



SkillBridge-AI Enabled Skill Exchange Platform.

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Abstract – SkillBridge is an AI-enabled skill exchange platform designed to connect individuals who want to learn new skills with those willing to teach them, creating a collaborative peer-to-peer learning ecosystem. The platform leverages artificial intelligence to analyze users' skill profiles, interests, and learning goals, and then intelligently matches learners with suitable mentors or peers. Instead of relying solely on monetary transactions, SkillBridge encourages a skill-bartering model where users can exchange knowledge—for example, a user proficient in graphic design can teach design in exchange for learning coding or language skills. The AI system continuously improves recommendations by analyzing user interactions, feedback, and learning progress, ensuring more accurate and meaningful matches over time. The platform also includes features such as skill verification, reputation scores, scheduling tools, and progress tracking to enhance trust and efficiency. By democratizing access to knowledge and promoting collaborative learning, SkillBridge aims to bridge the gap between people with skills and those seeking them. This model supports lifelong learning, community engagement, and cost-effective education while empowering individuals to grow personally and professionally through mutual knowledge sharing.

Keywords: Artificial Intelligence, Peer-to-Peer Learning, Skill Matching, Collaborative Learning, Knowledge Sharing, EdTech Platform, Lifelong Learning.

I. INTRODUCTION

In today's rapidly evolving digital world, the need for continuous learning and skill enhancement has become more important than ever. Technological advancements, changing industry requirements, and increasing global competition require individuals to regularly update their knowledge and abilities. However, many people face challenges in accessing quality education due to high costs, limited resources, or geographical limitations. At the same time, there are many individuals who possess valuable skills and knowledge but lack opportunities or platforms to share them with others. This imbalance creates a gap between those who want to learn and those who are capable of teaching.

SkillBridge is an AI-powered skill exchange platform developed to address this issue by creating a collaborative environment where users can both teach and learn from each other. The platform encourages a skill-sharing and skill-bartering model, where users exchange their expertise instead of relying solely on financial payments. For instance, a user who is skilled in graphic design could teach design concepts to another user in return for learning programming, digital marketing, language skills, or other areas of interest. This approach makes learning more affordable, interactive, and community-driven.

Artificial Intelligence is a key component of the SkillBridge platform. The system analyzes users' profiles, including their existing skills, interests, and learning goals, to identify the most suitable learning partners. Using machine learning techniques, the platform continuously improves its matching process by studying user feedback,

interaction patterns, and learning progress. As a result, users receive more accurate and personalized recommendations over time, improving the overall learning experience.

To ensure a trustworthy and efficient platform, SkillBridge incorporates several supportive features. These include skill validation processes, reputation and rating systems, scheduling options for sessions, progress monitoring tools, and communication features that enable smooth interaction between users. Such functionalities help build confidence within the community and ensure effective knowledge exchange.

Additionally, the platform promotes the idea of lifelong learning, which is essential in today's fast-changing professional landscape. By providing a flexible and cost-effective learning environment, SkillBridge allows individuals from different backgrounds to acquire new skills and improve their career opportunities.

In summary, SkillBridge aims to connect individuals who possess valuable knowledge with those who are eager to learn. By combining artificial intelligence with a collaborative skill exchange system, the platform encourages knowledge sharing, community participation, and accessible learning opportunities for people around the world.

II. Related Works

SkillMesh: A Peer-to-Peer Platform for Collaborative Skill Exchange Abhijit Dnyaneshwar Jadhav, Avani Ray,



Ashish Satish Awale, Rohan Uddhav Patil, Gaurav Pramod Latpate, Srushti Pradeep Patil presents SkillMesh, a peer-to-peer platform designed to connect learners with mentors for collaborative skill development. The system focuses on personalized learning by allowing users to create skill profiles and connect with individuals who possess complementary expertise. Unlike traditional e-learning systems that rely on pre-recorded lectures, the platform emphasizes interactive and community-driven learning. The study demonstrates how algorithm-based matching can help users discover suitable learning partners. It also highlights the importance of building supportive learning communities that encourage knowledge sharing and continuous skill development in the digital era.

Peer-to-Peer Skills and Knowledge Exchange Platform: M. Bhagya Meena Sri

This research proposes a peer-to-peer knowledge exchange platform that enables individuals to share and learn skills collaboratively. Users can create profiles, specify their skill levels, and connect with others interested in similar learning goals. The system incorporates a skill-assessment mechanism to categorize users based on proficiency levels, ensuring effective collaboration between learners and mentors. The platform also supports real-time interaction features such as communication tools and collaborative learning activities. The study emphasizes how peer-based knowledge sharing can transform traditional education models by making learning more accessible, interactive, and community-driven.

Skill Swap App: Optimizing Peer-to-Peer Skill Exchange: Sameeksha Pakhare, Ahillya Patil, Siddhi Naik, Prof. Charmi Kasundra, Prof. Mayuri Narudkar introduces Skill Swap, a platform designed to enable users to exchange knowledge without financial transactions. The system focuses on identifying compatible users based on their skill levels, interests, availability, and feedback ratings. It employs a database-driven architecture using technologies such as Python and MySQL for backend operations. The platform reduces the effort required to find suitable mentors and encourages collaborative learning among students and professionals. The research highlights the potential of skill-bartering systems to make education more affordable and accessible while fostering a supportive learning community.

Learn and Let Learn: An Intelligent Peer-to-Peer Skill Exchange Platform: Harshal Sonawane, Nayan Sahane, Vivek Patil, Keshav Salunkhe (Guided by Dr. Ompal Singh) proposes Learn and Let Learn, an intelligent skill exchange platform designed to promote collaborative learning. The system allows users to act as both learners and mentors, enabling mutual knowledge exchange. A hybrid recommendation mechanism combining collaborative filtering and profile-based matching is used to suggest suitable learning partners. The platform aims to overcome the limitations of instructor-centric learning

systems by enabling peer-driven learning experiences. The authors highlight how personalized recommendations and user feedback systems can improve engagement and create an efficient knowledge-sharing ecosystem.

A Mobile-Based Collaborative Learning Application for Peer-to-Peer Skill Swap Among University Students Authors: (JISRT research team; includes multiple contributors from educational technology research)

This research focuses on a mobile application for peer-to-peer skill exchange among university students. The platform was developed using Flutter and Firebase to provide an accessible learning environment for students with limited educational resources. A bidirectional matching algorithm connects learners with complementary skill sets, achieving high accuracy in pairing suitable participants. The system demonstrated strong performance with high message delivery success rates and positive user feedback during testing. The study concludes that digital peer-learning platforms can significantly improve access to education and encourage collaborative skill development within academic communities

Dynamic Peer Learning Recommendations in E-Learning Using Hybrid Collaborative Filtering and Interaction-Based Clustering

Authors: Dazzle A. J., Dishant Naik, Parvathi R., Pattabiraman V.

This paper explores dynamic recommendation techniques for peer learning in e-learning environments. The authors propose a hybrid system that combines collaborative filtering with interaction-based clustering to improve peer matching accuracy. Traditional recommendation systems often rely on static interaction data; however, this research incorporates contextual factors such as learner roles, engagement levels, and learning progress. The model adapts over time as more user interactions occur, providing personalized peer recommendations. The research demonstrates how machine learning techniques can enhance collaborative learning platforms by improving learner engagement and knowledge exchange efficiency.

RiPPL: A Crowdsourced Adaptive Platform for Recommendation of Learning Activities:

Hassan Khosravi, Kirsty Kitto, Joseph Jay Williams RiPPL is a crowdsourced peer-learning platform designed to recommend personalized learning activities based on students' knowledge levels. The platform allows learners and educators to contribute learning resources, which are then analyzed using adaptive algorithms to suggest suitable activities. RiPPL integrates concepts from learning analytics, crowdsourcing, and adaptive learning technologies. A pilot implementation with university students showed measurable improvements in learning outcomes and positive user perceptions. The study demonstrates how collaborative content generation and



intelligent recommendation systems can support scalable and personalized learning environments.

Advancing Peer Learning with Learning Analytics and Artificial Intelligence: Omid Noroozi, Christian Schunn, Bertrand Schneider, Seyyed Kazem Banihashem discusses how artificial intelligence and learning analytics can enhance peer learning environments in higher education. The authors analyze emerging educational technologies that support collaborative knowledge sharing and provide adaptive feedback to learners. AI tools can track student interactions, evaluate learning patterns, and offer recommendations to improve collaboration and engagement. The paper highlights the importance of integrating intelligent technologies into peer-learning systems to address challenges such as large class sizes and limited instructor support. It concludes that AI-driven analytics can significantly improve learning outcomes and collaborative learning effectiveness.

Human-AI Collaboration Enables More Empathic Conversations in Peer-to-Peer Support

Authors: Ashish Sharma, Inna W. Lin, Adam S. Miner, David C. Atkins, Tim Althoff

This study investigates how AI systems can enhance peer-to-peer communication and collaboration in online support platforms. The authors developed an AI-assisted system that provides real-time feedback to participants during conversations, helping them respond more effectively and empathetically. Experimental evaluation showed that AI-supported conversations improved empathy levels by nearly 20%. Although the research focuses on mental-health support communities, its findings demonstrate the potential of AI to enhance human interactions in peer-learning platforms by guiding users and improving communication quality.

AI-Powered Skill Matching System Using Natural Language Processing

Authors: Ahmed Raza, Emily Wong, Vikram Sinha

This paper proposes an AI-based skill-matching system that uses Natural Language Processing (NLP) to analyze user profiles and match individuals based on their expertise and learning needs. The system processes textual descriptions of skills and requirements to identify the most compatible learning partners. By automating the matching process, the system improves efficiency and reduces manual effort in finding suitable mentors or collaborators. The authors emphasize the role of AI in improving the accuracy of skill-matching platforms, although challenges remain in interpreting complex or ambiguous skill descriptions.

III. Proposed Method

The proposed system, SkillBridge, is an AI-enabled digital platform designed to connect individuals who are willing to share and learn skills from each other in a collaborative environment. Unlike traditional job portals or learning platforms, SkillBridge focuses on skill exchange, where

users can both teach and learn without monetary barriers. The platform leverages Artificial Intelligence, recommendation algorithms, and user profiling to create an intelligent ecosystem that matches learners with suitable mentors based on their skills, interests, and availability.

In this system, users register on the platform by creating a detailed skill profile that includes their expertise, skills they wish to learn, experience level, preferred learning mode (online/offline), and availability. The AI engine analyzes these profiles using machine learning techniques to identify compatible users for skill exchange. For example, a user proficient in graphic design can teach design skills to someone who can, in return, teach programming or digital marketing. This reciprocal learning approach promotes collaborative knowledge sharing.

The platform includes an AI-powered recommendation system that continuously analyzes user behavior, ratings, completed sessions, and interests to suggest the most relevant skill partners. Natural Language Processing (NLP) is used to analyze skill descriptions and ensure accurate matching between learners and mentors. The system also includes a smart matching algorithm that ranks potential partners based on compatibility score, skill relevance, and user feedback.

SkillBridge integrates a secure communication and collaboration module where users can schedule sessions, conduct video meetings, share learning materials, and track progress. The platform maintains a learning dashboard that records completed skill exchanges, session feedback, and skill progress metrics. Gamification features such as badges, points, and achievement levels motivate users to actively participate and maintain high-quality interactions. To ensure trust and credibility, the system incorporates a verification and rating mechanism. After each skill exchange session, participants can rate and review each other, which helps the AI model improve future recommendations. Additionally, AI-based moderation helps detect spam profiles, fake accounts, or inappropriate behavior, thereby maintaining platform integrity.

The architecture of the proposed system consists of a user interface layer, AI recommendation engine, skill database, communication module, and security layer. Cloud-based storage is used to maintain scalability and support a large number of users. The system is designed to be accessible through both web and mobile applications, ensuring convenience and flexibility for users.

Overall, SkillBridge aims to create a community-driven learning ecosystem where people can exchange knowledge efficiently. By integrating AI-driven matchmaking, collaborative tools, and user feedback mechanisms, the platform enhances accessibility to skill development and encourages lifelong learning through peer-to-peer interaction.

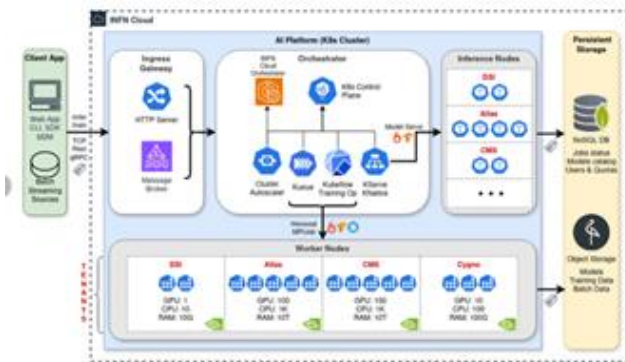


Figure.1.System Architecture

The SkillBridge – AI Enabled Skill Exchange Platform is designed using several functional modules that collectively enable efficient skill sharing and learning among users. Each module performs a specific task to ensure smooth operation of the platform and to enhance user experience.

User Registration and Profile Management Module

This module allows users to create and manage their accounts on the platform. During registration, users provide personal details, professional background, skills they can teach, and skills they wish to learn. The system also allows users to update their profiles, add certifications, and set their availability for skill exchange sessions. This module forms the foundation for building a personalized learning environment and helps the AI engine understand user preferences.

Skill Listing and Management Module

The skill listing module enables users to add, edit, and categorize their skills in the platform database. Skills are organized into different domains such as technology, arts, business, communication, and more. This structured skill database helps the system efficiently identify potential skill exchange partners. It also allows users to search for specific skills they want to learn.

AI-Based Skill Matching Module

This module is the core component of the platform. It uses Artificial Intelligence and machine learning algorithms to analyze user profiles, skill requirements, and preferences. Based on this analysis, the system recommends suitable skill partners who can exchange knowledge with each other. The matching process considers factors such as skill compatibility, user ratings, availability, and past learning interactions to generate accurate suggestions.

Communication and Collaboration Module

This module provides tools that allow users to interact and conduct skill exchange sessions. It includes messaging features, video conferencing support, file sharing, and session scheduling. These features enable effective communication between learners and mentors, making the knowledge exchange process more interactive and productive.

Feedback and Rating Module

The feedback module helps maintain quality and trust within the platform. After completing a skill exchange session, users can rate and review their partners based on their experience. The collected feedback is used by the AI system to improve future recommendations and maintain credibility among users.

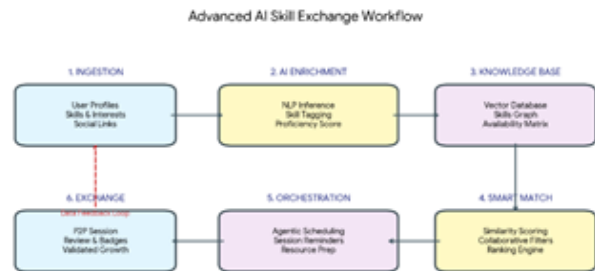


Figure.2.Methodology workflow of the Skill Exchange Platform

Overall Working Flow of the Proposed System:

The SkillBridge – AI Enabled Skill Exchange Platform operates through a systematic workflow that enables users to share and learn skills efficiently. The workflow begins with user onboarding and continues through skill matching, interaction, and feedback, creating a continuous learning ecosystem supported by Artificial Intelligence. The process starts with user registration and profile creation. New users sign up on the platform by providing basic personal details such as name, email, and professional background. During profile creation, users specify the skills they possess and the skills they wish to learn. They may also include additional details such as experience level, preferred learning method, availability schedule, and learning goals. This information forms the foundation for building a personalized user profile within the platform database.

Once the user profile is created, the system stores all skill-related data in a centralized skill database. The platform categorizes skills into different domains such as programming, design, communication, business, arts, and others. This structured storage enables efficient data retrieval and supports the intelligent matching process.

After profile completion, the AI-based matching engine analyzes the stored information to identify compatible users for skill exchange. The algorithm compares the skills offered by one user with the skills requested by another. Based on factors such as skill compatibility, experience level, user preferences, availability, and past interactions, the system generates a list of recommended partners. Each recommendation is ranked according to a compatibility



score to ensure the best possible match. When a suitable match is found, users can initiate contact through the platform's communication and collaboration tools. The system provides messaging features, session scheduling, and integrated video meeting options. Users can discuss learning objectives, set meeting times, and exchange resources such as documents, tutorials, or practice exercises. These collaborative tools make the learning process interactive and efficient.

During the skill exchange sessions, users participate in peer-to-peer learning where one user teaches a particular skill while learning another in return. The system tracks session progress and maintains records in the learning dashboard, which allows users to monitor completed sessions, acquired skills, and overall progress.

After the completion of each session, users provide feedback through the rating and review system. The feedback helps evaluate the quality of the interaction and contributes to building trust within the platform. The AI system continuously analyzes these reviews and user activity patterns to improve the accuracy of future skill matching recommendations.

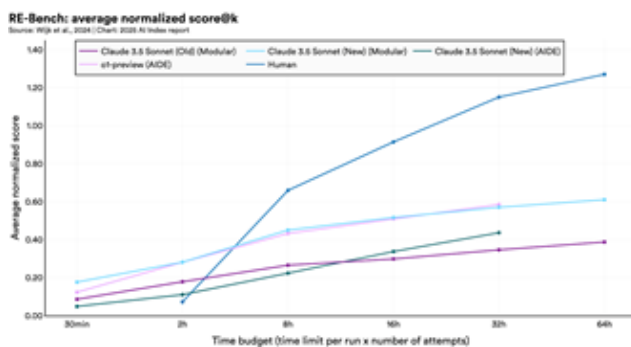


Figure.3. Performance Evaluation of Multimodal Emotion Detection Framework

$$CS = w_1S_m + w_2E_m + w_3A_m + w_4R_u$$

The Skill Compatibility Score (CS) equation is used to determine how well two users match for a skill exchange on the SkillBridge platform. In this formula, S_m represents the similarity between the skills offered and the skills requested, E_m indicates the experience level match between users, A_m refers to availability compatibility, and R_u denotes the user's rating or reputation score. The variables $w_1, w_2, w_3,$ and w_4 are weighting factors that determine the importance of each parameter in the matching process. The final compatibility score helps the AI system rank potential partners and recommend the most suitable skill exchange pairs.

$$Similarity(A, B) = \frac{A \cdot B}{\|A\| \|B\|}$$

Cosine similarity is used in the SkillBridge platform to measure the similarity between two users' skill profiles. Each user's skills are represented as vectors in a multidimensional feature space where each dimension corresponds to a particular skill. The cosine similarity formula calculates the cosine of the angle between the two vectors A and B. If the value is close to 1, the skill sets are highly similar, while values closer to 0 indicate low similarity. This method is effective in recommendation systems because it focuses on the orientation of the vectors rather than their magnitude, enabling accurate identification of users with complementary skills.

V. Conclusion

The SkillBridge – AI Enabled Skill Exchange Platform provides an innovative approach to collaborative learning by enabling individuals to share and acquire skills through a structured digital environment. The system leverages artificial intelligence to intelligently match users based on their skills, interests, availability, and learning goals. By integrating AI-driven recommendation algorithms, communication tools, and feedback mechanisms, the platform creates an efficient ecosystem where knowledge can be exchanged in a mutually beneficial manner.

The proposed system addresses the limitations of traditional learning platforms by promoting peer-to-peer knowledge sharing instead of one-directional teaching models. Users can both teach and learn, making the platform flexible and inclusive for people with different expertise levels. The integration of rating systems and performance tracking ensures transparency and helps maintain the quality and reliability of skill exchange sessions.

Furthermore, the platform encourages continuous learning and community engagement through interactive sessions, progress tracking dashboards, and AI-based recommendations. These features enhance user participation and help individuals improve their professional and personal skills effectively.

Overall, SkillBridge contributes to building a collaborative learning community where knowledge becomes accessible and transferable without financial barriers. The use of advanced technologies such as artificial intelligence and data-driven recommendations improves the efficiency of partner matching and enhances the overall user experience. This platform has the potential to support lifelong learning, promote skill development, and create a dynamic knowledge-sharing ecosystem for individuals across various domains.



VI. Future Work

The SkillBridge – AI Enabled Skill Exchange Platform can be further enhanced by incorporating several advanced technologies and features to improve its efficiency, scalability, and user experience. One potential direction for future work is the integration of advanced machine learning and deep learning algorithms to enhance the accuracy of skill matching and recommendation systems. By analyzing user behavior, learning patterns, and engagement history, the system can provide more personalized and intelligent suggestions for skill exchange partners.

Another important enhancement is the integration of Natural Language Processing (NLP) to better understand user profiles, skill descriptions, and communication patterns. This would allow the system to identify hidden relationships between skills and recommend more relevant learning opportunities. Additionally, implementing multilingual support would make the platform accessible to users from diverse linguistic backgrounds, enabling global participation.

Future development could also include the introduction of blockchain technology to create a secure and transparent system for skill certification and verification. This would allow users to store verified digital credentials and build trusted skill portfolios. Furthermore, the integration of mobile applications and real-time collaboration tools such as live workshops and group learning sessions would enhance user interaction.

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