

SkillsBridge

An AI-Powered Job Readiness Platform

Problem in Current Job Market

Candidates apply blindly without understanding skill requirements

Employers struggle to find “job-ready” candidates

Lack of **personalized guidance** on what to learn to crack specific jobs

Mismatch between **academic knowledge and industry expectations**

Our Solution

Smart Job Matching using Skill Vector Mapping

AI-Based Skill Gap Detection

Personalized Upskilling Recommendations (Courses, Certifications)

Assessment & Mock Interview using AI (LLaMA + Gemini)

Goal – Transform Applicants into Job-Ready Professionals

Module-Wise Algorithm Flow

1. User Profile & Skill Input Module

Algorithm:

1. User registers and enters skills manually or uploads resume.
2. AI extracts skills → Generates **User Skill Vector**
3. Store in database.

2. Job Description Processing & Ranking

Algorithm Steps:

System fetches **Top 10 most relevant Job Descriptions (JDs)** using **Resume Parsing + Skill Matching**.

AI extracts required skills from each JD → Generates **JD Skill Vector** V_j .

For each JD, compute **Relevance Score** based on user's current skill vector.

Rank JDs in descending order of match score.

Top-ranked JD is selected for Interview Scheduling.

System initiates **AI Mock Interview / Gemini-based evaluation** based on the **best-matched JD**.

3. Upskilling Recommendation Module

Algorithm:

1. Detect missing skills from **Gap Vector**.
2. **Search Course DB / AI Suggestion (LLaMA)** to fetch learning content.
3. Generate a **Personalized Learning Path** with priority-wise skills.
4. Show **Recommended Learning Timeline + Progress Tracking**

5. Assessment & AI Interview Module

Algorithm:

1. **Schedule Mock Interview with AI** once learning progress reaches threshold.
2. AI generates **role-based interview questions** from top-matched JD.
3. AI evaluates answers and **provides real-time feedback & improvement tips**.
4. System **updates readiness score** and suggests retry or move to job application.

Test Cases

S.No	Module	Input	Expected Output
1	User Registration	New user signs up with email/password	Account created successfully
2	Resume Upload	Upload resume file (PDF/DOC)	Resume parsed successfully
3	Skill Entry	User enters skills manually	Skills saved automatically after cleaning & preprocessing
4	Job Search	User searches for jobs	Top 10 relevant job listings displayed automatically
5	Job Recommendation	User profile and skills	Platform suggests suitable jobs automatically
6	Upskilling Suggestion	Partial match with job requirements	Recommended courses/resources shown
7	Learning Path Display	User selects suggested courses	Personalized learning timeline displayed
8	Assessment Attempt	User completes a test/quiz	Test submitted and score shown
9	Mock Interview	User schedules AI mock interview	Interview conducted and feedback provided
10	Progress Tracking	User completes learning modules	Progress status updated

Functional morphism

Functional Morphism – SkillsBridge

Definitions:

- Let $f: U \rightarrow S$ → Map users to their **skill sets**.
- Let $g: J \rightarrow S$ → Map **job descriptions** to **required skills**.
- Let $h: S \times S \rightarrow C$ → Compute **compatibility score** between user and job.

Composition:

$$h(f(U)g(J)) = \text{Compatibility Score}$$

- If score < threshold → Trigger **Upskilling Module**:

$$\alpha: G \rightarrow R$$

Where G = Skill Gap Vector, R = Recommended Learning Resources.

Mathematical model

Mathematical Model – SkillsBridge

1. Sets and Entities

- Users: $U = \{u_1, u_2, \dots, u_m\}$
- Job Descriptions: $J = \{j_1, j_2, \dots, j_n\}$
- Skills: $S = \{s_1, s_2, \dots, s_k\}$

.2Skill Representation

- User Skill Vector: $\mathbf{V}_u = [v_1, v_2, \dots, v_k]$
- Job Skill Vector: $\mathbf{V}_j = [r_1, r_2, \dots, r_k]$

.3Compatibility Score

- $C \in [0, 1] \rightarrow 1$, perfect match

4. Skill Gap Vector

$$G = \max(V_j - V_u, 0)$$

5. Upskilling & Assessment

- After completing learning: $\mathbf{V}'_u = \mathbf{V}_u + \alpha \cdot G$, $\alpha \in [0, 1]$
- User is **ready to apply** if $C(\mathbf{V}'_u, \mathbf{V}_j) \geq \theta$

UML Diagram

SkillsBridge — Component Diagram

