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Skill-Connect: A Collaborative Platform for Students

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Abstract - Currently, students from different institutions expe- rience difficulties in building professional networks, discovering collaborators for their projects, and accessing project-related opportunities. Existing social media platforms and professional networking platforms such as LinkedIn are primarily geared toward professionals and are not a complete fit for the needs of students. Skill-Connect is a platform reserved for student users in multiple colleges. Students will be able to create detailed profiles that describe their skills, interests and academic accomplishments. It will allow peer-to-peer connections, groups that could collaborate on projects, and sharing of information regarding internships, events, as well as academic resources. This is a simple, accessible, and scalable system designed to give students with different backgrounds a resource that will allow them to connect, communicate, and collaborate. Skill-Connect will enhance academic development, increase innovation, and ultimately prepare students for a career.

***Index Terms*—skill-connect, Student collaboration, hackathons, startups, E-Learning etc**

1. INTRODUCTION

In this digital age, networking has an important function in both academic and professional growth. It is possible to connect with professionals and job seekers using websites like LinkedIn and Internshala, but those types of platforms are not tailored to addressing a student's needs. College students do not get several opportunities to meet other students outside their own college, get project collaborators, or share great resources on internships, technical events, and career advice. The absence of a website for college students limits opportunities to interact and collaborate and provides a gap of communication.

In response to these opportunities, Campus Connect is now proposed as a networking solution for all college students across multiple colleges. All users on the site will create their own profiles, allow to show their skills and achievements, and connect with peers who have specialized interests. The site will also let the user create project groups, share profiles, and check opportunities in academics, clubs, and organizations - all relevant to their interests.

The objectives of the project goal is to create a unique, easy to use, and secure platform for students to connect and creatively collaborate for their career development. Campus Connect's goal is to create more communication between students from different college premises when there is an interaction with lots of potential within the academic commu- nity. By developing a secure space for collaboration, Campus Connect aims to create meaningful interactions that will pre- pare students for success development through creativity and sharing ideas.

-In addressing these challenges, we have introduced Skill- Connect, a personalized networking platform built for students. Skill-Connect will fill this void by providing::

- A shared space for hackathons, incubation programs, and internships.
- A verified academic persona for inter-institutional net- working.
- A scalable, user friendly, cloud-based platform that en- sures access and performance.

In this paper, we will discuss the methodology, architecture and system design of Skill-Connect. User requirements will be discussed, and Skill-Connect will be compared to alterna- tives currently on the market to demonstrate advantages and unique contribution.

2. LITERATURE REVIEW

Educational peer-to-peer student networking and collaborative spaces have been widely investigated over the last few decades. While different tools exist for professional networking, internships, and informal communication, their suitability for academic collaboration between peers is doubtful. The next section gives an overview of current literature on peer and collaborative learning models, online collaboration platforms, and social media–based academic networking.

A. Collaborative and Peer Learning Models

Collaborative learning has again and again been shown to improve student performance by active engagement and sharing of knowledge. Jaya et al. [1] demonstrated peer interaction achieves maximum learning efficiency, emphasizing the significance of collaboration in developing skills. Tang et al. [6] also emphasized sustainable models of peer learning online, highlighting that student motivation and worldview are key to long-term uptake. Such evidence proves structured learning among peers improves academic achievement.

B. Platform-Based Peer Collaboration

A few researchers attempted to develop formal platforms for peer collaboration among students. Bhagatkar et al. [8]

proposed an integrated peer-to-peer e-learning platform that utilized the shared whiteboard facility and doubt-resolution mechanisms. Anantha [7] developed a machine learning–based system for peer learning in which optimal recommendations were employed to enable students to collaborate with suitable peers for project work. Gamage and Whiting [3] also argued that MOOCs' practice communities instill a feeling of belonging in users and facilitate collaborative knowledge creation. These studies establish the potential for platform-facilitated collaboration above and beyond common learning management systems.

C. AI- and Cloud-Supported Collaboration

Technology integration has also created new avenues for peer learning. Tegos et al. [4] explored conversational agents as scaffolds for peer collaboration in MOOCs and reported increased engagement and live support. Similarly, Al-Samarraie et al. [5] analyzed cloud-supported collaborative learning environments and concluded that they exert an effect of enhancing student engagement as well as the construction of knowledge. Together, these pieces of research suggest that intelligent systems and cloud tech can work as scalability-facilitating enablers for collaboration.

D. Social Media as a Collaboration Tool

Social media web pages are unofficial platforms of scholarly networking. Liu et al. [9] confirmed that social media-based collaborative learning impacts student performance positively, which is moderated by level of self-efficacy. Chambers et al.

[10] specifically examined peer-to-peer learning on Facebook during the COVID-19 pandemic and found that despite the fact that students benefited from interactivity in the community, they still faced problems with content authenticity and spamming. The findings justify the observation that platforms like Facebook groups and WhatsApp communities remain relevant but are inadequate for systematic academic teamwork.

E. Identified Gaps

Despite advancements, existing tools and platforms are short of providing a harmonized, student-centric space. LinkedIn remains business focused, with emphasis on professional identity rather than students working together, while Internshala is limited to employer-student engagement. Social media platforms, though popular, are devoid of verification and structured form. Literature suggests high demand for a platform that provides verified academic identity, peer-to-peer cooperative working on projects, and scalable networking [2], [6], [7].

F. Research Contribution

With these shortcomings in mind, the proposed Skill-Connect platform borrows from past work by combining the formalism of learning platforms and the coverage of social networks. The other solutions focus less on authenticated student identities, academic collaborations, and institution-to- institution connections, hence addressing shortcomings out- lined in literature up to now.

3. METHODOLOGY

Skill-Connect's methodology is intended to provide a structured, secure and scalable pathway for students to network and collaborate. The development of the system follows a modular methodology, where each module (frontend, backend, database, and cloud infrastructure) must operate in harmony to deliver an appropriate user experience.

A. Requirement Analysis

Prior to development stage, we surveyed students, as we interviewed students from several communities to create a better understanding of the challenges they were facing. We discovered three main needs, these were;

- An authenticated academic identity to help establish trust between peers.
- A purpose-built collaborative environment for projects and hackathons.
- Simple access and discovery of events, internships or opportunities without reliance on third-party job portals. These requirements formed the basis of the design and execu-

tion of the proposed system.

B. System Architecture

1) Presentation Layer (Front End):

- This presentation layer was developed from React.js or Angular with a simple and engaging user expe- rience layer.
- It allows students to register, set up their profile, search for peers, and work on projects.
- The presentation layer allows for responsive design so it can be viewed on a desktop, tablet, or handheld device.

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2) Application Layer (Back End):

- The application layer was developed using either Node.js or Django and is responsible for the logic of the application, APIs and authentication.
- The back-end layer establishes the connection with the application layer as well as the database, and provides a path for real-time application which includes the creation of projects, connection re- quests/exchange, and event registration.

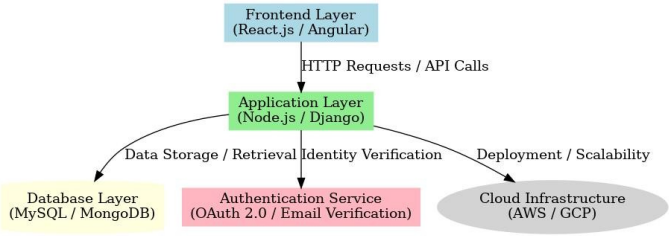

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Fig. 1. System Architecture

3) Data Layer (Database + Cloud):
- MySQL is being used to store the relational data (user information and user projects) and MongoDB is being used to store unstructured data (chat, shared resources).
- The application is hosted using AWS/GCP Cloud, which provides the security and scalability. If the traffic was sufficiently large, auto-scaling and load balancing techniques would be applied.

C) ER Model Entities

- Student (Entity)
  - Student _ ID (PK), Name, Email, Password (hashed), Verified Credentials
- Profile
  - Details: Institution, Skills, Interests,achievements, Certifications, Resume
- Project
  - Project _ ID (PK), Title, Description, Team Members, Tasks, File/File Uploads
- Event/Internship
  - Event_ID, Title, Type (Hackathon, Workshop, In- ternship), Organizer, Due Date, Location/Online
- Connection
  - Connection_ID, Request _ Status(Pend- ing/Accepted/Rejected), Student _ ID1 Student_ID2
- Messaging/Chat
  - Chat_ID, Sender_ID, Receiver _ ID, Message,Timestamp (used for direct communication between students)
- Post/Feed
  - Post_ID, User_ID who is the author, content (text, image, video), Any Likes, comments, shares (Students can share any updates, opportunities, and achievements)
- Notification
  - Notification _ ID, User _ ID, Types (message, connec- tion request, event reminder, project update), Seen (Yes/No).
- Skill Endorsements/Recommendations
  Endorsements_ID, Student_ID, Skill, Endorsed_By (Like the endorsements on LinkedIn that add cred- ibility)

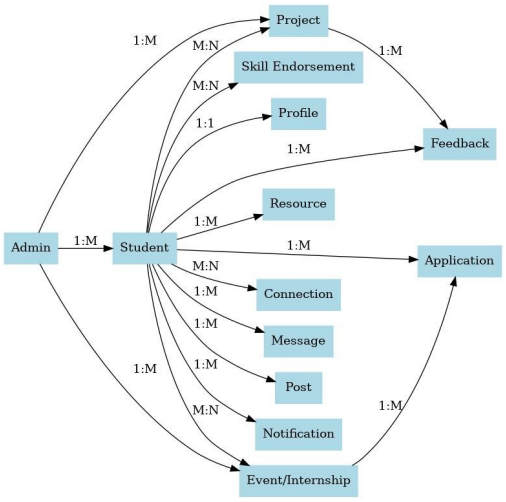

Fig. 2. ER Diagram

10) Learning/Resource Section
- Resource _ ID, Title, Category (PDF, Video, Notes,
  Roadmaps), Uploaded_By
  (students share study material, guides, roadmaps)

11) Job/Internship Applications
- Application _ ID, Student _ ID related to Event/Internship _ ID, Status (Applied, Shortlisted, Selected, Rejected).

12) Admin
- Admin _ ID, Role, Admins manage Users, Approve events/, handle reports.

13) Feedback/Rating System
- Feedback _ ID, Student _ ID, Project _ ID/Event _ ID; Rating 1-5, Review (so students can review events, projects, internships)

D) Process Workflow

1) Registration Authentication:
- New users will register with their institutional email ID.
- Authentication will be provided using OAuth 2.0, which verifies who is accessing the Skill-Connect system.

2) Profile Creation:
- Students will create/update profiles declaring their skills, interests, and projects.
- The system will validate the data input and store that data in the database.

3) Networking:
- Students will look for peer students using multiple filters (skills, college, interests).
- A recommendation engine will filter only students with that skill set to recommend to the student.

4) Project Work:
A student can create or join a project group

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Fig. 3. workflow Diagram

- Tools will be provided for document sharing, chat- ting, and assigning tasks for collaboration and com- munication with each team member.

5) Events Internships:
- Students will receive notifications of events, hackathons and internships as well as register and track their engagements.

6) Collaboration Knowledge Sharing:
- Peer-to-peer collaboration will occur by group dis- cussion, discussion forum and forums of shared resources.

The functional process flow of Skill-Connect (Fig.3) is as follows.

E. Algorithms and Techniques

Recommendation Algorithm:

The platform utilizes a content-based filtering method to recommend comrades, projects, or events.

$$\text{Similarity}(A, B) = \frac{|\text{Skills}(A) \cup \text{Skills}(B)| - |\text{Skills}(A) \cap \text{Skills}(B)|}{|\text{Skills}(A) \cup \text{Skills}(B)| - |\text{Skills}(A) \cap \text{Skills}(B)|}$$

A and B are two students. We consider similarity based on skills, based on the skills they have in common.

1) Authentication & Security:

i. Token-based authentication is managed using OAuth 2.0.
ii. We verify an institutional email account to decrease the chances of fake profiles. All data will be encrypted using AES 256 encryption.

2) Scalability approach:

iii. Cloud services will manage auto-scaling, ensuring the platform works well during the peak of load (for example during hackathons).
iv. Load balancers will distribute requests evenly across the servers.

F. Development Methodology

The project was completed under an Agile development model, where the development process was separated by several different sprints.

Sprint 1: Requirement gathering & UI/UX design Sprint 2: Student profile & authentication module. Sprint 3: Networking module and project collaboration.

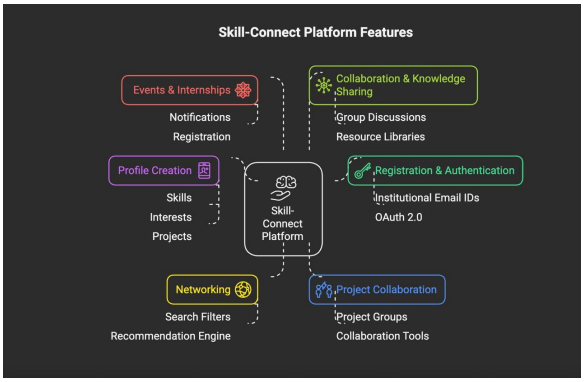

Fig. 4. Features of skill connect

Sprint 4: Events, internships & notification system.

Sprint 5: Cloud deployment & testing.

Each sprint incorporated collecting feedback from students, including enhancing some features, and utilized that feedback so that the platform aptly met students' requirements.

IV. Results

- Skill-Connect was developed using an iterative develop- ment process and a testing mind set with a cohort of students from multiple colleges. The beta version that they first submitted proved to be useful in terms of both data and measurable results.
- User Experience: A mobile-first and natural interface resulted in positive user experience feedback. Students were stating decisively that it was easy to create an account, search for peers, and engage in events together.
- Engagement: There were consistent usages during the piloting period, and the overwhelming majority of users were engaging in group chat, sharing ideas for projects and riffling around for various other opportunities, hacks, or workshops. This means that the engagement was successful for collaborative behaviours.
- Cross-College Interaction: Skill-Connect, unlike many university portals, facilitated users' ability to engage with students at other colleges, therefore forming distinct teams for competitions or entrepreneurial pursuits.
- Trust and Security: Email verification with student-ID verification to confirm authenticity, greatly reduced the spammers and less reputable or fake accounts, with confidence - Quite different to a vast improvement to the backchannels and ad hoc forums that were less formal or relaxed on social media.

System Performance: APIs, authentication components, and records functioned, during simultaneous users, as users searched for events and were able to connect

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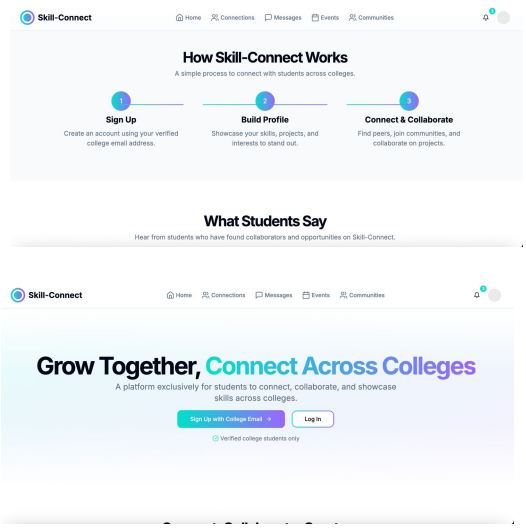

Fig. 5. skill Connect picture

to the database. Also, load testing showed satisfactory responsiveness.

V. DISCUSSION

The findings largely illustrate how Skill-Connect addresses existing platform gaps. Professional networks like LinkedIn serve more of a career and employer focus and ignore students who do not have prior work experience. Similarly, Internshala is an excellent site for linking students to internships but does not support peer-to-peer collaboration. In contrast, social media groups (e.g., Facebook, WhatsApp, and Telegram) offer accessibility, however also suffer from unverified users, spam, and no structure.

Skill-Connect is uniquely positioned because it fuses the benefits of these other platforms without the shortcomings. It is a unique ecosystem rooted in student-only verification identity and membership as well as structure such as project groups, forums, and event boards.

VI. CONCLUSION AND FUTURE SCOPE

A. CONCLUSION:

In this article, we discussed Campus Connect (Skill-Connect), a new platform designed to address the need for student-to-student collaboration across campuses. Current platforms and communities for skill development are either focused on open networking or the creation of employer- student ties. Linking student-to-student across institutions will benefit from our system which emphasizes verified academic identities, peer-to-peer academic networking, and structured access to collaborative opportunities.

The proposed methodology, requirements and cloud-based architecture outlined in this paper has demonstrated how a scalable and student-centric purpose-built platform can incor- porate student features (e.g., profiles by skill, project match- making, group collaboration, and event notifications). Through comparative review with other platforms We were able to review the limitations these platforms create for effective collaboration in addressing and a desire for a system that enables collaboration for academic innovation, peer learning and inclusiveness. Our proposed framework will work towards addressing these limitations and help build a more connected student network.

B. FUTURE SCOPE:

While the current version of Campus Connect aims to miti- gate challenges of inter-college collaboration, future iterations may greatly improve its functionality:

AI-based Student Recommendations - We could add ma- chine learning algorithms to provide functionality for peer, project, and internship recommendations based on academic interests and intersecting collaborations; more effectively and accurately matchmaking. [11]

Linking with Employment Websites / Recruiters - The system can be designed to connect to job sites, bridging col- laborative students to workplaces and ultimately opportunities to build their career. [12]

Video-based Networking and Collaboration - Adding a video conferencing feature will enable students to conduct hackathons, project discussions, and mentoring and supervi- sion sessions to keep the pace with online learning and remote collaborative work approaches that continue to trend upward. [13]

Gamifying / Credentialing Student Engagement - We can build a rewards system that may include digital badges and leader boards to capture students' connection efforts and to expand student engagement - we will soon see these systems adopted into online learning environment by the educational technology sphere. [14]

International Collaboration - If adapted for global scale, we might enable students from anywhere in the world to col- laborate on research, innovation or entrepreneurship projects, creating a greater, more diverse and multicultural learning community - a major theme that is emerging in strategic learning. [15]

In conclusion, the design of the proposed Campus Con- nect platform is a step toward addressing the issue of inter- institutional collaboration. Because it is scalable and the potential for AI, video-based interaction platforms and linking to employment opportunities, the Campus Connect platform is designed for the future.

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