

# **DATABASE MANAGEMENT SYSTEMS**

**By**

**Arslan Gill (39085)**



**Submitted To:**

**MR.MUHAMMAD WASEEM MALIK**

**Date:**

**14/11/2025**

**PROJECT PROPOSAL**

# **Proposal: AI-Powered Internship Management System for Placement Office**

## **1. Introduction**

The Placement Office plays a crucial role in connecting students with internship opportunities. However, managing applications, matching eligible students, scheduling interviews, and coordinating employers manually takes significant time.

This project proposes an **AI-powered Internship Management System** that automates matching, centralizes internship information, and supports data-driven decisions for the Placement Office.

## **2. Problem Statement**

- Manual shortlisting consumes time and may overlook potential candidates.
- Tracking student applications, interviews, and employer feedback is difficult without automation.
- Students lack personalized internship recommendations based on skills and GPA.
- Employers face difficulty identifying suitable applicants quickly.
- Placement officers require a unified system to manage postings, students, and outcomes.

The project aims to solve these issues using a centralized digital platform integrated with AI-based candidate recommendation.

## **3. Entities With Attributes (Including Normalization, Specialization & Generalization)**

### **Generalized Entity**

#### **1. User**

**Attributes:** user\_id (PK), email, password\_hash, first\_name, last\_name, role, created\_at, is\_active

**Generalization:** Acts as parent entity.

## **Specialized Entities**

### **2. Student (Specialization of User)**

- user\_id (PK, FK)
- student\_roll\_no
- program
- year\_of\_study
- gpa
- resume\_id (FK)
- preferred\_domains
- availability\_start\_date
- availability\_end\_date

### **3. PlacementOfficer (Specialization of User)**

- user\_id (PK, FK)
- office\_location
- phone

### **4. EmployerRep (Specialization of User)**

- user\_id (PK, FK)
- company\_id (FK)
- designation
- phone

## **5. Company**

- company\_id (PK)
- name
- industry
- website
- contact\_email
- address

## **6. InternshipPosting**

- posting\_id (PK)
- company\_id (FK)

- posted\_by (FK → EmployerRep)
- title
- description
- min\_gpa
- required\_skills (via link table)
- location
- stipend
- start\_date
- end\_date
- application\_deadline

## 7. Application

- application\_id (PK)
- posting\_id (FK)
- student\_id (FK)
- status
- applied\_at
- matching\_score (AI-generated)
- shortlist\_reason

## 8. Skill

- skill\_id (PK)
- name
- category

## 9. PostingSkill (Normalized Many-to-Many)

- posting\_skill\_id (PK)
- posting\_id (FK)
- skill\_id (FK)
- required\_level

## 10. StudentSkill (Normalized Many-to-Many)

- student\_skill\_id (PK)
- student\_id (FK)

- skill\_id (FK)
- proficiency\_level
- years\_experience

## **11. Resume**

- resume\_id (PK)
- student\_id (FK)
- file\_url
- parsed\_text

## **12. Interview**

- interview\_id (PK)
- application\_id (FK)
- scheduled\_at
- mode
- interviewer\_id (FK)

## **13. Assessment**

- assessment\_id (PK)
- application\_id (FK)
- type
- score
- max\_score
- assessed\_by (FK)

## **14. InternshipOutcome**

- outcome\_id (PK)
- application\_id (FK)
- final\_status
- rating\_by\_company
- certificate\_url

## **15. AIRecommendation**

- recommendation\_id (PK)
- student\_id (FK)
- posting\_id (FK)
- score
- explanation

## **Normalization Summary**

- **1NF:** All attributes are atomic.
- **2NF:** No partial dependencies; join tables avoid composite issues.
- **3NF:** No transitive dependencies; separate entities handle unique data (Company, Skill, PostingSkill, StudentSkill).

## **Specialization & Generalization Summary**

- **User** is generalized parent.
- **Student, PlacementOfficer, EmployerRep** are specialized children.
- Ensures clean role-based data separation.

## **5. Website Development Section**

### **Core Modules**

- Student Portal
- Employer Portal
- Placement Officer Portal
- AI Recommendation Engine
- Interview & Assessment Module

### **Website Pages**

## **Student**

- Dashboard
- Recommended Internships (AI-based)
- Apply to Posting
- Interview Schedule
- Upload Resume / Manage Skills
- View Outcomes

## **Placement Officer**

- Manage Internship Postings
- Approve Employer Requests
- View Applications
- AI Match View (scores + reasons)
- Reports & Analytics

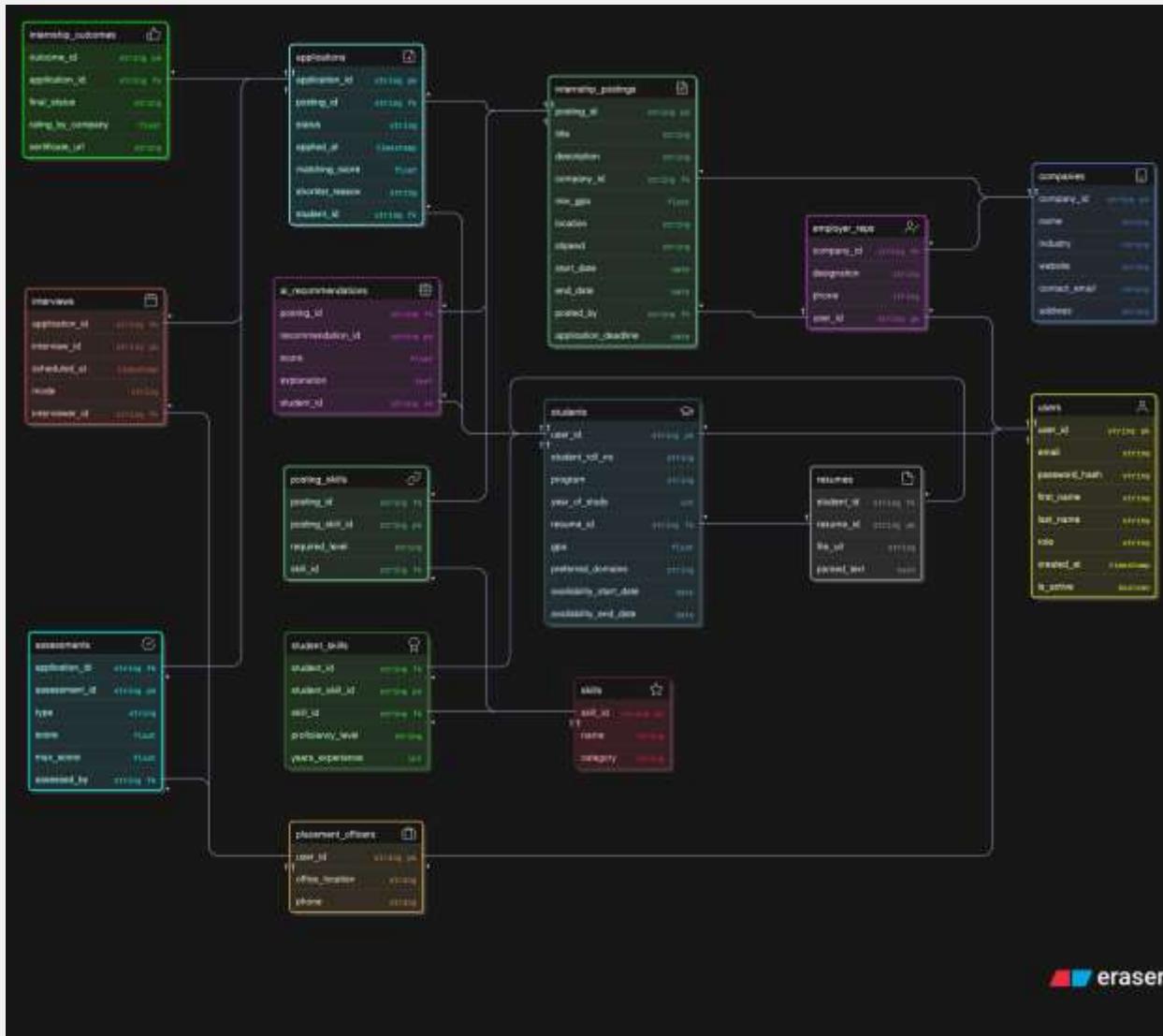
## **Employer**

- Create Posting
- Review Candidates
- Shortlist / Schedule Interviews
- Submit Feedback
- Finalize Intern

## **Suggested Tech Stack**

- **Frontend:** React + TailwindCSS
- **Backend:** Node.js (Express) or Python (FastAPI)
- **Database:** PostgreSQL
- **AI Service:** Python (Scikit-learn / Transformers)
- **Storage:** AWS S3 / MinIO

# ERD Diagram



## 6. Conclusion

The proposed **AI-Powered Internship Management System** will streamline internship placement by automating student shortlisting, centralizing application processes, improving employer coordination, and enhancing decision-making through AI-driven recommendations. The design uses proper normalization, specialization, generalization, and a clear ER structure. The website component ensures accessibility and a user-friendly experience for students, employers, and the Placement Office.

Overall, this system will significantly enhance the efficiency, fairness, and transparency of internship placements.