

Campus Link: Connecting students across disciplines for collective learning and future readiness

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Abstract—Digital collaboration is increasingly essential for college students, given the demand for unified platforms that integrate both academic and extracurricular engagement. Existing systems often segregate social and educational interactions, limiting opportunities for students to connect with peers who share similar interests or career goals. To address this challenge, this paper proposes Campus Link, an interactive web-based platform designed to enable students to discover and collaborate across diverse domains. The platform provides features such as skill-based search, real-time messaging, interest-based groups, and talent-sharing posts, thereby fostering meaningful connections among users. By aligning with varied student interests - including placements, government examinations, higher education, entrepreneurship, and pursuits in arts and sports - Campus Link assists users in identifying relevant communities and resources to support their individual learning and career pathways. Unlike traditional portals, Campus Link offers a personalized, engaging, and goal-oriented networking experience. Future enhancements will focus on integrating AI-driven recommendation systems and ensuring greater scalability to accommodate broader adoption.

Index Terms—skill based search, common interest groups, talent showcasing through post

I. INTRODUCTION

Institutions of higher education increasingly face challenges in facilitating effective communication and collaboration among students. Traditional methods, such as circulars for group or club formation, face-to-face meetings, and email correspondence, often prove inadequate for addressing the diverse and evolving needs of modern

student communities. Without a centralized platform integrating both academic and extracurricular engagement, students frequently miss opportunities to connect with peers who share similar interests, professional goals, or academic pursuits. This fragmentation can hinder collaboration, knowledge sharing, and the development of supportive peer networks essential for personal and professional growth. Students in higher education today pursue a diverse range of aspirations, including preparation for campus placements, government examinations, higher studies, entrepreneurship, and creative pursuits in fields such as arts and sports. Existing institutional systems often compartmentalize these interests, lacking mechanisms for students to discover relevant communities, share resources, or collaborate toward common goals. These limitations underscore the need for innovative digital solutions that enable more cohesive and purpose-driven interactions among students.

To address these challenges, Campus Link is proposed as an interactive, web-based platform designed to create a unified digital environment for student engagement. It offers features such as skill-based profile searches, interest-driven groups, forums for open discussions, spaces for showcasing talents and projects, and opportunities to participate in diverse events. By focusing on student-to-student interactions, Campus Link fosters meaningful connections, promotes collaboration, and empowers students to explore varied academic and professional pathways, contributing to a more dynamic and interconnected collegiate experience. Beyond facilitating peer collaboration and engagement, *Campus Link* functions as a tool for identifying

students' skills and interests, while also promoting self-directed learning. The platform enables the assessment of program outcomes that are challenging to measure through direct evaluation methods, thereby providing valuable insights into students' competencies and attitudes.

II. RELATED WORKS

Numerous studies have investigated online platforms designed to support student collaboration and engagement, each offering distinct features and exhibiting specific limitations.

Davis et al. [1] presented a comprehensive overview of widely used online collaboration tools in educational contexts, including Slack, Microsoft Teams, Google Classroom, and Moodle. While these platforms facilitate real-time communication and collaborative document editing, their effectiveness is constrained by limited adaptability to general topics, often due to insufficient contextual understanding.

Smith and Johnson [2] explored collaborative argument mapping tools that employ Collaborative Learning Analytics (CLA) to enhance knowledge construction and group discourse. Although these tools enable detailed analysis of student interactions and engagement, their complexity and narrow focus restrict their applicability to broader collaborative needs.

Institutional websites [3], on the other hand, offer structured academic information, student resources, and contact details but lack personalization, collaboration functionalities, and efficient search capabilities, hindering students' ability to locate relevant information and establish meaningful connections.

A comparative analysis of these systems reveals that while online collaboration tools promote structured academic engagement, they fall short in supporting comprehensive student networking. Argument mapping tools foster critical thinking but are limited to structured discussion environments. Institutional websites provide extensive informational content but do not facilitate interactive collaboration or real-time communication. Although each platform demonstrates strengths in specific domains, none delivers a unified solution that seamlessly integrates academic collaboration, peer networking, and

resource sharing within a student-centered framework.

Despite significant advancements in online learning and collaboration technologies, critical gaps persist that impede effective student engagement. Existing platforms are often fragmented, limiting students' ability to identify peers with shared interests or collaborate effectively on projects. The absence of robust real-time communication features constrains opportunities for teamwork, while dispersed resource access and the lack of personalized recommendations further diminish user engagement.

To address these challenges, Campus Link is proposed as an integrated, interactive platform that combines student profiling, real-time messaging, group formation, project showcases, event participation, and achievement recognition. This comprehensive system bridges existing gaps in student communication, collaboration, and engagement, fostering a more connected and dynamic campus environment that supports diverse student goals.

III. PROPOSED APPROACH

The proposed system, Campus Link, is designed to address the shortcomings of existing platforms by providing a structured, interactive, and personalized environment that fosters student collaboration and facilitates collective progress toward shared goals. The architecture of the system is composed of multiple integrated modules that support skill-based profile search, interest-driven group formation, talent and project showcasing, and seamless real-time communication among students.

3.1 System Architecture

The Campus Link system follows a modular architecture presented in Figure 1 comprises three key layers: User Interface, Backend Services, and Supporting Services. The User Interface allows students to manage User Profiles, join study groups for academic and extracurricular collaboration. The Backend Services handle core functionalities, including Discussion Forums for topic-based interactions and group collaboration. The Supporting Services ensure security and data management through an Authentication Service for user access control and a Database System for storing profiles,

discussions, and shared resources. This structured approach enables seamless communication, secure access, and efficient collaboration within the platform.

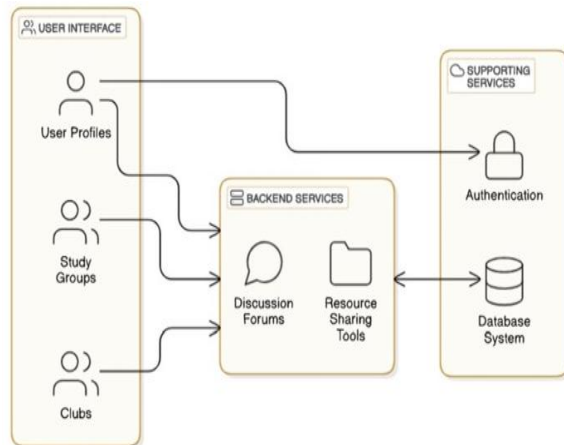


Fig 1: System Architecture

IV. RESULTS & DISCUSSION

4.1 Experimental setup

The development and deployment of the Campus Link system were carried out in a Windows 11 environment, with Visual Studio Code (VS Code) serving as the primary integrated development environment (IDE). The front end was developed using React.js, while Next.js and Firebase Functions were employed for backend operations. Firebase Firestore was utilized as the database to facilitate real-time data synchronization. State management in the front end was implemented using the React Context API, and the user interface was styled with CSS and Bootstrap. Development and testing processes were supported by tools such as Postman for API validation, the Firebase Emulator Suite for local testing of backend services, and GitHub for version control and collaboration. The front-end application was deployed on Firebase Hosting to ensure secure and high-performance delivery. This comprehensive environment was selected to achieve scalability, maintainability, and efficient performance of the Campus Link system.

4.2 Results

Screenshots of user interface presented in Figures 2 to 5, illustrate how the system enables users to connect through messaging, join groups, and participate in events, thereby helping them discover

peers with shared academic or personal interests.

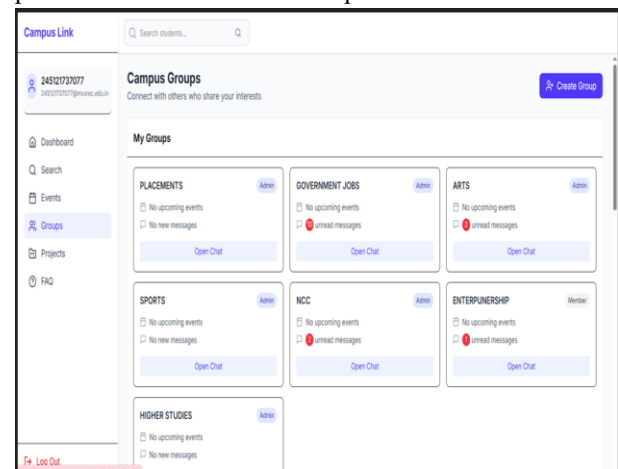


Fig 2: Groups Page

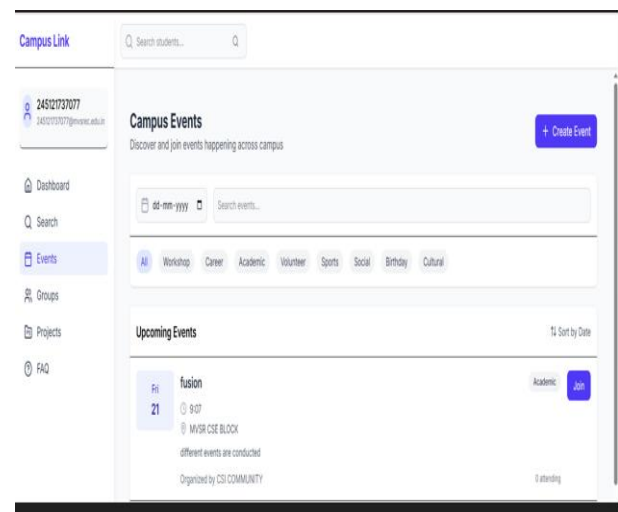


Fig 3: Events page

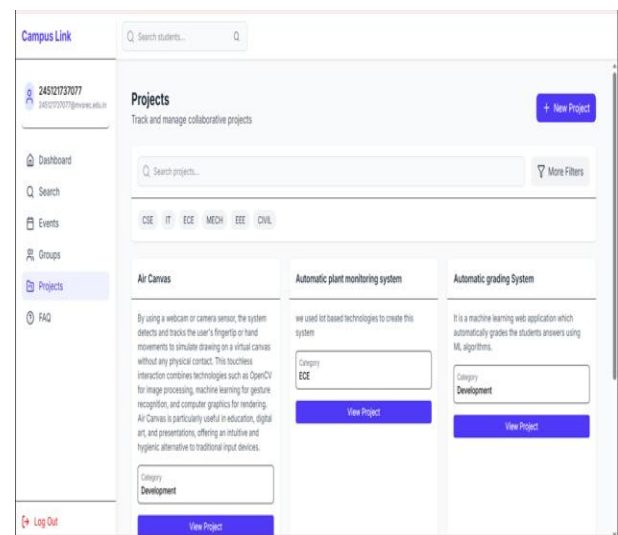


Fig 4: Projects Page

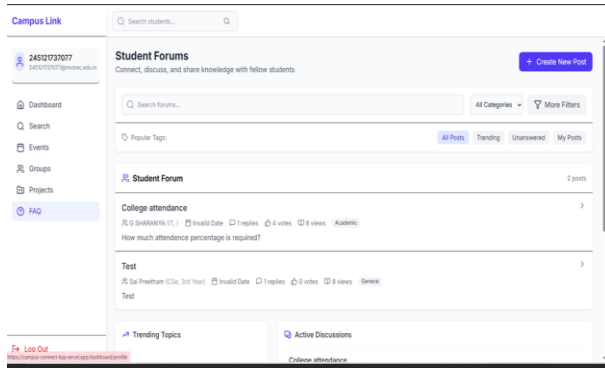


Fig 5: FAQ Page

4.3 Evaluation Metrics

The performance of the Campus Link platform was assessed using a range of quantitative and qualitative metrics to evaluate system efficiency, user satisfaction, and overall reliability. The User Engagement Rate quantifies the frequency of user interactions, encompassing activities such as messages sent, groups joined, and events attended. System Response Time measures the latency involved in processing user requests, including page load times and message retrieval. Search Efficiency evaluates both the speed and accuracy with which users can locate relevant groups, events, or discussion threads. Scalability examines the system's capacity to accommodate increasing numbers of users without experiencing performance degradation. Additionally, the User Satisfaction Score, derived from structured feedback and survey responses, reflects the extent to which the platform meets users' expectations and requirements. Collectively, these metrics offer a comprehensive assessment of the Campus Link system's functionality and inform directions for future enhancements.

4.4 Comparative Analysis

A comparative assessment was conducted between the proposed Campus Link system and traditional institutional websites to highlight differences in functionality, user engagement, and technological capabilities. Unlike institutional websites, which primarily deliver static information with limited interactive features, Campus Link fosters a dynamic, community-oriented environment that emphasizes student connection, collaboration, and personalized interaction. The system enables users to engage through messaging, groups, and event participation,

facilitating the discovery of peers with shared academic or personal interests.

This interactive and customizable design contributes to enhanced user engagement and satisfaction, making Campus Link a more effective solution for promoting meaningful collaboration and community growth among students.

Table 1 presents a comparison of key features and metrics between Campus Link and traditional institutional websites.

Table 1: Comparative analysis between proposed system & traditional institutional websites

Metric / Feature	Campus Link (Proposed System)	Institutional Websites
User Engagement Rate	High, with frequent messaging, groups, events	Low, limited to information browsing
System Response Time	300 ms for dynamic interactions	Fast for static pages
Search Efficiency	Hybrid algorithm (CF + CBF) enables accurate and fast personalized search	Limited keyword search; not personalized
Scalability	Designed for scalable dynamic interactions without performance degradation	Scales well for static content
User Satisfaction Score	Measured via surveys; high user satisfaction	Not formally measured; no feedback integration
Customization	High personalization (profiles, groups, hobbies)	None
Collaboration Tools	Robust (messaging, groups, forums, events)	Absent
Usability	Interactive, user-friendly interface	Simple but static navigation

V. CONCLUSION

The outcomes achieved by the Campus Link platform demonstrate strong alignment with its primary goal of fostering an interactive environment that facilitates student connection, collaboration, and personal growth across diverse interests and objectives. The system exhibits effective performance in critical functionalities such as real-time messaging, group creation, and event management, thereby serving as a valuable resource for enhancing meaningful student engagement. Campus Link enables students to identify and connect with peers who share similar aspirations across domains including academics, entrepreneurship, the arts, sports, career placements, competitive examinations, and higher education pursuits, supporting targeted collaboration. Although the platform offers significant strengths in customization and user-friendly design, there remain opportunities for further refinement in areas such as user interface navigation and advanced search capabilities. Overall, the versatile architecture of Campus Link effectively supports academic collaboration, talent presentation, and information exchange, providing students with a comprehensive space for both curricular and extracurricular development.

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