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Smart Collaborative Platform for Connecting Ideas with Skills (IDEAMATCH)

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Abstract: ***In the present academic environment, the formation of efficient teams for technical projects is a major problem. Students with innovative ideas may not find suitable collaborators for the projects, while students with the required technical skills may not find appropriate projects where they can apply their skills. This research aims to develop an intelligent collaboration platform named IdeaMatch, which helps to bridge the gap by efficiently matching the project ideas with the required skills. To achieve this, the proposed platform utilizes web technologies along with Natural Language Processing techniques to analyze the project ideas and the skills of the users. Based on the analysis, the best collaborators for the projects can be determined. In this research, the proposed system design for the IdeaMatch platform is based on a three-tier architecture, where the front end is based on React, the back end is based on ASP.NET Core, and the database is based on MySQL. From the experimental results, it is clear that the time required for team formation can be reduced significantly using the proposed intelligent collaboration platform.***

Keywords: Collaboration Platform, Skill Matching, Natural Language Processing, Academic Projects, Team Formation

I. INTRODUCTION

Collaboration is an important factor in modern technological innovation and research activities. In academic and other educational institutions, students often generate innovative ideas but are not able to convert those ideas into actual project implementations because of the lack of appropriate collaborators. At the same time, there are students with appropriate technical skills who want to enhance their skills by participating in appropriate project implementations. This situation often leads to inefficient team formations, increased project development time, and project failures. IdeaMatch is proposed as an online collaboration tool that efficiently connects students with innovative project ideas and those possessing appropriate technical skills. It is expected that IdeaMatch will provide a central platform where students can present their ideas and technical skills, thus facilitating the process of team formations efficiently. To efficiently form project teams, IdeaMatch is proposed with appropriate automated skill matching techniques. Instead of random team formations or using social networks, IdeaMatch proposes an innovative approach to forming appropriate project teams using technology.

II. LITERATURE REVIEW

Previous studies on collaborative learning stress the significance of diversity of skills and team formation in achieving successful outcomes of collaborative projects.

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Studies on team formation and dynamics show that teams formed based on diversity of skills perform better compared to those formed randomly. Recent developments in artificial intelligence and machine learning technologies have made it possible to create intelligent systems that can analyze user profiles and make recommendations on suitable connections. Natural Language Processing techniques can be used to obtain relevant information from user textual information.

Several collaborative systems have been proposed to facilitate collaborative working among professionals; however, most of these systems may not be suitable for academic environments. In addition, current collaborative systems lack intelligent matching mechanisms to match users based on their expertise, interest, and availability. The IdeaMatch collaborative platform is based on the above-mentioned concepts but has incorporated AI-based skill analysis and recommendation technologies to facilitate collaborative working among students.

III. PROPOSED SYSTEM

The proposed system introduces a web-based platform designed to facilitate collaboration between idea creators and skilled contributors. Users begin by creating detailed profiles that include their technical skills, interests, and availability. Project creators can then post descriptions of their ideas along with the skills required for implementation.

Once a project is posted, the platform analyzes both the project requirements and user skill profiles using a matching algorithm. Compatibility scores are calculated to identify individuals whose expertise aligns closely with the project's needs. The system then recommends potential collaborators to the project creator. By automating the process of identifying suitable team members, the platform reduces the time and effort required to form project teams and improves the likelihood of successful project completion.

IV. SYSTEM ARCHITECTURE

The architecture of the IdeaMatch system is based on the three-tier architecture concept. This concept divides the system architecture into the user interface components, the application components, and the data management components. This approach enables the system to remain scalable as well as secure. The presentation component of the system is the part where the user interface is defined. This component enables the user to interact with the system through various functionalities. Some of the functionalities include the creation of profiles, the posting of ideas, as well as the searching of collaborators. This component is designed to use the best technologies available for creating the user interface.

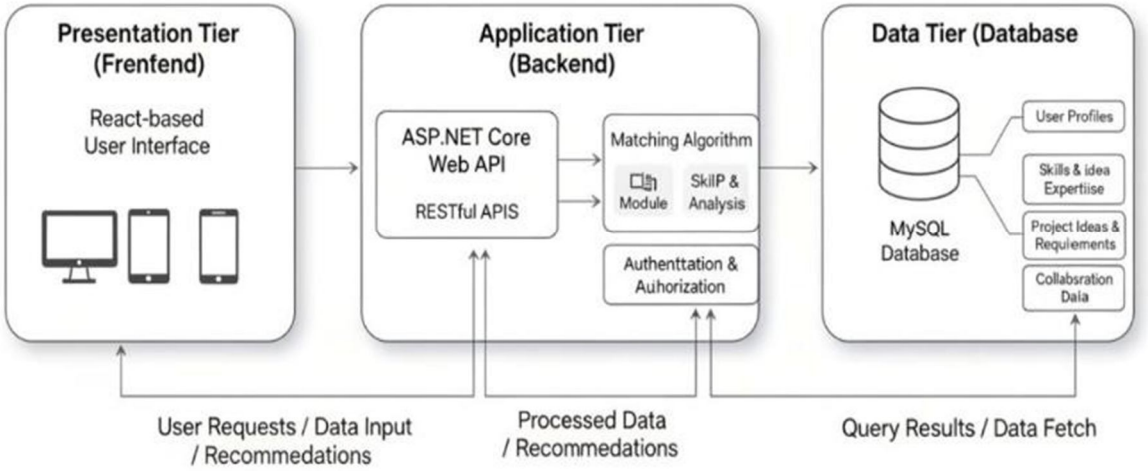


Figure 1: System Architecture

The application component of the system is the main processing component of the system. This is the part of the system where the user is authenticated. The component is also used to process the project as well as the skills information. Moreover, the component is used to match the project ideas with the collaborators. The backend of the system processes the request from the frontend. The backend of the system applies the matching concept to identify the users who have the appropriate skills to collaborate in the project. This component is the main part of the system where all the processes of the system take place. The data component of the system is the part where all the information of the system is stored. A database system is used to organize the data in the system. The system is designed in a way that the data is stored in the database in a well-structured manner. The system retrieves the data from the database when the need arises.

Communication between the components of the system is done through the use of APIs.

Besides the above components of the system architecture, the system is designed in a modular way. This enables the different components of the system to operate independently. These components include the user management component, the idea management component, as well as the matching component. The system is designed in a way that the components operate as a single entity. This enables the system to update easily in the future. The system can update to include new components such as AI systems or the development of mobile applications.

V. METHODOLOGY

The development of the IdeaMatch platform follows an iterative methodology combining elements of Agile development and structured system design. Initially, requirement analysis is conducted through student surveys and discussions to identify common challenges in project collaboration. Following the analysis phase, system design is carried out by creating database schemas, architectural models, and interface wireframes. The implementation phase involves developing backend APIs, designing the frontend interface, and integrating the matching algorithm.

Testing procedures include unit testing, integration testing, and usability evaluation to ensure that the system performs reliably under real-world conditions. Feedback from pilot users is used to refine the platform and improve matching accuracy.

VI. RESULTS AND DISCUSSION

The implementation of the IdeaMatch platform is expected to significantly improve the efficiency of team formation in academic institutions. Automated matching algorithms can reduce the time required to identify collaborators while increasing the probability of forming well-balanced teams.

By encouraging interdisciplinary collaboration, the system can also promote knowledge sharing between students from different technical backgrounds. This approach not only enhances learning outcomes but also helps students develop practical experience in teamwork and project management. The platform may serve as a digital innovation hub within universities, enabling students to transform conceptual ideas into functional prototypes through effective collaboration.

VII. CONCLUSION

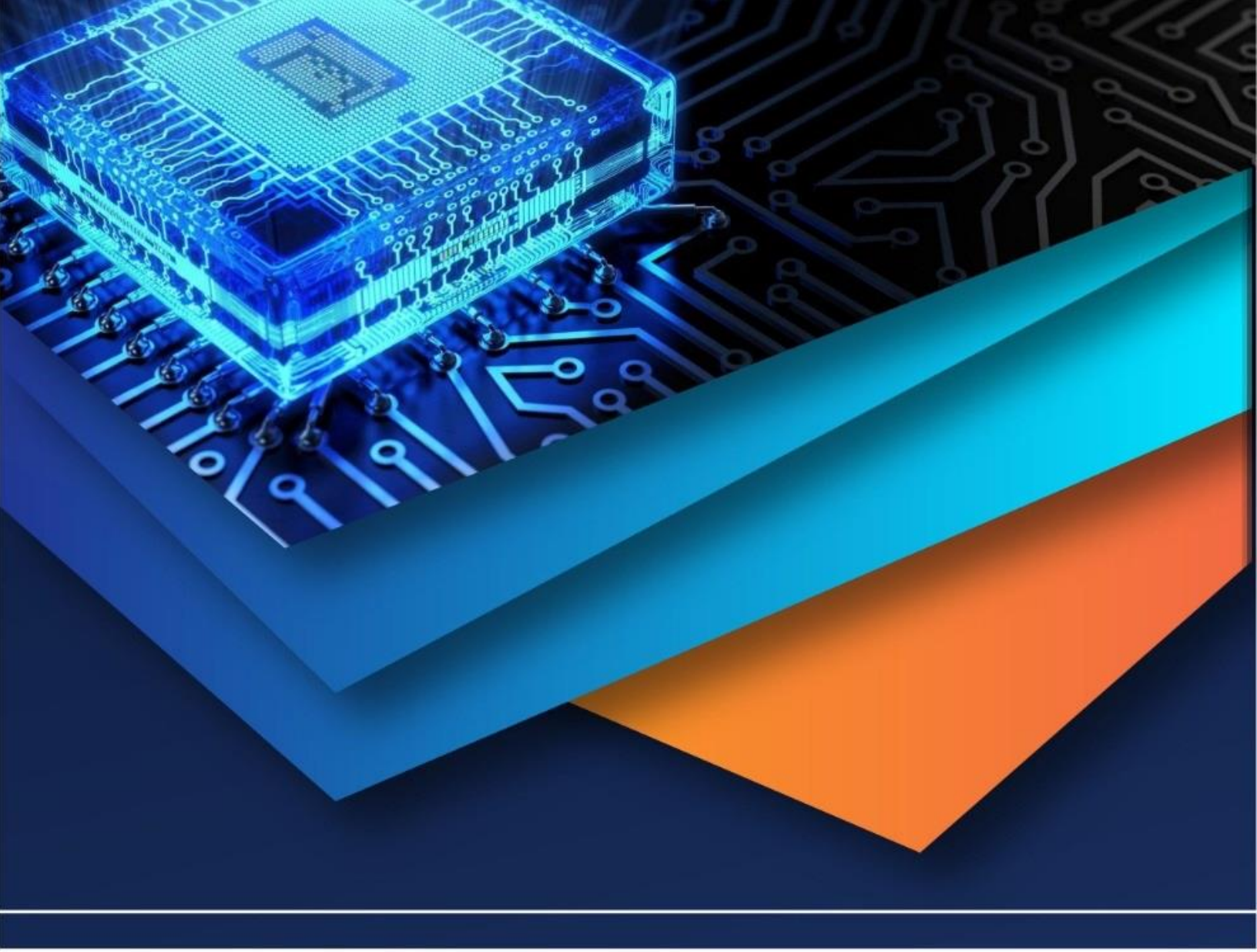
This research presents IdeaMatch, an intelligent collaboration platform designed to bridge the gap between innovative ideas and technical expertise among students. By combining modern web technologies with automated skill-matching mechanisms, the system offers an efficient approach to forming project teams within academic environments. The proposed architecture ensures scalability, security, and ease of use, making the platform suitable for deployment within universities and research communities. Future improvements may include advanced machine learning models for more accurate matching, mobile application support, and integration with institutional learning management systems.

Overall, IdeaMatch demonstrates the potential of technology-driven collaboration systems in fostering innovation, improving project success rates, and strengthening student engagement in practical learning.

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