SKILLBRIDGE AI

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN **COMPUTER ENGINEERING**

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CERTIFICATE

This is to certify that the Mini Project entitled **" SKILLBRIDGE AI "** is a bonafide work of **Soham Parab(41), Sushanth Shetty(51), Vighnarth Nile(37), Atharva Sambhaji(47)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Computer Engineering" .**

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Head of Department

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Principal

Mini Project Approval

This Mini Project entitled "**SKILLBRIDGE AI"** by **Soham Parab(41), Sushanth Shetty(51), Vighnarth Nile(37), Atharva Sambhaji(47)** is approved for the degree of **Bachelor of Engineering** in **Computer Engineering.**

Examiners

1……
(Internal Examiner Name & Sign)

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(External Examiner name & Sign)

Date:

Place:

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1. Introduction

1.1. Introduction

The employment market demands not only relevant skills but also adaptability. Traditional job portals lack personalization and do not address skill gaps effectively.

Our Solution: An AI-powered platform to diagnose competencies, identify skill gaps, and provide personalized job recommendations.

Key Features:

AI-driven skill assessment

Personalized job and training recommendations

Real-time job market insights

Skills verification and certification

1.2. Motivation

The rapid advancements in technology and the evolving job market demand a dynamic system that bridges the gap between job seekers' skills and industry requirements. Many candidates struggle to identify their skill gaps, while employers face challenges in finding the right talent. This project aims to motivate the development of an intelligent platform that uses AI to enhance career development through targeted job recommendations, skill gap analysis, and personalized learning paths, ensuring candidates stay competitive in the market.

1.3. Problem Statement & Objectives

The core problem this project addresses is the lack of a centralized system that effectively evaluates candidates' competencies and suggests improvements. The objective is to create a smart employment platform that calculates a candidate’s profile score based on various factors like skills, experience, and certifications, offering AI-driven job recommendations, training pathways, and real-time insights into the labor market.

1.4. Organization of the Report

This report is organized into several key sections. It begins with an introduction to the project concept and motivation. Following this, the system's architecture, design, and methodology are detailed. Next, the implementation process is outlined, highlighting the algorithms and technologies used. The report concludes with a discussion on results, future work, and the overall contribution of the project.

2. Literature Survey

2.1. Survey of Existing System

Sr no.	Paper Name	Abstract	Conclusion
1	"Career Craft AI : A Personalized Resume Analysis and Job Recommendations System", 1st International Conference on Innovative Sustainable Technologies for Energy, Mechatronics, and Smart Systems, 2024	• Career Craft AI is a system integrated into the Level Up e-learning platform to enhance job search and resume optimization. • The system uses Support Vector Machine (SVM) algorithms and cosine similarity to classify users based on their skills and provide personalized job recommendations. • Natural Language Processing (NLP) techniques are employed to offer resume enhancement tips, improving job seekers' chances of being shortlisted.	Career Craft AI effectively enhances job search and resume optimization by utilizing SVM algorithms and NLP techniques. The system provides personalized job recommendations and resume improvement tips, benefiting both job seekers and recruiters. It proves to be a valuable tool in bridging the gap between candidate's skills and job market demands.
2	"Resume Building and Course Recommendation System", IEEE International Conference for Women in Innovation, Technology & Entrepreneurship, 2024	• An Android application was built to recommend jobs based on user's skills, preferences, and expertise in databases, frameworks, platforms, and languages. • The recommendations are generated using a content-based filtering ML model implemented in Python. • The app was developed using Kotlin, Jetpack Compose, Ktor, and designed with Material 3 Design Principles.	Through this project, we successfully developed a Job Recommendation system using a content-based filtering ML model.The Android app was built with Kotlin, Jetpack Compose, Ktor, FastAPI, and MongoDB, featuring an attractive, easy-to-use UI. The system simplifies job hunting by providing centralized, personalized job recommendations based on users' skills and interests, helping IT professionals evaluate their talents and explore various job options.

Sr no.	Paper name	Abstract	Conclusion
3	"Job and Course Recommendation System using Collaborative Filtering and Naive Bayes algorithms", 2nd International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation, 2023	• The paper introduces a job and course recommendation system that uses machine learning algorithms. • Specifically, the system employs Naïve Bayes and Collaborative Filtering algorithms to offer personalized recommendations. • The system suggests relevant courses and job opportunities based on student's skills, interests, and aspirations.	The recommendation system effectively provides personalized course and job recommendations based on user's academic and professional backgrounds.Integration with online learning platforms and job portals makes the system a valuable tool for improving career prospects.Future work could involve exploring additional data sources and expanding the system's features to enhance its effectiveness.
4	S. Gadegaonkar, D. Lakhwani, S. Marwaha, A. Salunke, "Job Recommendation System using Machine Learning", Third International Conference on Artificial Intelligence and Smart Energy, 2023	• This study addresses the gap between job seekers and recruiters by developing an Android app • The app uses a content-based filtering ML model to suggest jobs tailored to user's expertise in databases, frameworks and platforms. • The app is built using Kotlin, Jetpack Compose, and Ktor, and follows Material 3 Design Principles.	The project successfully developed a Job Recommendation system using a content-based filtering ML model.The app features an easy-to-use UI and provides personalized job recommendations based on user's skills and interests.The app simplifies the job-hunting process and helps IT professionals evaluate and explore job options.

2.2. Limitation Existing system or Research gap

Lack of Personalization: Generic job recommendations that do not consider individual career goals.

Ineffective Skill Gap Analysis: Job seekers remain unaware of specific skills needed for desired roles.

Limited Training Recommendations: Few platforms suggest personalized courses to bridge skill gaps.

Absence of Real-Time Insights: Lack of updated information on trending skills and job demands.

No Community Support: Lack of integrated networking and mentorship opportunities.

2.3. Mini Project Contribution

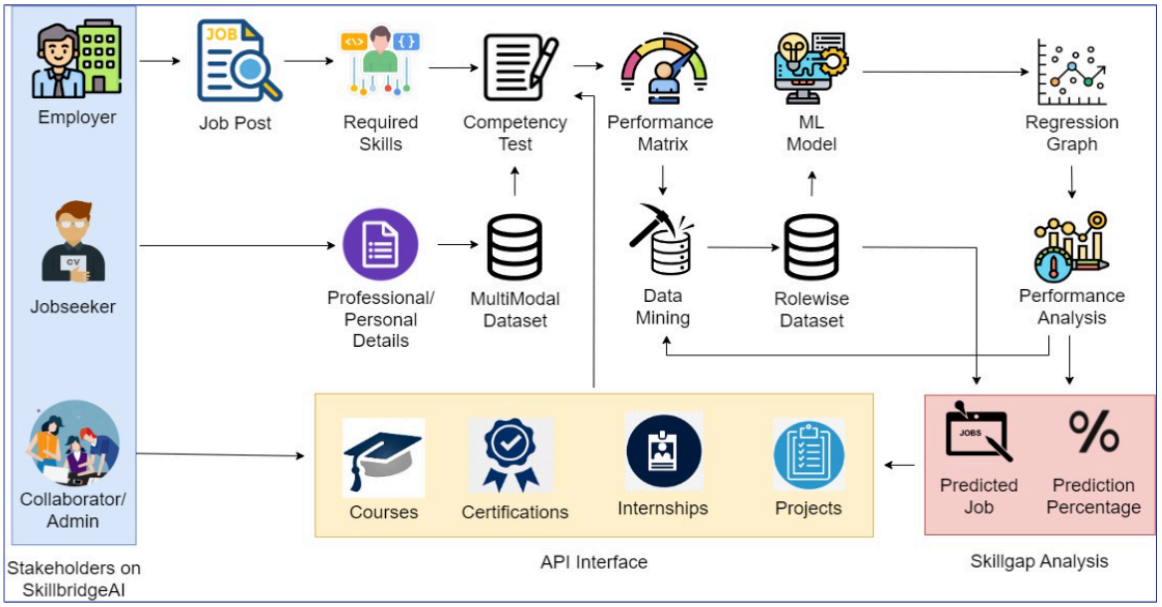
This mini project contributes by creating a functional prototype of an AI-powered employment platform that integrates skill gap analysis, job and training recommendations, and real-time insights into the job market. The system aims to enhance both candidate profiling and employer talent acquisition through intelligent, data-driven methods.

3. Proposed System

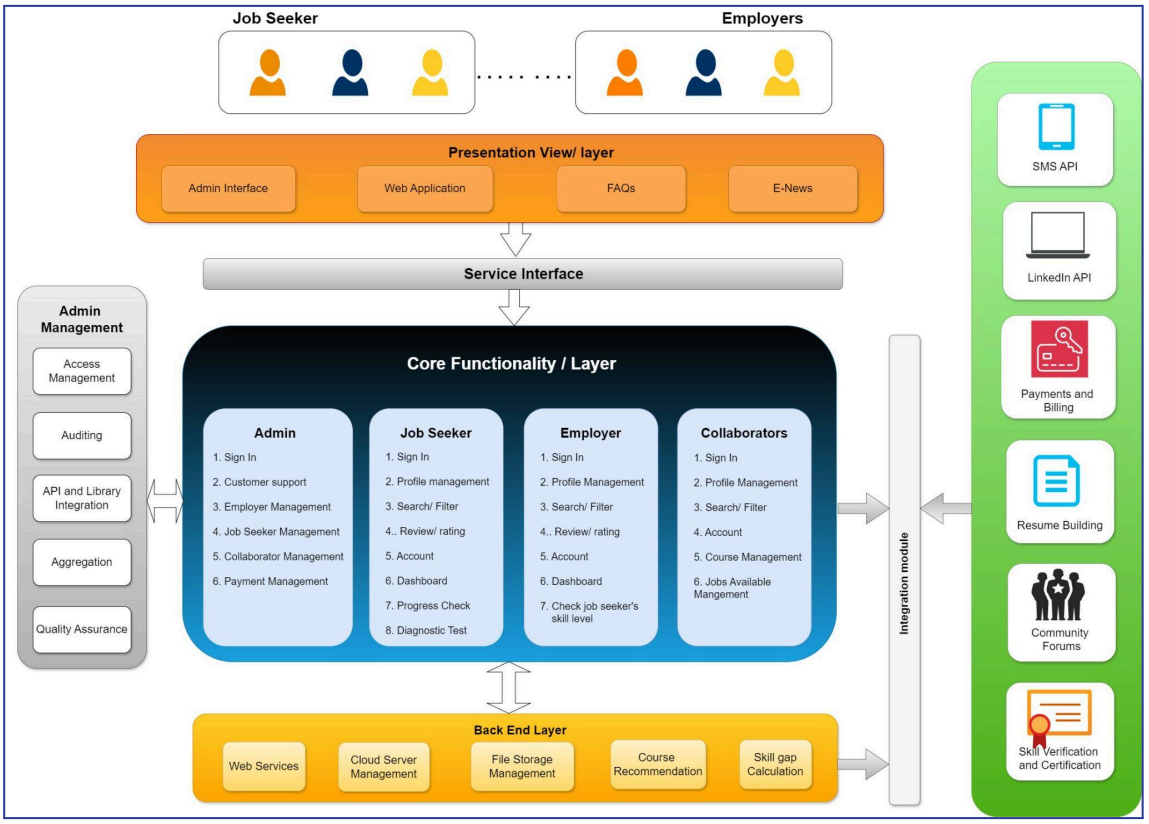
3.1. Introduction

The proposed system, Smart Competency Diagnostic and Candidate Profile Score Calculator, is designed to address the growing need for a comprehensive employment platform that bridges the gap between job seekers and employers. The system leverages artificial intelligence to analyze a candidate's skills, experience, and qualifications, calculating a personalized profile score. Based on this score, it provides tailored job recommendations, suggests relevant training programs, and highlights skill gaps that require attention. By incorporating real-time labor market insights and adaptive learning pathways, the system aims to empower candidates to enhance their employability while offering employers a more efficient way to assess talent. This platform promises to revolutionize career development and recruitment processes, ensuring that both candidates and employers benefit from a more informed and intelligent system.

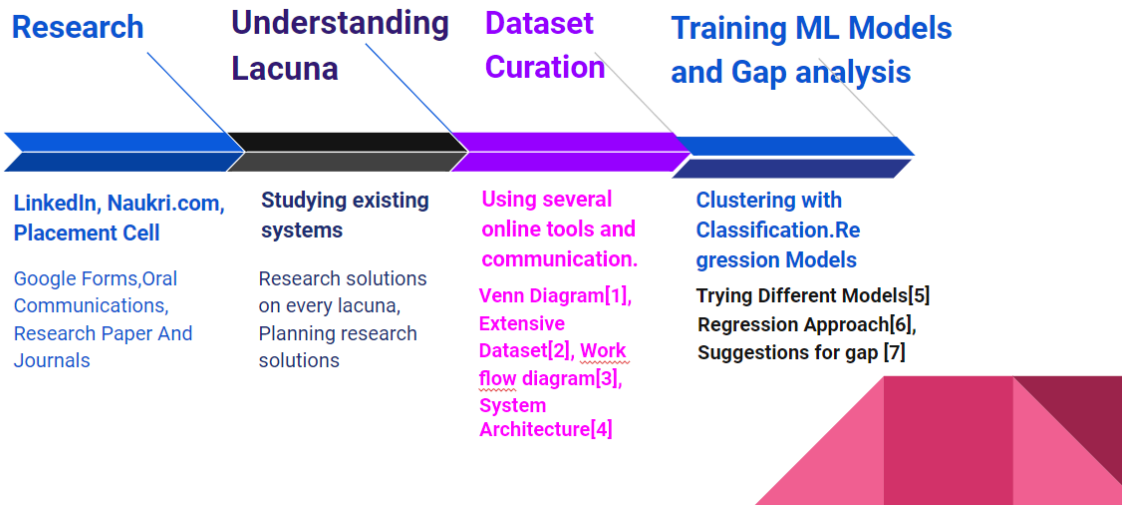
3.2. Architectural Framework / Conceptual Design



3.3. Algorithm and Process Design



3.4. Methodology Applied



3.5. Hardware & Software Specifications

Hardware Requirements

Development Machines

- CPU
- RAM 16GB
- Storage SSD 256GB

Networking Hardware

- Router and Switches
- Firewall Appliances

Servers

- Cloud-Based Servers

Software Requirements

Frontend Development

- React.js
- Tailwind CSS

Backend Development

- Node.js
- Express.js

Machine Learning and AI

- TensorFlow.js
- Python

Database and Hosting

- Firebase

Data visualization

- D3.js,Chart.js

Tools and Frameworks

Figma

- UI/UX design

Code Editor and IDE

- Visual Studio Code
- Google Colab

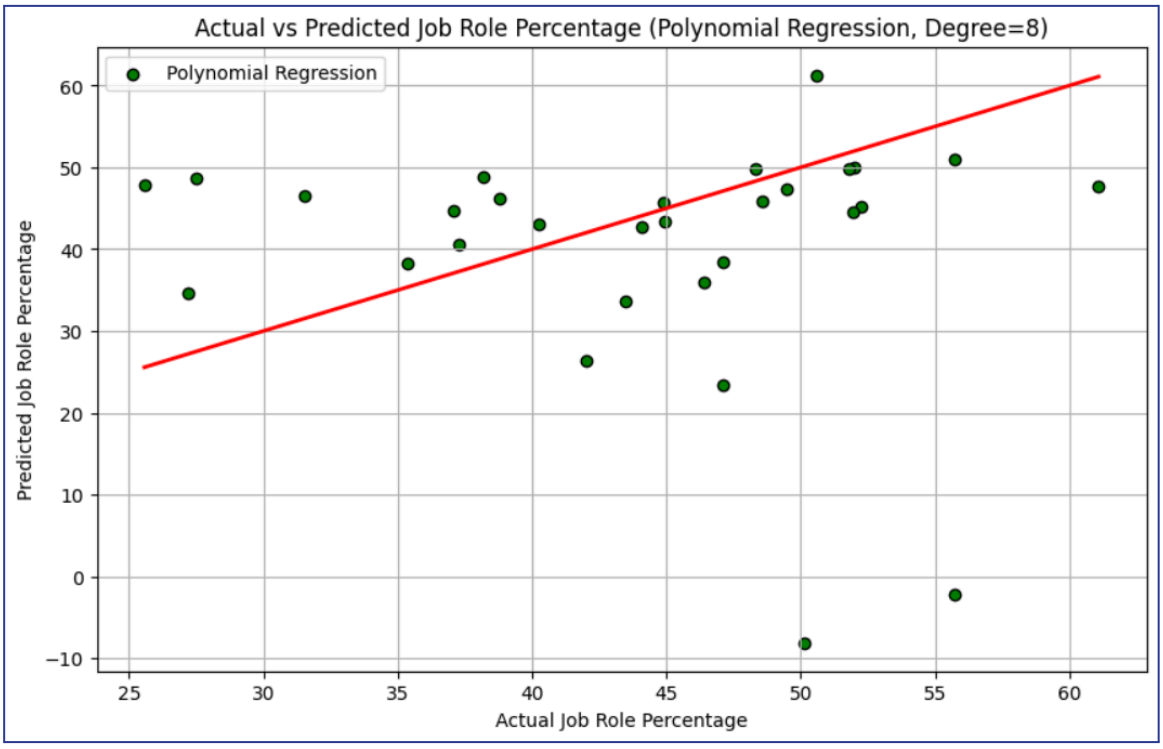
API development and Testing

- Postman

Cloud Services

- AWS(EC2,S3,RDS)
- Google Cloud Platform

3.6. Experiment and Results for Validation and Verification



3.7. Result Analysis and Discussion

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Predicted Job Role Percentage: 57.1697

Skill Gap Analysis:
- Java: Excellent! (Current Level: 0.80)
- Python: Excellent! (Current Level: 0.90)
- C#: Satisfactory (Current Level: 0.70)
- Bash/Shell: Satisfactory (Current Level: 0.60)
- MySQL: Satisfactory (Current Level: 0.50)
- PostgreSQL: Needs improvement (Current Level: 0.40)
- SQL Server: Needs improvement (Current Level: 0.30)
- Oracle: Needs improvement (Current Level: 0.20)
- Jenkins: Excellent! (Current Level: 0.90)
- GitLab CI/CD: Excellent! (Current Level: 0.80)
- Docker: Satisfactory (Current Level: 0.60)
- Vulnerability Assessment: Satisfactory (Current Level: 0.50)
```

3.8. Conclusion and Future work.

Our platform offers a groundbreaking approach to job seeking, integrating personalized AI-driven recommendations, adaptive learning pathways, and real-time insights. By addressing the gaps in existing systems, we aim to significantly enhance job seekers' success in the competitive job market.

Future Work

- Adaptive Learning Pathways:

  Personalized Learning: Develop adaptive learning pathways based on the job seeker's progress and feedback.
- Real-Time Job Market Insights based on candidate’s skills and competencies:

  Dashboard: Create a dashboard displaying real-time data on trending jobs, skills in demand, and salary benchmarks.
- Skills Verification and Certification:

  Skill Assessments: Implement a system for verifying skills and certifying competencies through assessments and tests.
- Resume Wizard:

  Automated Resume Building: Develop a resume wizard to help candidates automatically build their resumes based on their profiles, ensuring a professional and comprehensive presentation of their skills and experiences.

4. References

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