D. Y. Patil College of Engineering, Akurdi, Pune-44.
Department of Computer Engineering

SYNOPSIS

Group no – 20

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B.E. Computer Engineering SEM-I

Title : SkillBridge: AI-Powered Career Development and Job Readiness Platform

- **TECHNICAL KEYWORDS :**

1. AI-Powered Platform
2. Job Readiness
3. Skill Matching Resume
4. Analysis Mock Interview
5. NLP
6. Machine Learning
7. Career Recommendation
8. User Profiling
9. Keyword Extraction and Weighting
10. Machine Learning Algorithms
11. Semantic Similarity Scoring
12. Skill Gap Detection
13. Interview Simulation
14. Applicant Tracking System (ATS) Optimization

➢ RELEVANCE OF WORK:

In today's fast-paced world, getting the right job isn't just about having a degree. It's about having the right skills, knowing how to present them well, and being fully prepared for every step of the hiring process. But for many students and young professionals, that's where things get tough. Even after finishing their education, a lot of them feel lost. They're not sure which roles are the right fit, what skills they're still missing, or how to approach interviews with confidence. As a result, they often end up underemployed or missing out on great opportunities. This doesn't happen because they lack talent, but because they lack clear direction.

That's where our project, SkillBridge, comes in. We created it to solve this very problem. SkillBridge is designed to be a complete career companion. It doesn't just list jobs. It helps users discover roles that genuinely match their skills, highlights areas where they can improve, and offers tailored upskilling paths. It also helps them build stronger resumes, track their learning progress, and prepare for interviews with realistic mock sessions. In simple terms, it supports users from the moment they begin exploring their options to the point where they're confidently applying for jobs.

This is especially important today, as more and more companies are moving toward skill-based hiring practices. Platforms like SkillBridge give fresh graduates, final-year students, and even career changers a fair shot regardless of their background. Colleges can use it to enhance their placement programs, and recruiters benefit from a more job-ready pool of candidates.

By making job readiness more personal, structured, and accessible, SkillBridge helps close the gap between education and employment. It gives more people the tools they need to move forward and build meaningful careers.

➢ REVIEW OF LITERATURE:

Sr. No	Title and Author	Conference / Journal Name & Publication Year	Topic Reviewed/ Algorithms or Methodology used	Advantages and Disadvantages
1	SkillForge AI-Powered Learning & Placement Platform - Krishnan, S. et al.	2025 11th ICCSP, IEEE	AI-powered platform for learning and placement using personalized learning pathways and skill tracking.	**Advantages**: Personalized learning, integrated placement support. **Disadvantages**: High implementation complexity, dependent on accurate profiling.
2	AI knows you: Prediction of extroversion trait - Naz, A. et al.	IEEE Access, 2024	Deep learning model (CNN) for personality trait prediction using social media/textual data.	**Advantages**: Predicts personality traits effectively. **Disadvantages**: Privacy concerns, needs large labeled data.
3	Contribution of Job Readiness Application - Nurmalasari, R.	2021 7th ICEEIE, IEEE	Survey-based analysis using regression on job readiness factors and competency mapping.	**Advantages**: Provides empirical insight into education-employment gap. **Disadvantages**: Limited to certain demographics or regions.
4	Prediction of Student Job Readiness - Gemilang, H. et al.	2024 ICoDSA, IEEE	MLP and XGBoost to predict job readiness from student performance metrics.	**Advantages**: High prediction accuracy with ensemble models. **Disadvantages**: Data quality sensitive, model interpretability low.

5	Enhancing Career Readiness - Jiranantanagorn, P.	2023 CSDE, IEEE	Online platform for competency assessment and matching with workplace preferences.	**Advantages**: Facilitates self-assessment and employer matching. **Disadvantages**: Requires regular platform updates and employer participation.
6	Collaborative Mock Interview Platform - Ahmad, M.M. et al.	2024 OTCON, IEEE	Web-based mock interview with collaborative tools, AI feedback.	**Advantages**: Real-time collaboration, useful for preparation. **Disadvantages**: Quality dependent on AI feedback system.
7	Virtual Job Interview Simulator - Rao, G.S. et al.	2025 ICOEI, IEEE	NLP-based virtual interviewer using real-time text and audio processing.	**Advantages**: Simulates real interviews, improves confidence. **Disadvantages**: NLP limitations may affect accuracy.
8	Intelligent Resume Recommendation - Mishra, A. et al.	2024 ICCCNT, IEEE	NLP-based resume parser and recommender with feedback system.	**Advantages**: Provides personalized resume improvements. **Disadvantages**: May overlook creative/unique formats.
9	AI-Powered Mock Interview Platform - Sharma, T. et al.	2025 ICSSAS, IEEE	Combines Computer Vision, NLP, and GenAI to simulate interviews and evaluate responses.	**Advantages**: Multi-modal analysis of interview performance. **Disadvantages**: High resource consumption.
10	AI-Powered Resume Builder - Jha, R. et al.	2025 ICDT, IEEE	AI-based resume template recommender and content enhancer.	**Advantages**: Boosts application quality with intelligent suggestions. **Disadvantages**: May generate generic suggestions.

➢ PORPOSED WORK:

The project proposes an AI-powered career guidance platform called **SkillBridge**, designed to help students become job-ready through smart, personalized features:

- Users will sign up and build a profile based on their education, skills, and interests.
- An AI-based engine will assess their current skills and suggest suitable job roles.
- The platform will highlight skill gaps and recommend tailored learning paths to bridge them.
- A resume analyzer will help users align their resumes with job descriptions for better visibility.
- Mock interview modules will allow users to practice and receive feedback in a simulated environment.
- A dashboard will enable users to track their progress toward job readiness.
- Admin tools will be provided for colleges and recruiters to monitor student development and identify potential candidates.

➢ RELEVANT MATHEMATHICS IN THE PROJECT:

This project incorporates several mathematical concepts that are essential for accurate matching, evaluation, and recommendation within the platform. These include:

1. Skill Matching using Vector Similarity
Users and job descriptions are represented as multi-dimensional vectors based on their respective skills. Techniques such as cosine similarity, Jaccard similarity, and Euclidean distance are used to measure how closely a user's skill set aligns with the requirements of a job.

2. Keyword Weighting using TF-IDF
To analyze resumes and job descriptions, the Term Frequency-Inverse Document Frequency (TF-IDF) technique is used. This helps identify important and relevant keywords, while reducing the impact of common or less-informative terms.

3. Skill Gap Analysis
Mathematical set operations or matrix comparisons are used to determine the gap between a user's current skill set and the required skills for a job. This forms the foundation for personalized upskilling recommendations.

4. Score Normalization
Different rating scales (e.g., user-assessed skills, quiz scores) are normalized using techniques such as min-max scaling or z-score standardization. This ensures uniform comparison across varied metrics.

5. Learning Path Optimization
To guide users efficiently from their current skills to the required skill set, basic optimization algorithms such as greedy strategies or dynamic programming can be applied. These help in determining the most effective upskilling path.

6. Performance Evaluation using Descriptive Statistics
User performance in assessments and mock interviews is analyzed using statistical measures such as mean, median, standard deviation, and percentile ranks. These insights help determine a candidate’s job readiness level.

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