfully provides a structured and searchable community platform for college students to post queries and receive answers from seniors and fellow batch mates. Students

1. User Authentication — Email and password based secure login and registration using Firebase Auth with session management
2. Community Feed — A general feed where students can browse, post, and interact with queries from across the college community
3. Query Posting — Students can post academic or campus-related questions with descriptions and attach relevant tags
4. Tag-Based Categorization — Questions are labeled with subject or topic tags enabling efficient filtering and discovery
5. Similar Question Suggestions — Previously answered similar queries are surfaced during search to reduce duplication
6. Answer and Reply System — Students, seniors, and batch mates can post answers and replies to open queries
7. Push Notifications — Users receive real-time alerts for replies on their queries and trending discussions using FCM and Expo Notifications
8. Local Preference Caching — AsyncStorage is used to cache user preferences and improve app performance

can easily post questions, apply relevant tags, and discover previously answered similar queries, significantly reducing duplication and saving time.

The application improves peer knowledge sharing, preserves

institutional knowledge across academic years, and provides a more organized and reliable communication

platform compared to existing informal solutions.

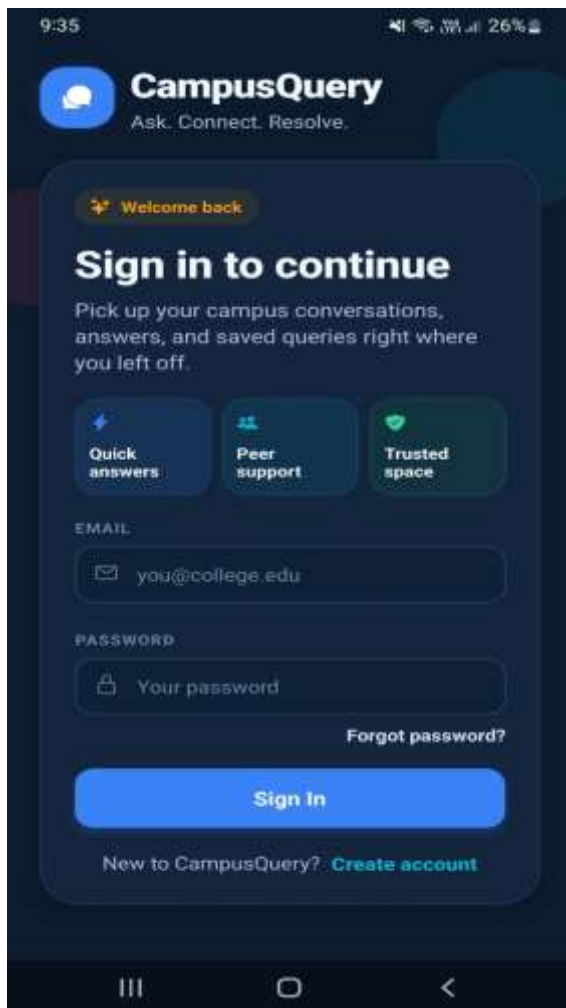


Fig 5: SignIn Interface

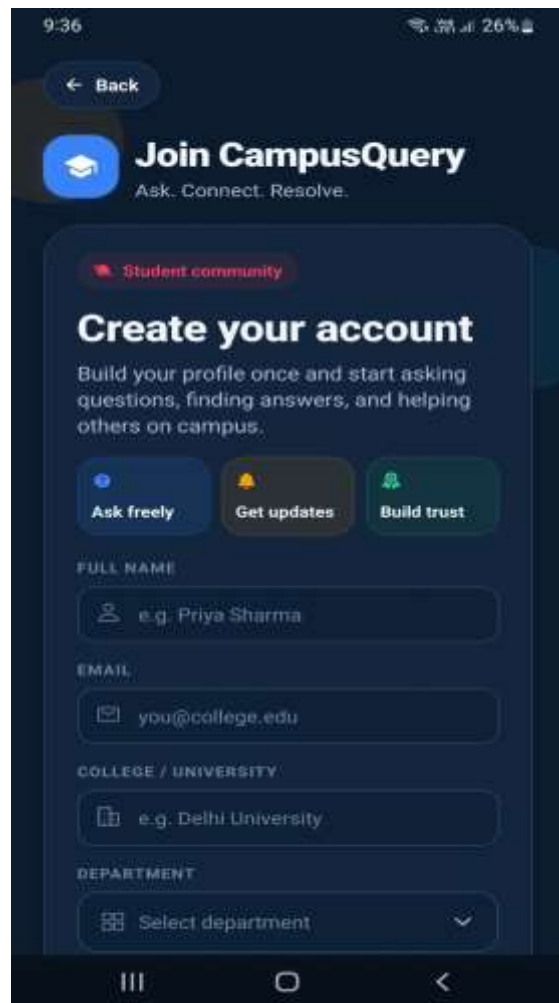


Fig 6: Create Account Interface

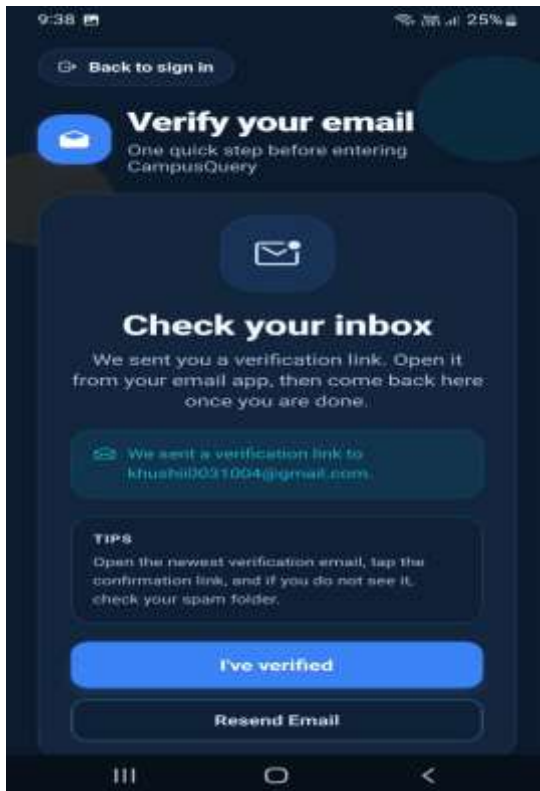


Fig 7: Verification Page for Email

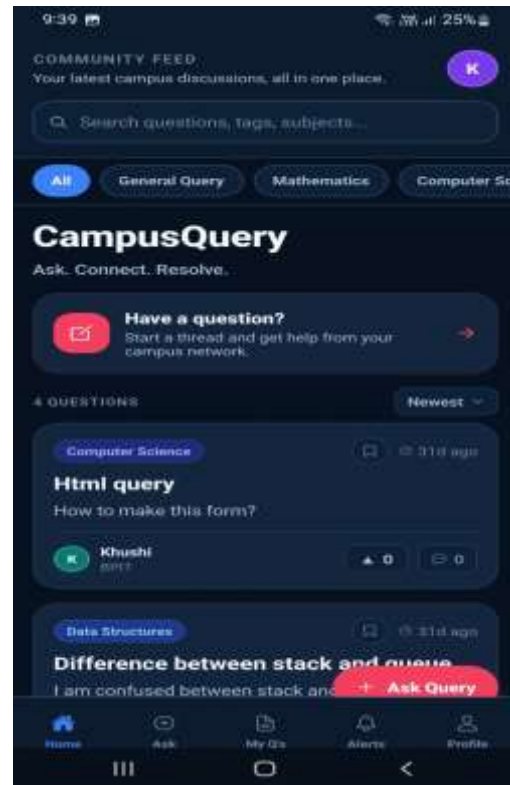


Fig 8: Community Feed

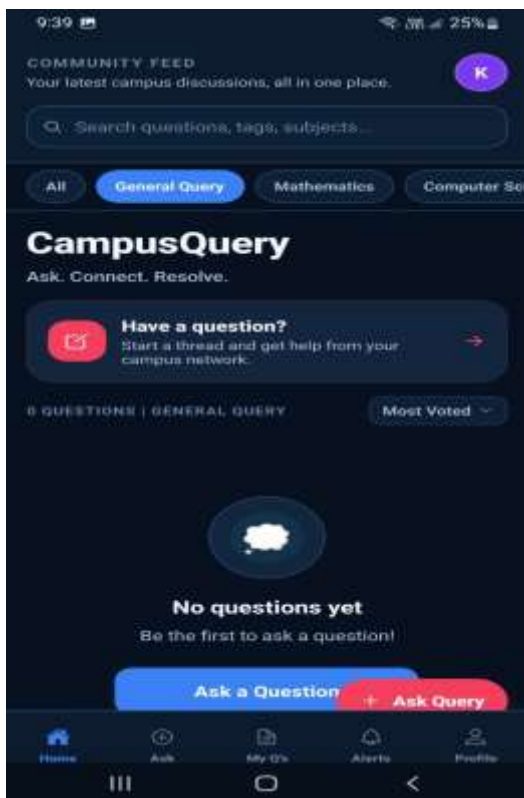


Fig 9: General Query Feed

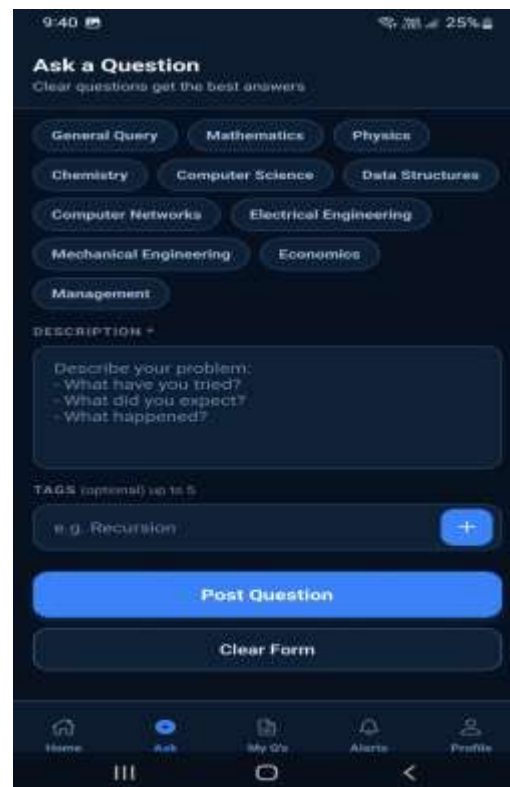


Fig 10: Post Question/Query



Fig 11: Student Profile Interface

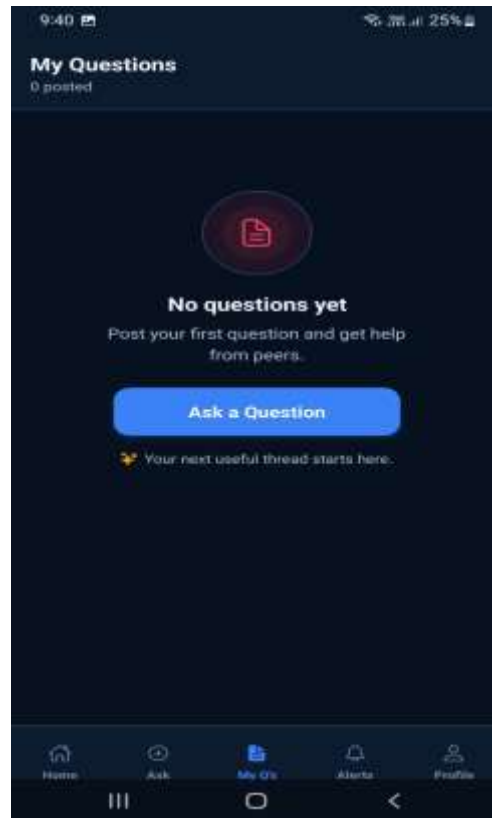


Fig 12: All Questions asked list

13. Limitations :

Although the proposed CampusQuery system provides several benefits, it also has certain limitations:

1. Requires stable internet connection
2. Mobile device dependency
3. Cloud security depends on Firebase configuration
4. Initial setup and onboarding required for new users
5. Limited offline functionality
6. Requires authenticated user accounts to participate

These limitations can be addressed in future versions using hybrid offline-online synchronization and enhanced moderation mechanisms.

14. Future Scope :

The proposed CampusQuery system can be enhanced further by integrating advanced technologies and additional functionalities such as:

1. AI-based answer suggestion system
2. Doubt resolution via live chat or video
3. Faculty participation and verification module
4. Subject-wise leaderboard for top contributors
5. Integration with college timetable and syllabus
6. Voice-based query posting
7. Multilingual support for regional students
8. Smart tag recommendation using NLP

9. Machine Learning-based answer ranking
10. Automated email and push alert digests
11. Integration with college ERP or LMS portals

Future enhancements can make the system more intelligent, inclusive, and suitable for large-scale academic environments.

15. Conclusion :

The CampusQuery application provides an efficient, secure, and community-driven solution for academic query management in educational institutions. The system reduces dependency on informal communication channels, improves query resolution speed, and simplifies knowledge sharing using mobile and cloud technologies.

By digitizing the academic doubt-solving process, the proposed system helps institutions and students save time, reduce confusion, and improve overall learning efficiency. The use of Firebase cloud database ensures real-time synchronization, secure data storage, and scalability.

Compared to traditional methods such as WhatsApp groups or verbal communication, the proposed system provides better organization, accessibility, and analytics capabilities. Future enhancements such as AI-based answer suggestions, NLP-powered tag recommendations, and faculty verification can further improve the effectiveness and reliability of the system.

The proposed CampusQuery app can serve as an effective digital academic assistance platform for schools, colleges, and universities.

16. References :

The following references include research papers, case studies, and official technical documentation that were reviewed and utilized during the development and study of the CampusQuery application.

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