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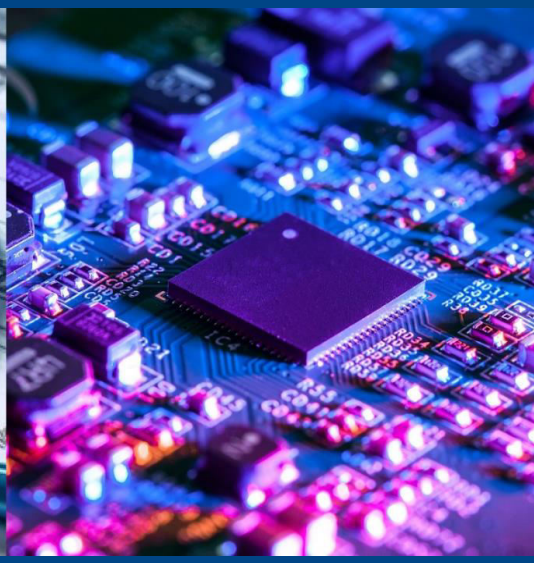

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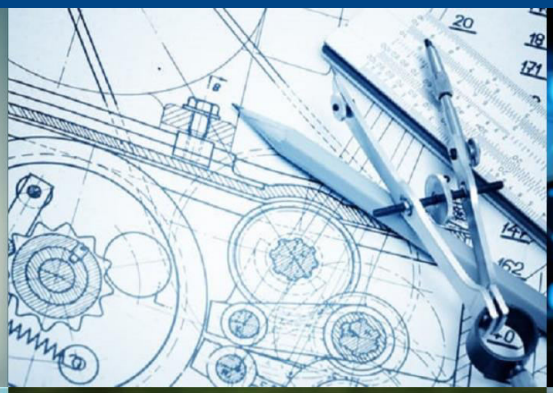

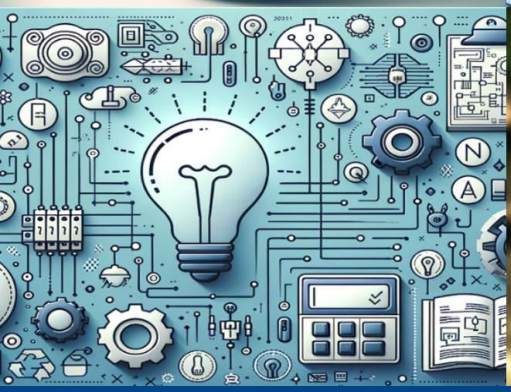

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Implementation and Analysis of Scope: Streamlined Communication and Organized Placement Engagement

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ABSTRACT: The "Scope" is a comprehensive web application designed to enhance communication and streamline information sharing within the college community. It aims to address common challenges in managing academic events, and handling placement-related queries by providing a centralized platform for students, teachers, and placement officers. The Placement Query Tracking System facilitates efficient handling of placement-related queries. Students can submit queries, which are initially managed by Training Placement Coordinators (TPCs) assigned to specific classes. If a TPC cannot resolve a query, it is escalated to the Training Placement Officer (TPO) for further action. The system incorporates machine learning algorithms for automatic classification and tagging of queries, helping to streamline query resolution and provide real-time updates to students. The Event Management System allows faculty to organize events easily, using KeyBert to extract key discussion points from descriptions. "Scope" aims to foster better student engagement, enhance academic support, and streamline placement- related processes, leveraging machine learning techniques for improved user experience. By integrating these features into a single platform, the app seeks to create a more connected and efficient college ecosystem.

KEYWORDS: Web application, Machine Learning, Query tracking, Event Management System, KeyBert Model, Bert Classification Model

I. INTRODUCTION

Current communication between students, faculty, and administration is fragmented and inefficient, leading to missed deadlines, poor collaboration, and reduced student engagement. A centralized, real-time communication platform is needed to streamline information sharing, enhance collaboration, and improve the overall academic experience. The purpose of the Scope web app is to provide a streamlined communication platform for students and faculty members. It allows faculty to manage events, and resolve student queries related to training and placement. The website also provides students with a platform to track and submit placement-related queries. Additionally, the project includes a Placement Query Tracking System that enables students to submit placement-related queries, track their submitted queries, receive real-time updates, and view academic progress. The system incorporates automatic classification of placement queries for improved management and support. In the Placement Query Tracking System, there are Training Placement Coordinators and a Training Placement Officer (TPO). Queries are first sent to Coordinators, who are assigned to different classes. If the Coordinators can't resolve the queries, they forward them to the TPO, who can view all queries and track their assignments. Queries will be classified using machine learning algorithms and given tags. In the Event Management System of the Scope website, teachers can add key points that will be discussed in the events. KeyBert is used to extract relevant keywords from event descriptions to assist teachers in summarizing topics. Students can also register for events. This system allows for an organized presentation of event details, helping students identify sessions aligned with their interests through the highlighted keywords. By registering for events in advance, students can manage their academic calendar effectively, while teachers benefit from having a clearer picture of attendee interest

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and expectations. The inclusion of keyword summaries enhances communication by making event objectives more transparent and accessible, fostering improved participation and engagement across the student body.

II. LITERATURE REVIEW

2.1 Educational Mobile Applications for Campus Engagement

Overview: Educational mobile applications designed for campus environments have become increasingly popular, as they provide streamlined communication channels for students, faculty, and administrative staff. Apps like CampusApp, Blackboard, and Schoology show that centralized platforms improve information access, streamline event management, and provide a sense of community.

Key Findings: Studies suggest that mobile apps promoting social and academic interactions within campuses enhance engagement and ease of access to resources (Mustafa et al., 2021). A review by Alomari et al. (2020) highlights the importance of personalization in educational apps to cater to diverse student needs.

Application to Scope: By incorporating features like event management, real-time updates, and study material access, Scope can enhance the campus communication experience, catering specifically to the needs of college students and faculty.

2.2 Role-Based Access and Escalation in Educational Systems

Overview: Role-based access control (RBAC) is a security practice that has been widely implemented in educational systems to protect sensitive information and ensure that data access aligns with institutional hierarchy.

Key Findings: Research by Rao et al. (2017) indicates that RBAC improves data security and operational efficiency in educational apps by limiting access to specific roles, such as students, teachers, or administrators. Additionally, escalation mechanisms ensure unresolved issues are handled at higher levels when necessary.

Application to Scope: By implementing role-based access, Scope can maintain secure data management for students, Coordinators, and the TPO, allowing effective handling of queries and appropriate escalation based on role and authority.

2.3 Machine Learning for Query Classification and Management

Overview: Machine learning (ML) algorithms are increasingly used in educational support systems to classify and manage student queries efficiently. For example, support ticketing systems often rely on classification to sort queries by topic or urgency.

Key Findings: Studies by Kumbhare et al. (2018) highlight that machine learning algorithms, such as SVMs and decision trees, effectively categorize queries with high accuracy, especially when trained on domain-specific data. Balaji et al. (2020) report that ML algorithms can significantly reduce response times by routing complex queries to the appropriate staff members.

Application to Scope: Scope's Placement Query Tracking System can utilize ML to categorize and tag queries, directing them to Coordinators or the TPO based on complexity or topic. This automation can streamline the query resolution process, minimizing delays and administrative overhead.

2.4 Student Engagement through Interactive Campus Applications Overview:

Engaging students with interactive campus applications that include event registration, announcements, and real-time notifications has shown to enhance their involvement and academic success. Platforms such as EngageU and CampusGroups have been found effective in fostering student involvement. Key Findings: According to a study by Duncan et al. (2019), digital platforms offering interactive options (like event registration and study material downloads) increase student engagement and satisfaction. Furthermore, Paredes et al. (2021) found that students are more likely to engage in campus events when they can view key points or agenda items beforehand. Application to Scope: Scope's features for event registration and displaying event key points allow students to tailor their participation based on interest. This approach aligns with findings that personalized, agenda-focused event previews drive better attendance and engagement.

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Relevance to current Research

In the research paper, the proposed communication application has unifies the interaction between students, teachers, and administrators within a college. This system supports features such as messaging, notifications, and announcements in a centralized digital environment. This work is closely aligned with the Scope project's objective to bridge communication gaps in academic settings. While Chatster focuses on messaging and general information flow, Scope advances this concept by integrating role-based dashboards, real-time event participation, and placement query resolution, making it more structured and operationally targeted.

Relevance to current Research

The paper introduces a mobile application tailored to managing college events through features such as event creation, display of event lists, and tracking user registrations. The proposed app emphasizes simplicity and mobile accessibility. This approach is relevant to Scope as it validates the necessity for event management tools within academic institutions. Scope extends this idea by incorporating web-based responsiveness, admin-level control and integration with learning materials, thereby improving user engagement and post-event analysis.

Relevance to current Research s

The authors developed a platform to streamline college event announcements and coordination. The research emphasizes minimizing delays in communication, making events more accessible to students. This is highly relevant to Scope, as it demonstrates the importance of centralized systems in facilitating information dissemination. Scope builds on this by adding intelligent engagement mechanisms, real-time event updates, and feedback systems to ensure events are not only announced but also actively monitored and assessed.

No.	Paper Title	Author Name	Key Points	Remark
1	College Communication App - Chatster	R. Deepika, M. Selvam, S. Gurumoorthy 2023	Proposes a communication app to unify teacher-student interaction with admin oversight and messaging services	Lays foundation for academic communication models, which Scope builds upon with real-time event and query workflows.
2	Android Application for College Events	Deshmukh, R., Rajbhar, V., Sankhe, M., and Kahlon, R.K. 2020	Android app for event creation, event calendar display, and registration tracking; focuses on UI simplicity	Validates the necessity for event-centric modules; Scope enhances it with role access and feedback
3	Streamlined Application for Managing College Events	Ms. Fathimath Hanan K T, Ms. Heena Sherin T, Ms. Lulu Shadin U, Mrs. Sulthana Rinsy A P 2024	Emphasizes quick event dissemination and centralized event storage via mobile app	Supports Scope's intent to minimize communication gaps during academic events
4	Study on Event Management Applications	Verma, A., Srivastava, G., Verma, H., Johri 2017	Analyzes existing apps for event organization; highlights need for responsive UI and real-time updates	Shows relevance to Scope's use of Tailwind CSS and Vite for speed and responsiveness.
5	Query Classification Based on Automatic Learning Query Representation	Hanxiao Zhang, Wei Song, Xianjun Liu, Lizhen Liu, Xinlei Zhao 2019	Applies deep learning (BERT, GRU) for understanding and classifying search queries.	Directly aligns with Scope's use of BERT for student query classification in the placement module

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III. METHODOLOGY OF PROPOSED SURVEY

3.1 Requirements Analysis

Define Requirements: Gather detailed requirements for each module (Event Management System, Placement Query Tracking System). Document Requirements: Create a Software Requirements Specification (SRS) document covering all functionalities, constraints, and data needs.

3.2 System Design

Architectural Design: Outline system architecture, database schema, and data flow diagrams for each module. Detailed Design: Specify component-level designs, including UI/UX mockups, API specifications, and data storage requirements. Finalization: Finalize and approve all designs to ensure readiness for development.

3.3 Model Selection and Preparation:

Selected KeyBert algorithm for keyword extraction from event descriptions. KeyBert leverages BERT embeddings to identify contextually relevant phrases that summarize event content. Implemented BERT for classification of placement queries into predefined categories such as eligibility, deadlines, and document requirements. Curated training datasets for BERT from real-world placement queries and manually tagged them for accurate model training.

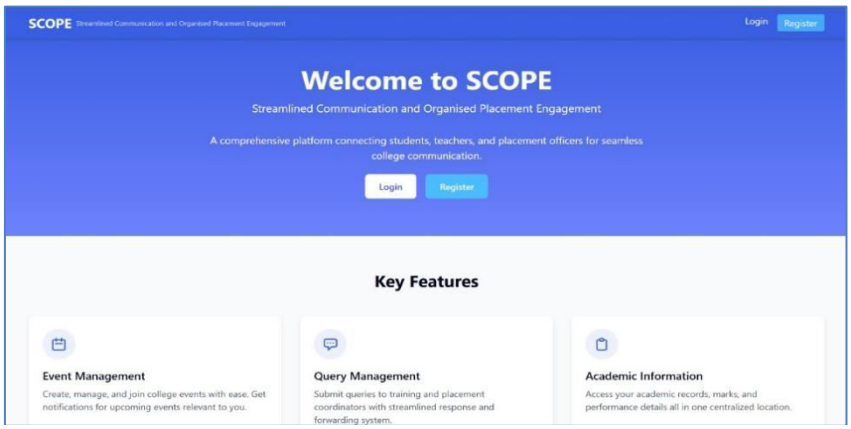
3.4 Implementation

Module Development: Begin coding each module sequentially, such as first building the Event Management System, followed by Placement Query Tracking. Integration: As each module is completed, integrate it into the main application, ensuring they work together. Internal Testing: Perform unit tests and integration tests to verify functionality and address initial bugs.

3.5 Computational Resources:

Backend Server: A robust server with sufficient processing power and memory will be essential, particularly for handling BERT-based classification and SVM training. Storage: Adequate storage for datasets (queries, comments, and feedback) and high-quality user interaction logs to support ongoing machine learning improvements. Data Quality: The effectiveness of classification models relies on the availability of quality labeled datasets, particularly for training algorithms on common query types and event feedback.

IV. RESULTS



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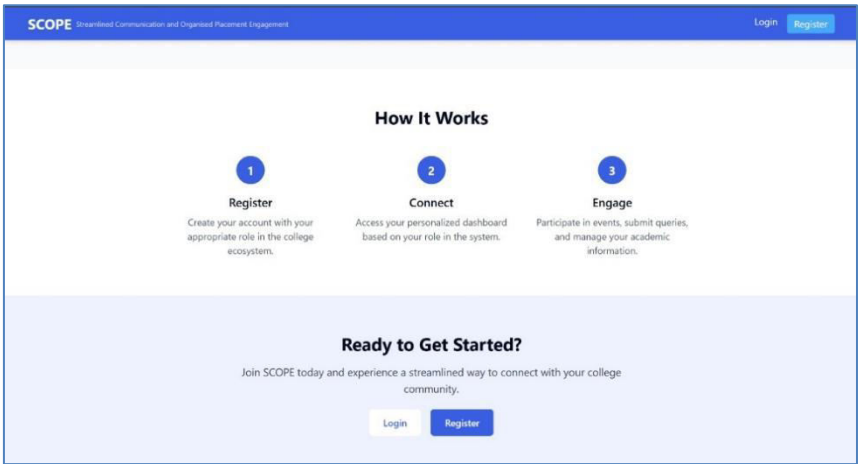

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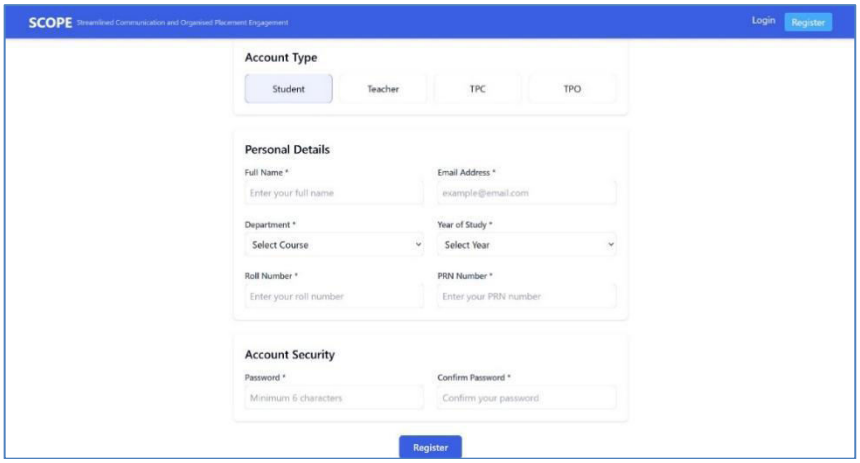

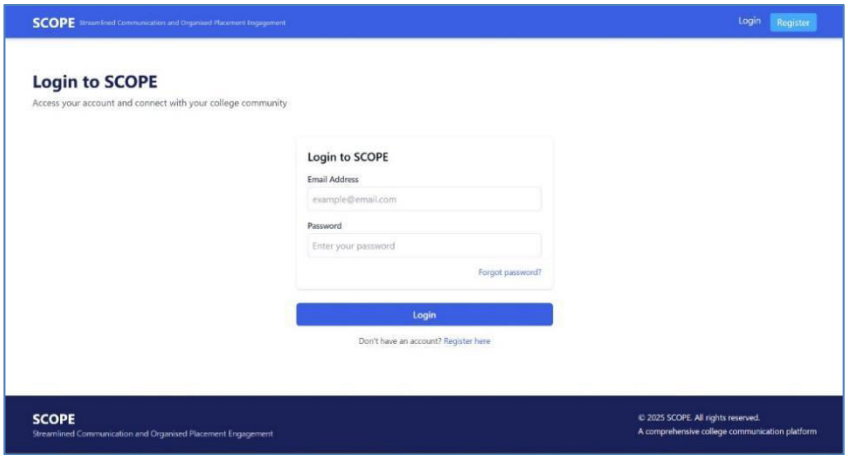

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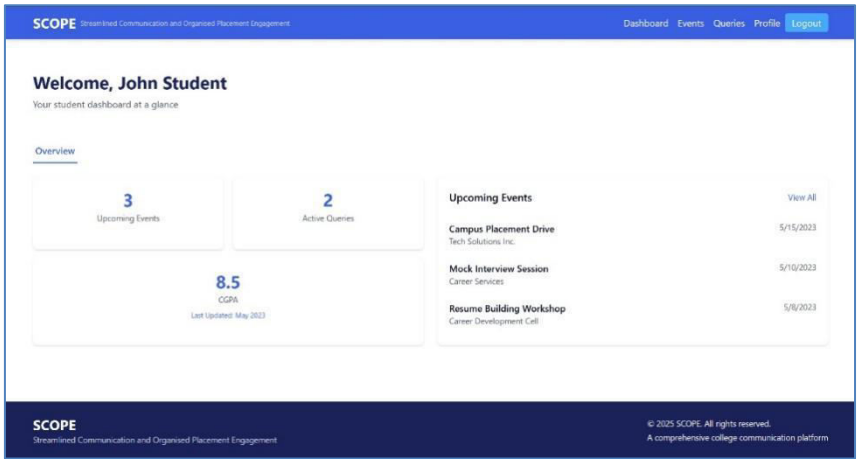

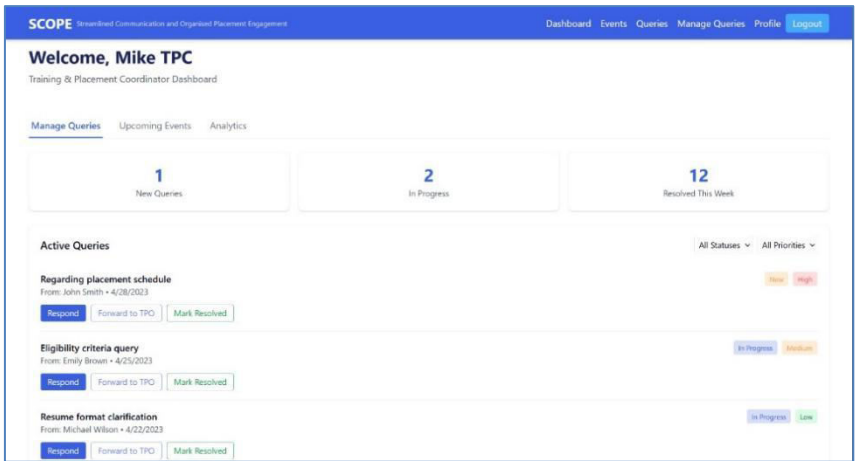

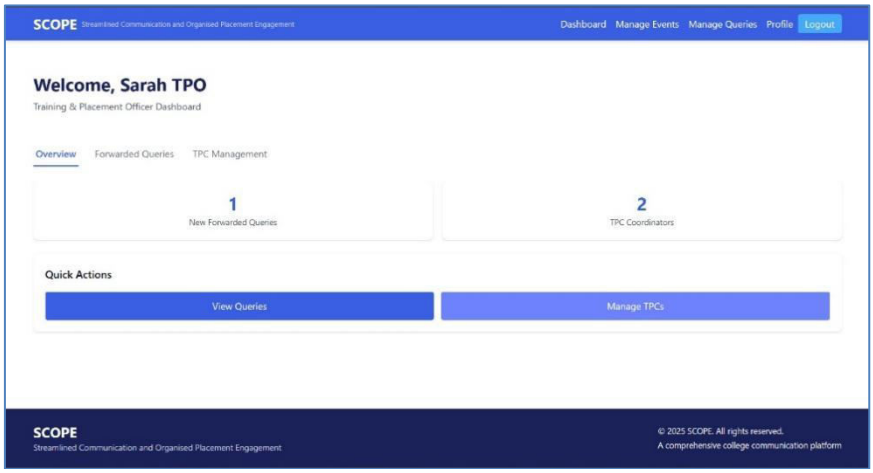

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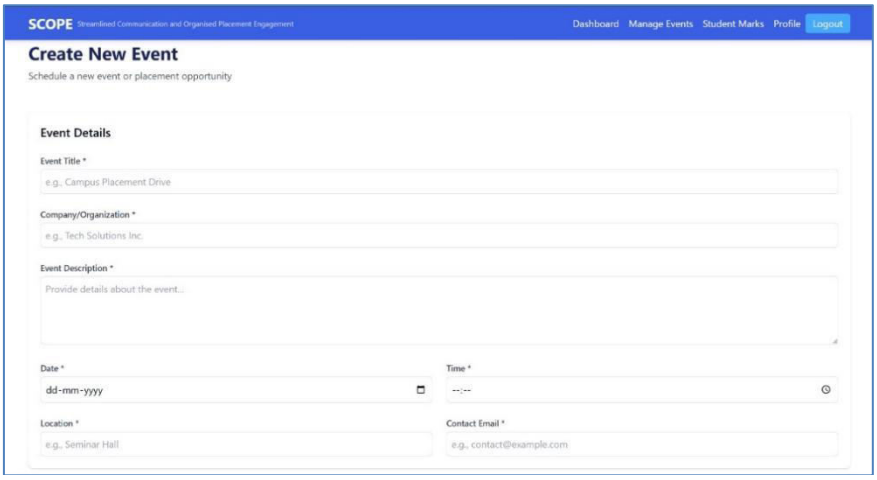

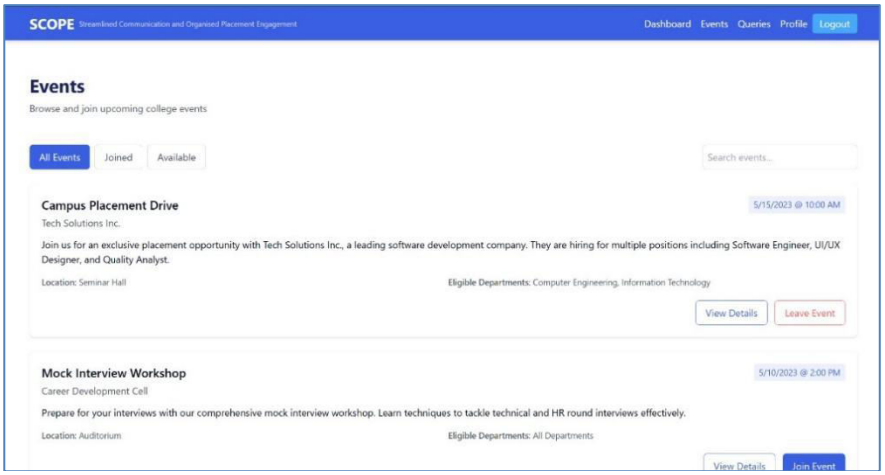

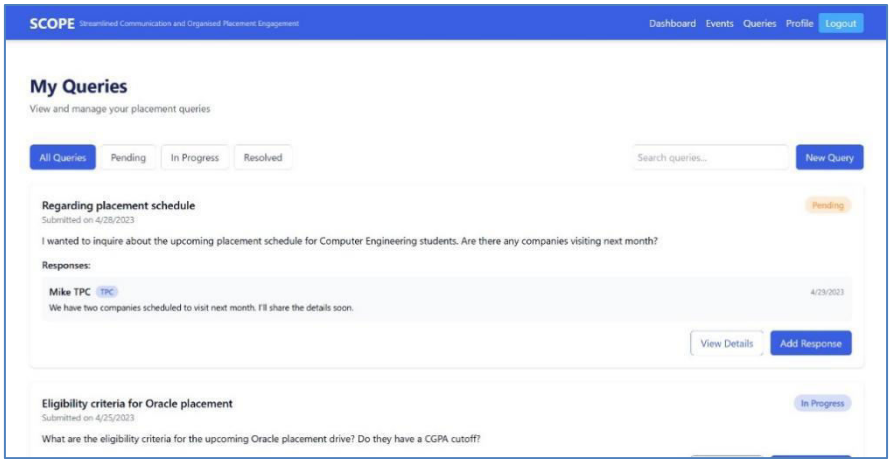

V. CONCLUSION AND FUTURE WORK

The Scope – Streamlined Communication and Organized Placement Engagement project successfully delivers a centralized, role-based platform aimed at improving communication, collaboration, and engagement within a college environment. By integrating modern web technologies such as React for the frontend and Node.js with Express and MongoDB for the backend, Scope provides a responsive, scalable, and secure solution tailored to the distinct needs of

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students, teachers, TPCs, and TPOs. Through modules like event management, query submission and tracking, role-based dashboards, and user authentication, the project addresses real-world academic and placement-related challenges faced in educational institutions. The use of MongoDB for flexible data storage, along with features like file uploads and token-based security, further enhances the system's functionality and reliability. The structured approach to development, including testing and modular architecture, ensures long-term maintainability and adaptability. Overall, Scope not only streamlines communication but also fosters a more connected and informed campus community, making it a practical and impactful solution in the domain of academic digitalization.

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