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PROJECT TITLE : JOB PORTAL

**1.PROJECT OVERVIEW:**

**1.1 PROJECT VISION:**

To develop a scalable, secure, and user-centric job portal that demonstrates advanced database management principles while solving real-world employment challenges through technology.

**1.2 CORE OBJECTIVES:**

* **Primary Objective:** Design and implement a normalized relational database system supporting complex job market operations
* **Secondary Objectives:**
  + Implement role-based access control (RBAC) with three distinct user types
  + Develop RESTful API endpoints following Laravel conventions
  + Create responsive, mobile-first user interfaces
  + Deploy on cloud infrastructure with proper CI/CD practices
  + Ensure data integrity through comprehensive validation and constraints

**1.3 PROJECT SCOPE:**

The system encompasses:

* **User Management:** Registration, authentication, and profile management
* **Job Lifecycle:** Posting, searching, filtering, and application tracking
* **Administrative Controls:** Employer verification, application moderation
* **Document Management:** Resume upload, storage, and retrieval
* **Notification System:** Real-time status updates and email notifications

**2. TECHNICAL ARCHITECTURE**

### ****2.1 TECHNOLOGY STACK****

* **Backend Framework:** Laravel 12 (PHP 8.3)
* **Frontend Technologies:** Blade Templating Engine, Bootstrap 5, HTML5/CSS3
* **Database Management:** MariaDB/MySQL 8.0
* **Development Environment:** XAMPP (Apache, MySQL, PHP)
* **Version Control:** Git/GitHub
* **Cloud Deployment:** Railway.app (Backend), Aiven.io (Database)
* **Additional Tools:** Composer, NPM, Artisan CLI

### ****2.2 SYSTEM ARCHITECTURE****

The application follows the Model-View-Controller (MVC) architectural pattern:

**Model Handles:**

* Storing user information in the database
* Saving job postings
* Keeping track of job applications
* Managing company profiles
* Handling resume uploads
* Following business rules like "one person can only apply once to same job"

**View Handles:**

* The web pages users see
* Job listing pages
* Application forms
* User profile pages
* Login and registration screens
* Making everything look nice with colors and layouts

**Controller Handles:**

* Taking user requests like "show me all jobs"
* Processing form submissions like job applications
* Deciding which page to show next
* Getting data from database and sending it to web pages
* Handling user actions like clicking buttons

**3. DATABASE DESIGN & ANALYSIS**

### ****3.1 DATABASE DESIGN PHILOSOPHY****

Our database design adheres to the following principles:

* **Normalization:** All tables are normalized to 3NF to eliminate redundancy
* **Referential Integrity:** Foreign key constraints ensure data consistency
* **Scalability:** Design supports horizontal and vertical scaling
* **Security:** Prepared statements prevent SQL injection attacks
* **Performance:** Indexed columns for optimal query performance

### ****3.2 ENTITY ANALYSIS****

|  |  |  |  |
| --- | --- | --- | --- |
| ENTITY | PRIMARY KEY | KEY ATTRIBUTES | DESCRIPTION |
| USER | UserID | Name, Email, Password, UserType | Stores common account data for both JobSeekers and Employers. |
| JOBSEEKER | SeekerID | UserID (FK), DateOfBirth, Address, ProfileSummary | Subtype of User; holds seeker-specific profile details. |
| EMPLOYER | EmployerID | UserID (FK), CompanyName, CompanyDescription, CompanyWebsite, VerifiedStatus | Subtype of User; holds employer-specific company details. |
| RESUME | ResumeID | SeekerID (FK), FilePath, UploadDate, LastUpdated | Stores uploaded resumes for JobSeekers. |
| JOB | JobID | EmployerID (FK), Title, Description, Requirements, Location, SalaryRange, PostedDate | Represents job listings posted by Employers. |
| APPLICATION | ApplicationID | JobID (FK), SeekerID (FK), ResumeID (FK), AppliedDate, Status | Captures a JobSeeker’s application to a specific Job with one resume. |

### ****3.3 ADVANCED BUSINESS RULES IMPLEMENTATION****

### ****USER REGISTRATION RULE****

* **Rule:** Every account must register as either JobSeeker or Employer
* **Simple Explanation:** You can't create an account without choosing your role
* **Real Example:** During signup, you must click either "I'm looking for jobs" or "I'm hiring"

### ****UNIQUE EMAIL RULE****

* **Rule:** The Email in User table must be unique and validated
* **Simple Explanation:** One email = one account only
* **Real Example:** If [john@gmail.com](mailto:john@gmail.com) is taken, you must use different email

### ****EMAIL VERIFICATION RULE****

* **Rule:** Only Employers with VerifiedStatus = TRUE may post Job listings
* **Simple Explanation:** Companies must be verified before they can post jobs
* **Real Example:** New companies can't post jobs until admin approves them

### ****JOB POSTING RULE****

* **Rule:** An Employer may post zero or more Jobs; each Job must reference exactly one Employer
* **Simple Explanation:** Jobs must belong to a company, and companies can post multiple jobs
* **Real Example:** Google can post 50 jobs, but each job belongs only to Google

### ****RESUME UPLOAD RULE****

* **Rule:** A JobSeeker may upload multiple Resumes, but only one active Resume per Application
* **Simple Explanation:** You can have many resumes saved, but pick one for each job application
* **Real Example:** You have "Tech Resume" and "Marketing Resume" but apply with only one

### ****PROFILE COMPLETENESS RULE****

* **Rule:** JobSeekers must complete mandatory fields (DateOfBirth, Address, Profile Summary) before applying
* **Simple Explanation:** Must fill required profile info before applying to jobs
* **Real Example:** Can't apply until you enter your birth date, address, and summary

### ****APPLICATION CONSTRAINT RULE****

* **Rule:** A JobSeeker may apply to the same Job at most once
* **Simple Explanation:** You can only apply once to each job
* **Real Example:** Applied to "Software Engineer at Google"? Can't apply again to same posting

### ****APPLICATION STATUS RULE****

* **Rule:** Each Application's Status must be: Pending, Reviewed, Interview, Offered, or Rejected
* **Simple Explanation:** Applications follow specific status progression
* **Real Example:** Pending → Reviewed → Interview → Offered (or Rejected at any step)

### ****POSTING REQUIREMENTS RULE****

* **Rule:** Each Job must include: Title, Description, Requirements, Location, and Posted Date
* **Simple Explanation:** All job postings must have these 5 essential pieces of information
* **Real Example:** Can't post job without job title, description, requirements, location, and date

### ****AUTOMATIC TIMESTAMPS RULE****

* **Rule:** Applied Date and Posted Date default to current system date
* **Simple Explanation:** System automatically records when jobs are posted and applications are submitted
* **Real Example:** Apply today = Applied Date becomes today's date automatically

### ****RESUME UPDATE RULE****

* **Rule:** When JobSeeker updates Resume, old version may be retained but only latest links to new Applications
* **Simple Explanation:** Keep history of old resumes but new applications use newest version
* **Real Example:** Upload Resume v2.0, but Resume v1.0 stays for old applications

### ****DELETION RULES****

* **Rule:** Deleting User cascades to delete JobSeeker/Employer records; deleting Employer prevented if open Job listings exist
* **Simple Explanation:** Delete account = delete profile, but can't delete company with active job postings
* **Real Example:** Delete your account = your profile disappears; Google can't delete account if they have 20 open jobs

## **WHY THESE RULES MATTER:**

### ****DATA QUALITY:****

* Ensures all information is correct and complete
* Prevents garbage data from entering system
* Maintains professional standards

### ****USER EXPERIENCE:****

* Users know exactly what to expect
* Clear process flow from registration to job application
* Prevents confusion and errors

### ****SYSTEM INTEGRITY:****

* Database stays organized and reliable
* Prevents data corruption
* Ensures smooth operation

### ****BUSINESS LOGIC:****

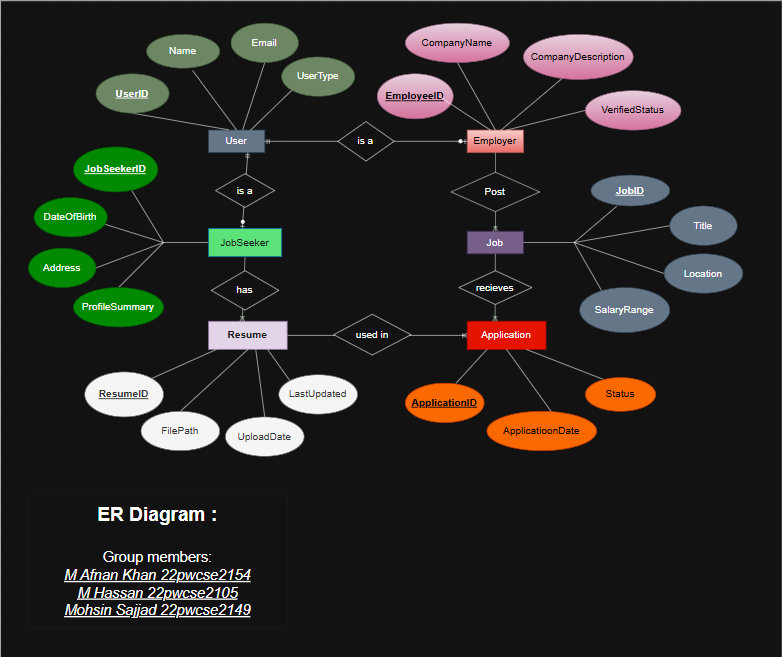
* Reflects real-world hiring processes
* Protects both job seekers and employers
* Maintains platform credibility

### ****SECURITY:****

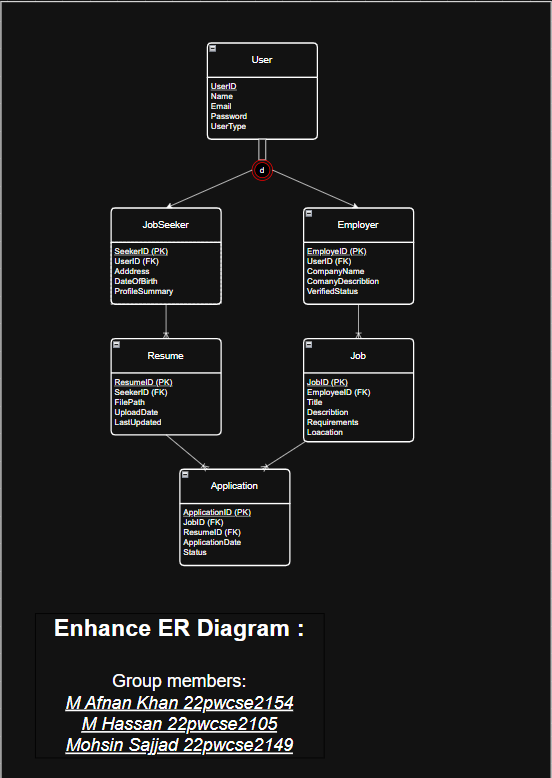
* Prevents unauthorized actions
* Ensures proper verification
* Protects user data

**4.ENTITY-RELATIONSHIP DIAGRAM**

**4.1 ER DIAGRAM:**

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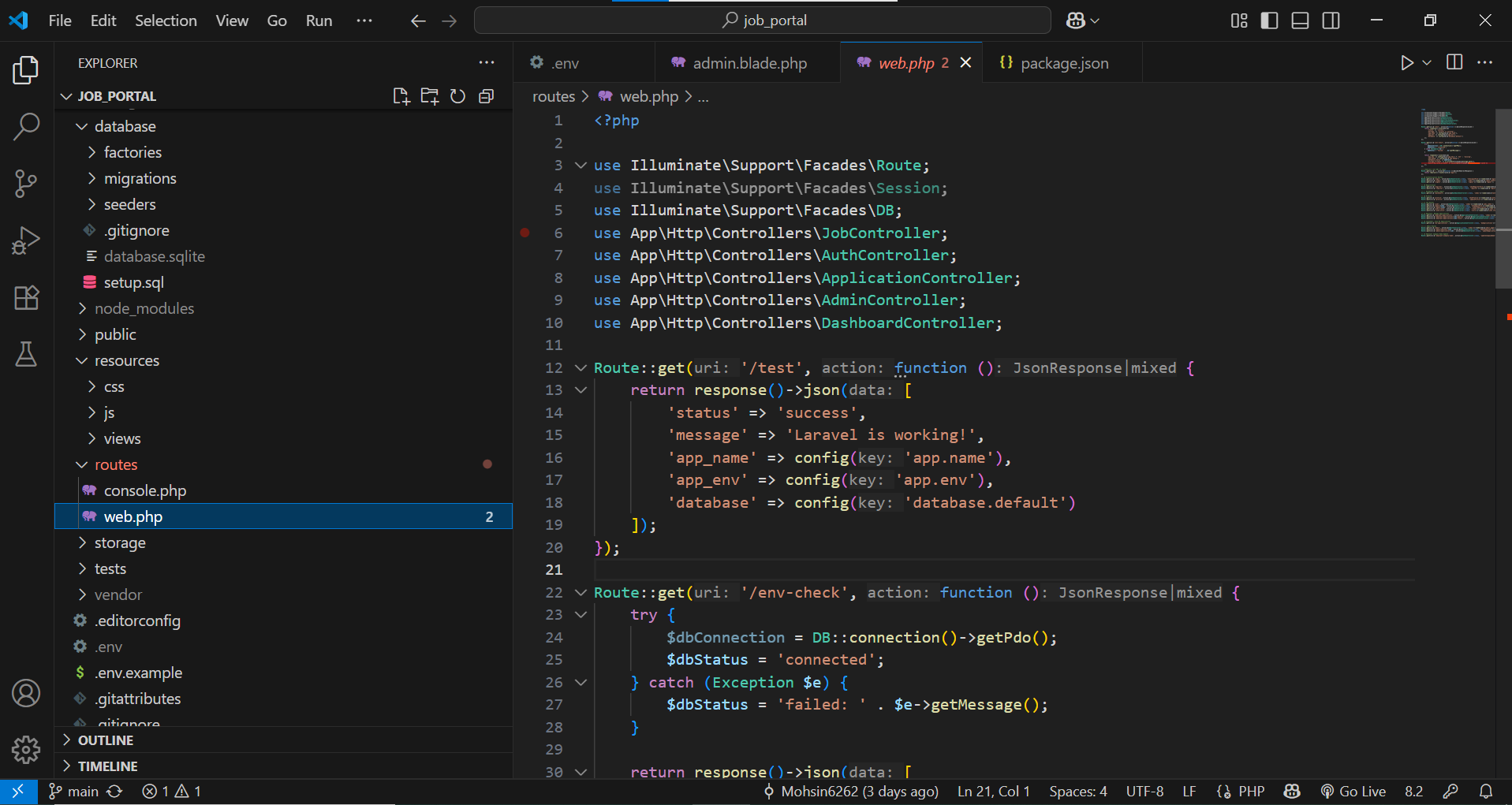
**4.2 ENHANCED ENTITY-RELATIONSHIP DIAGRAM:**

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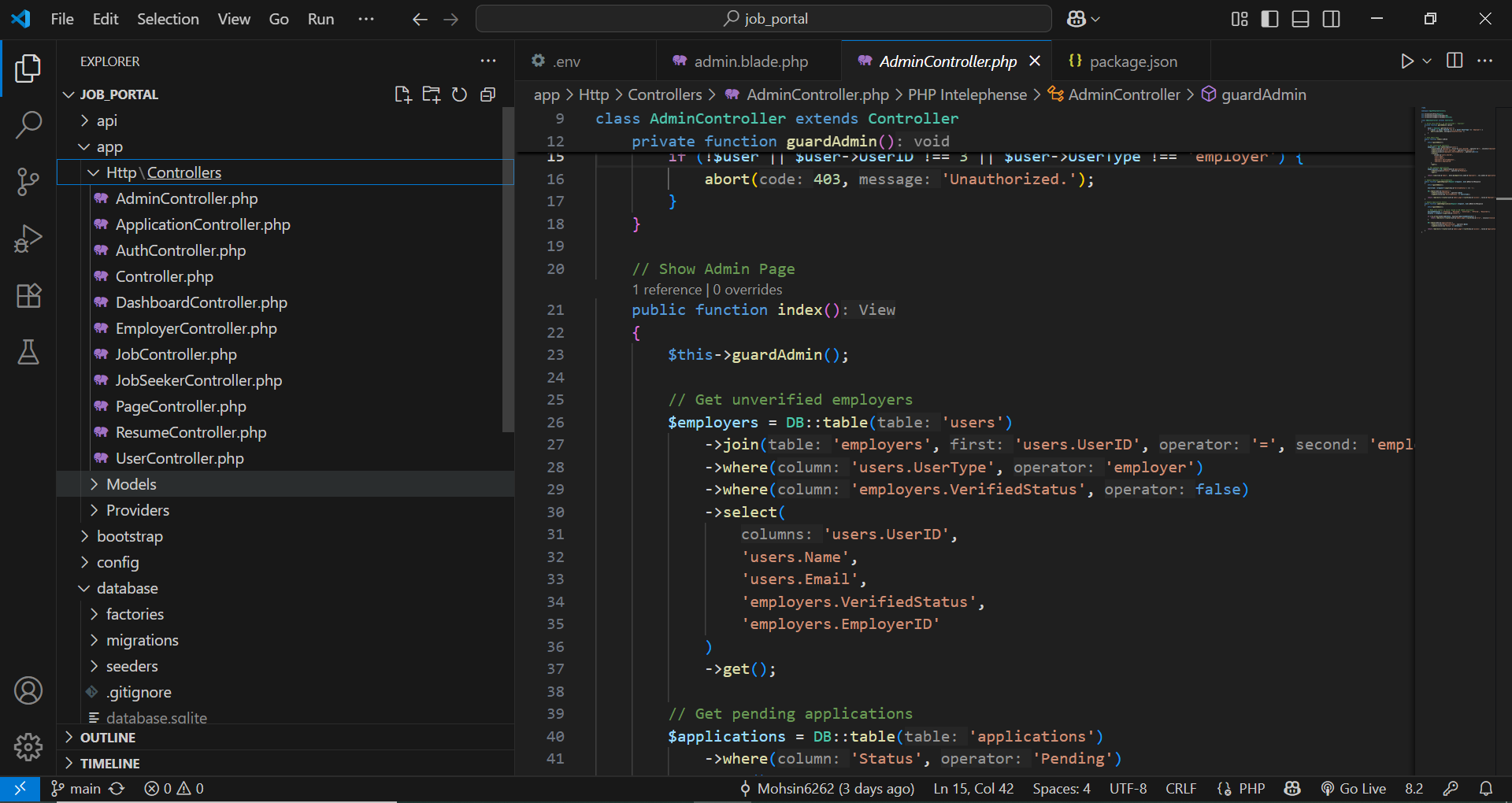
# **5. IMPLEMENTATION DETAILS**

# **5.1 LARAVEL MVC IMPLEMENTATION**

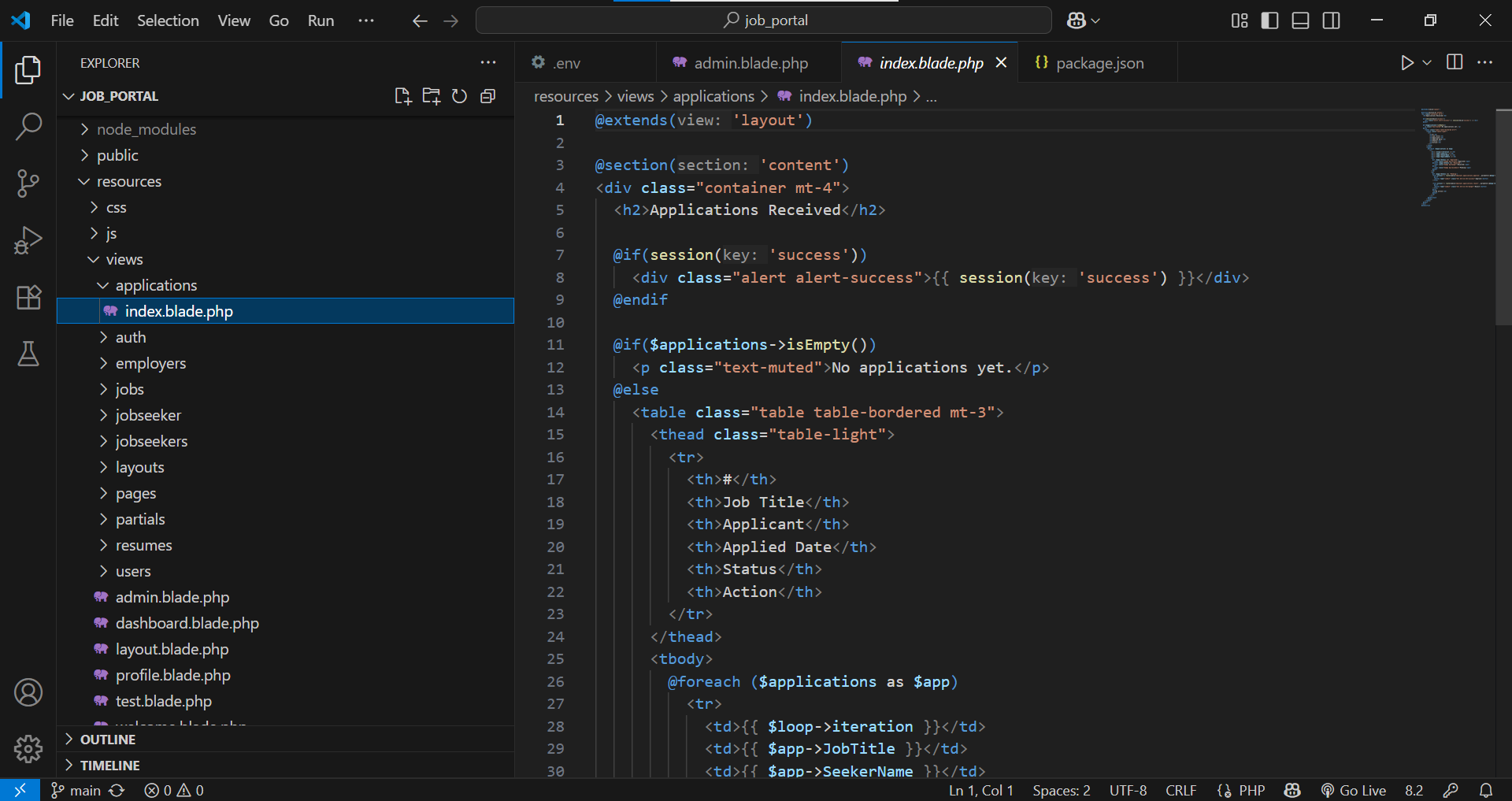
# **5.1.1 MODEL LAYER**

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**5.1.2 CONTROLLER LAYER**

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**5.1.3 VIEW LAYER**

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## **6. DEPLOYMENT ARCHITECTURE**

#### **6.1 DEPLOYMENT WORKFLOW DIAGRAM**

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## **7. DEPLOYMENT STEPS:**

**7.1 PUSH THE PROJECT ON GITHUB:**

cd C:\xampp\htdocs\job\_portal

git init

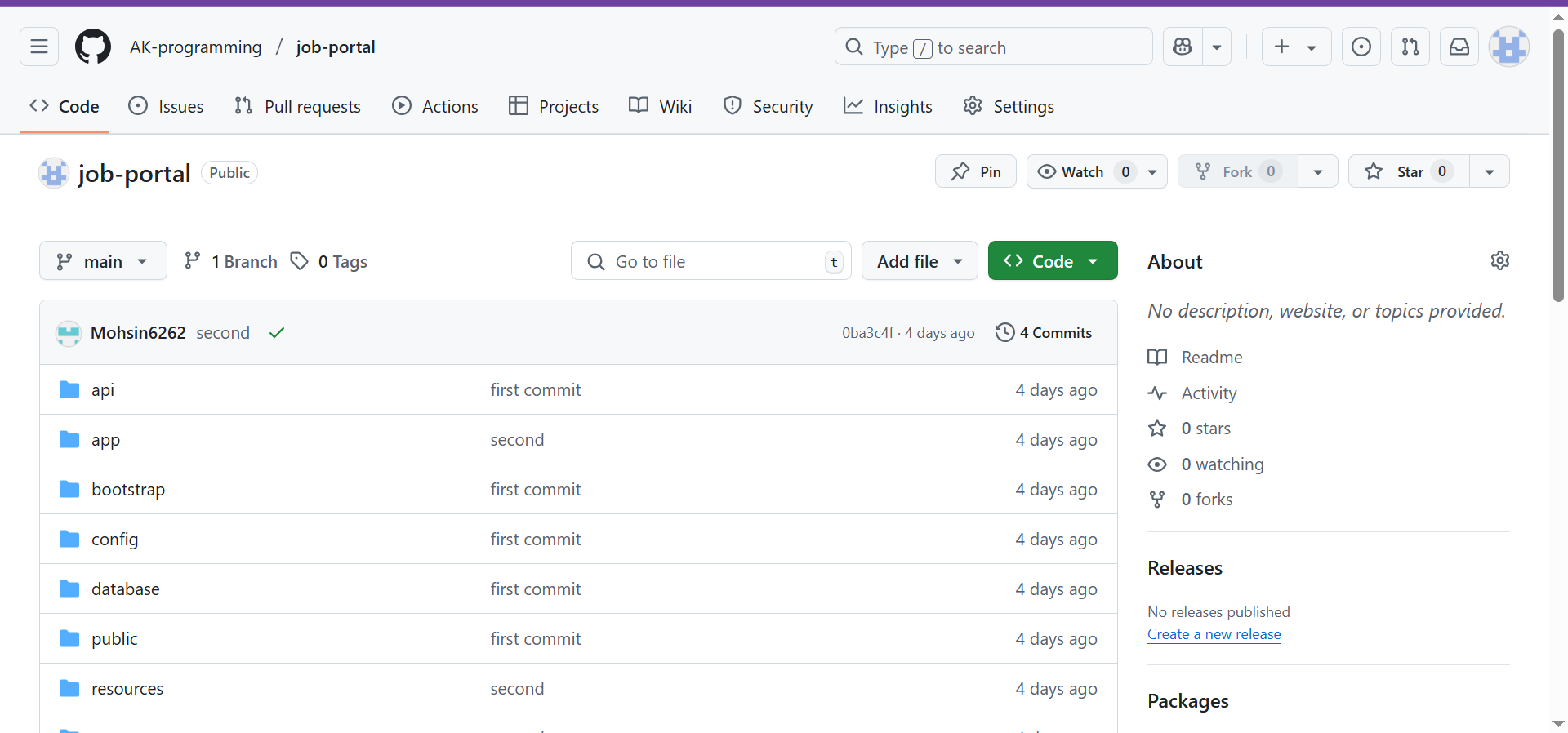
git remote add origin https://github.com/Ak-programming/job\_portal.git

git add .

git commit -m "Pushing project"

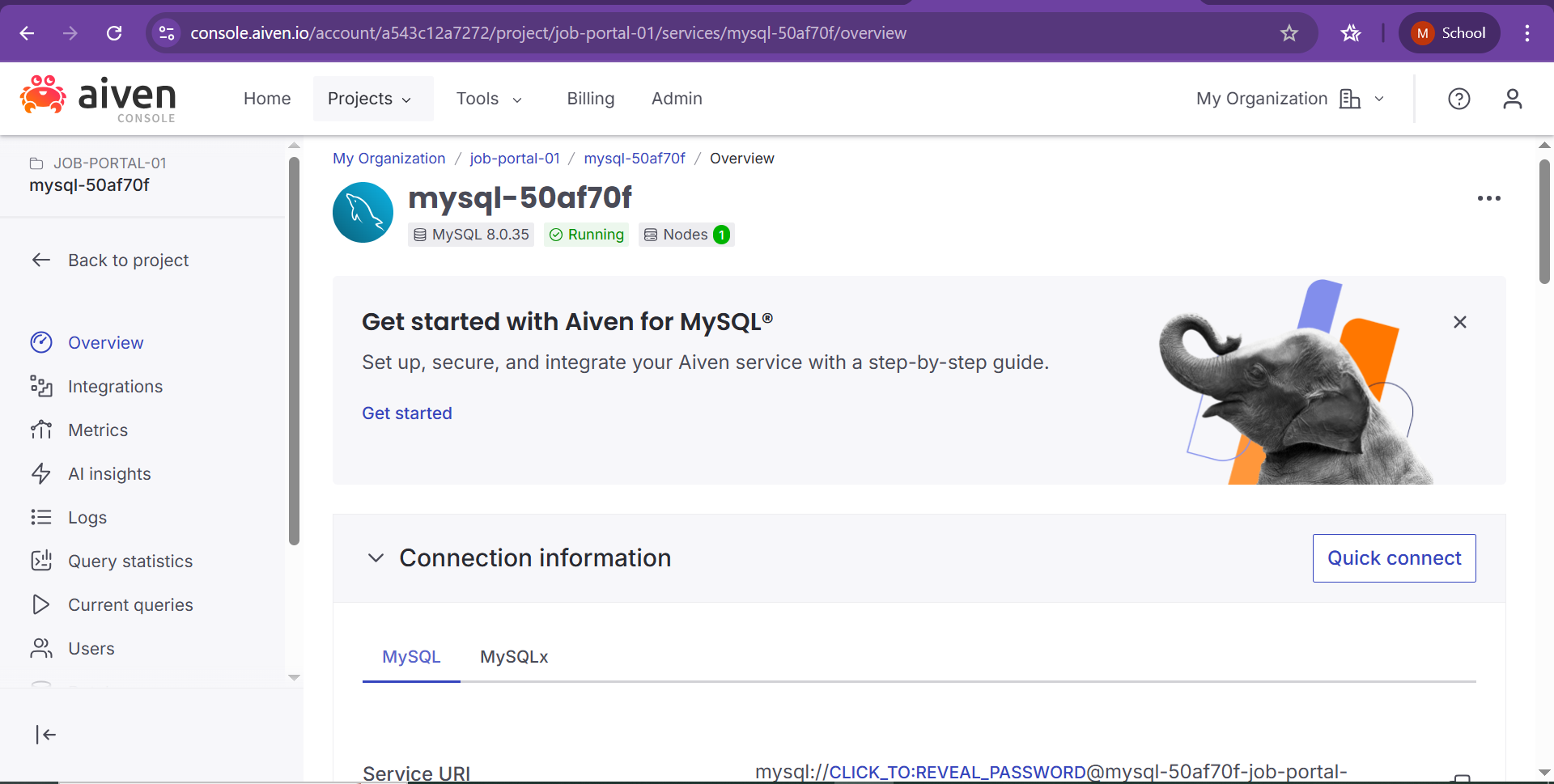
git branch -M main

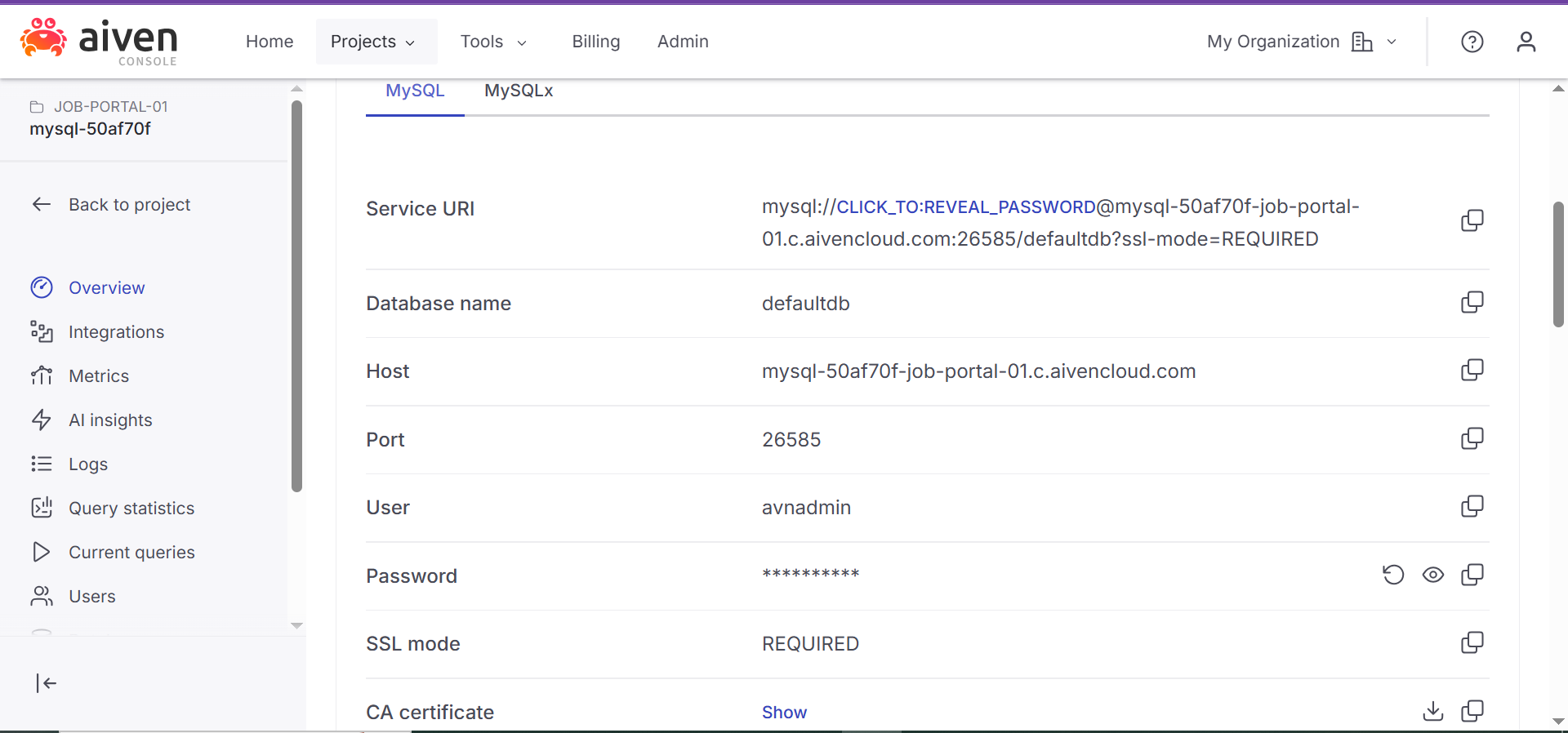
git push -u origin main

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**7.2 CREATE MYSQL DATABASE ON AIVEN.IO**

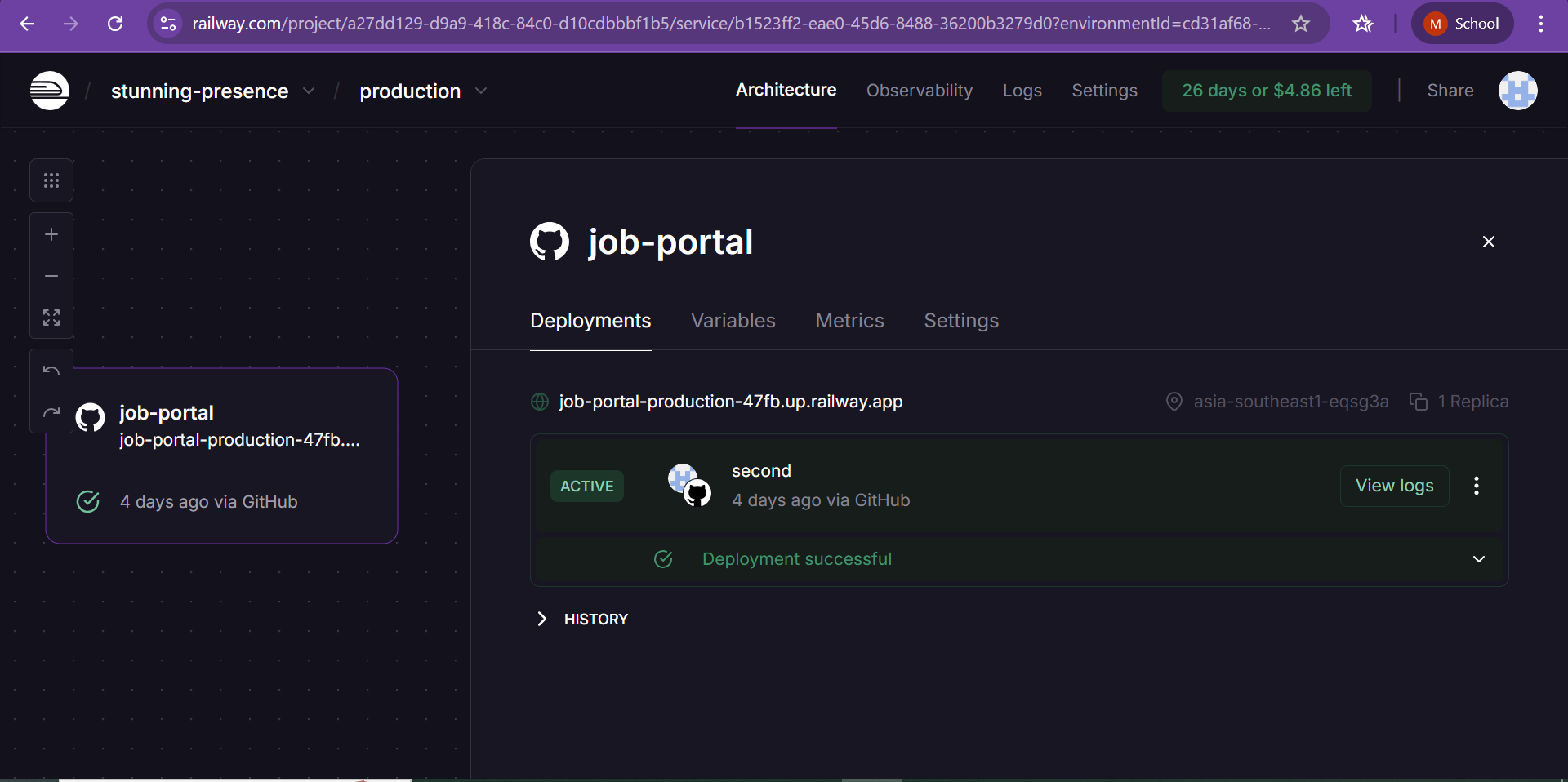
• Sign in to Aiven.io and create a new MySQL service.  
• After creation, note the following credentials:  
 - DB\_HOST  
 - DB\_PORT  
 - DB\_DATABASE  
 - DB\_USERNAME  
 - DB\_PASSWORD

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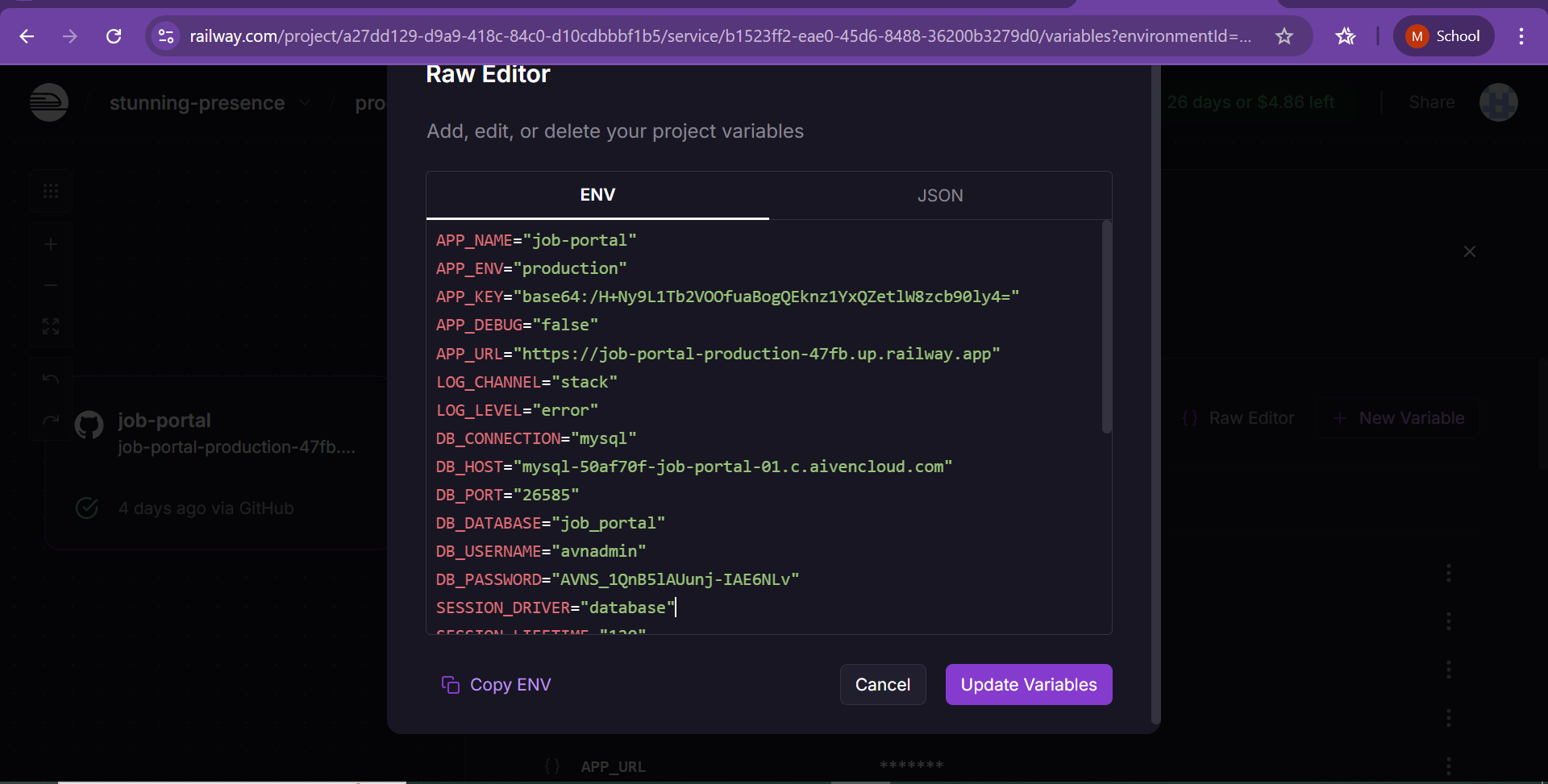
**7.3 DEPLOY BACKEND TO RAILWAY**

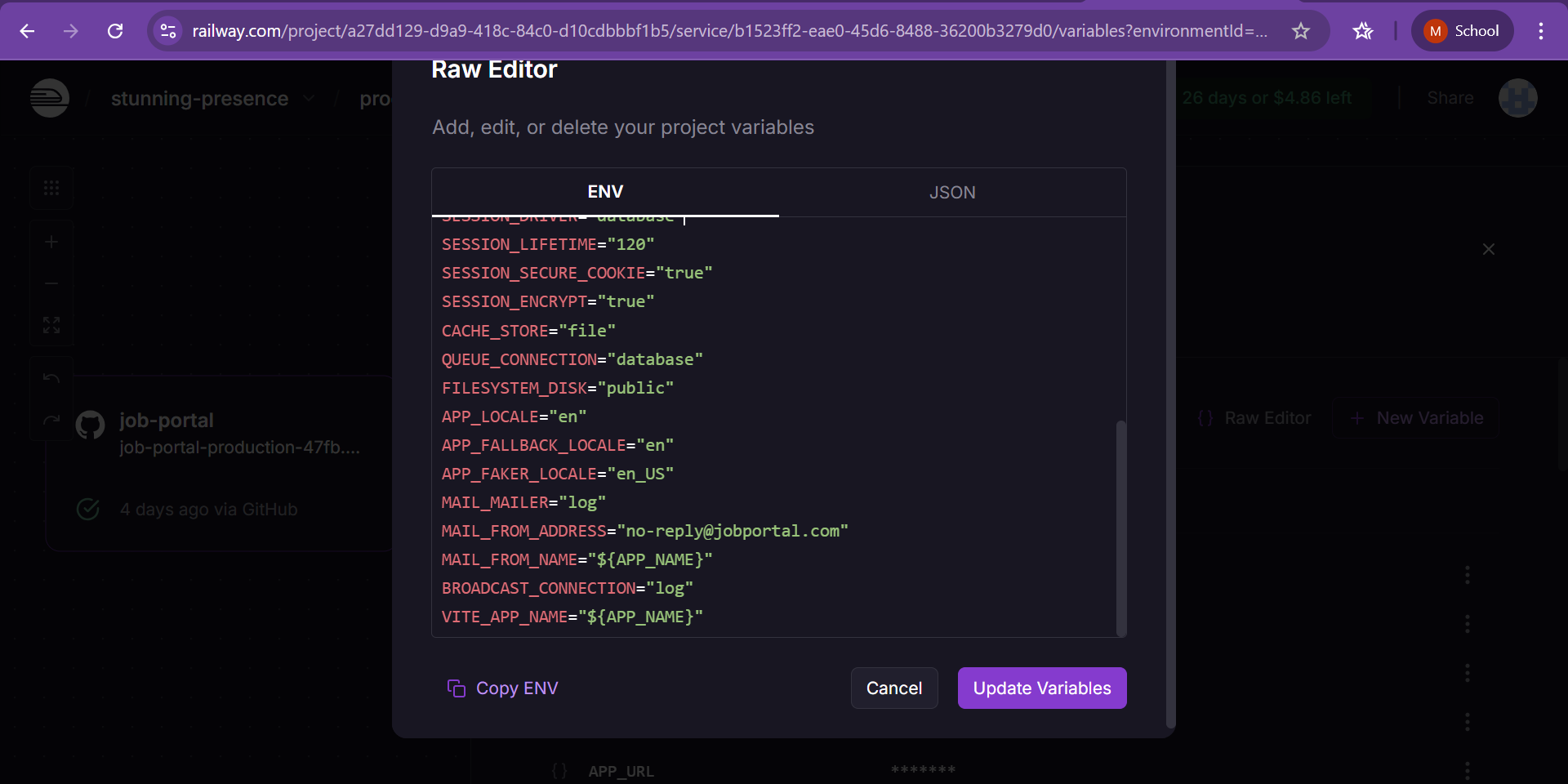
• Go to Railway.app.  
• Click on “New Project” → “Deploy from GitHub”.  
• Select your Laravel project repository



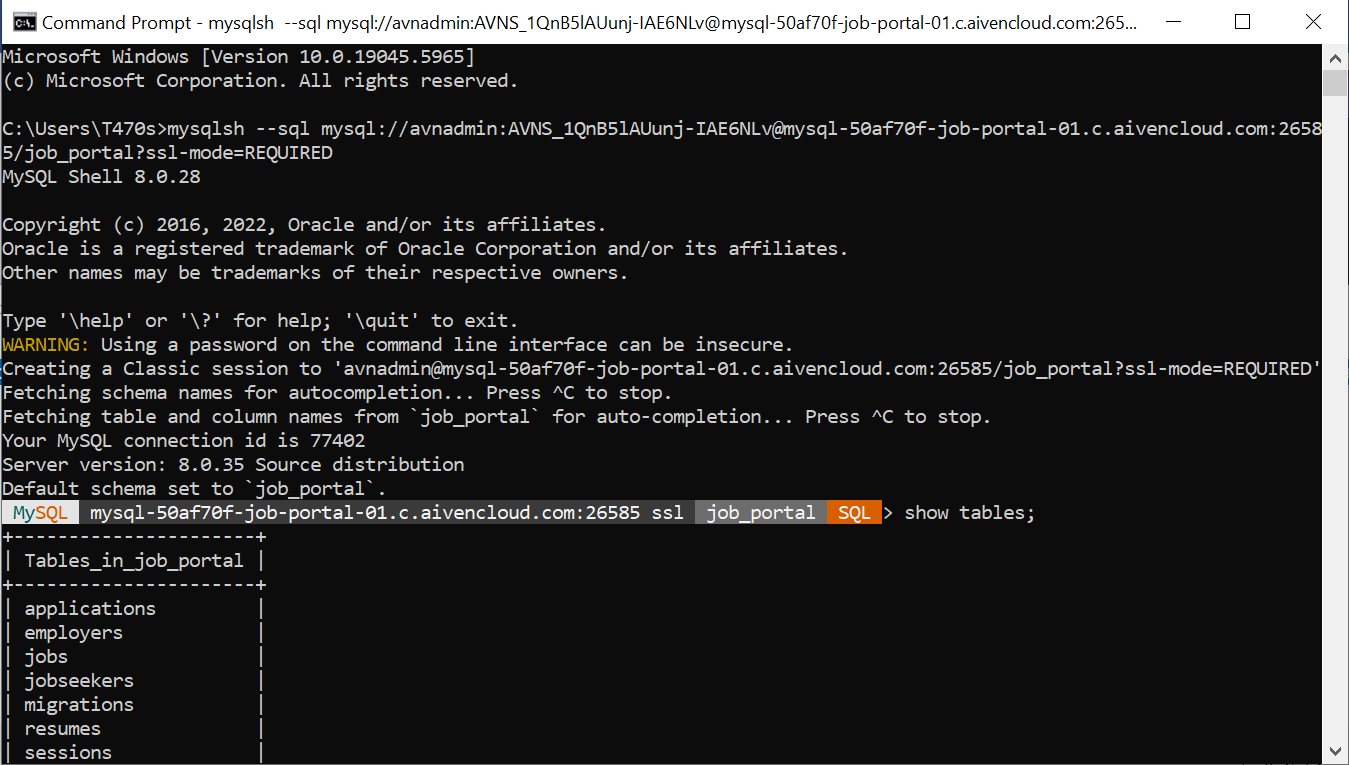
**7.4 CONFIGURING VARIABLE:**

• After deployment, open the “Variables” tab in Railway.  
• Add the following environment variables (from your .env file):





**7.5 ACCESS USING MYSQL CLIENT:**

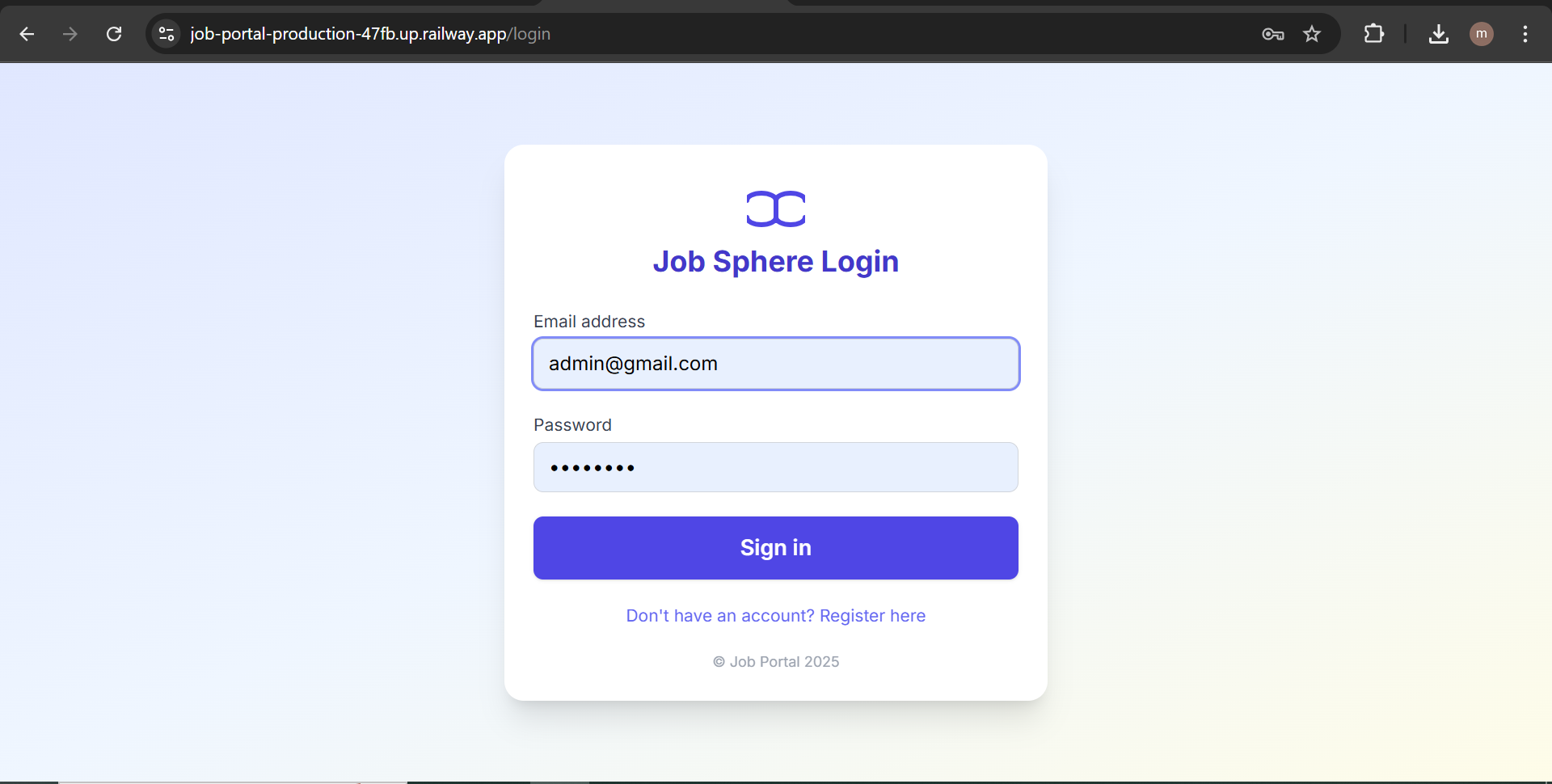


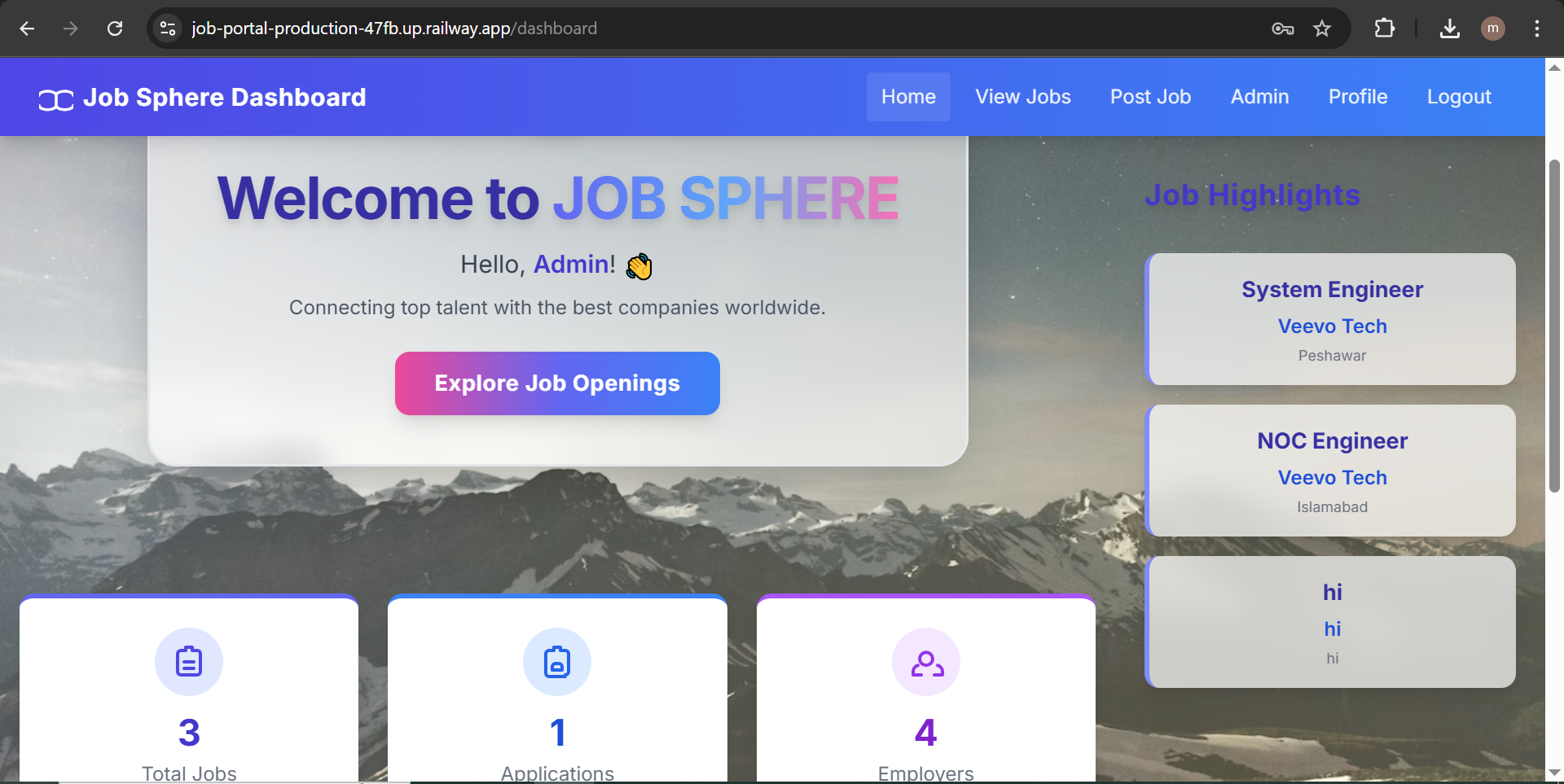
## **8. SYSTEM FUNCTIONALITY**

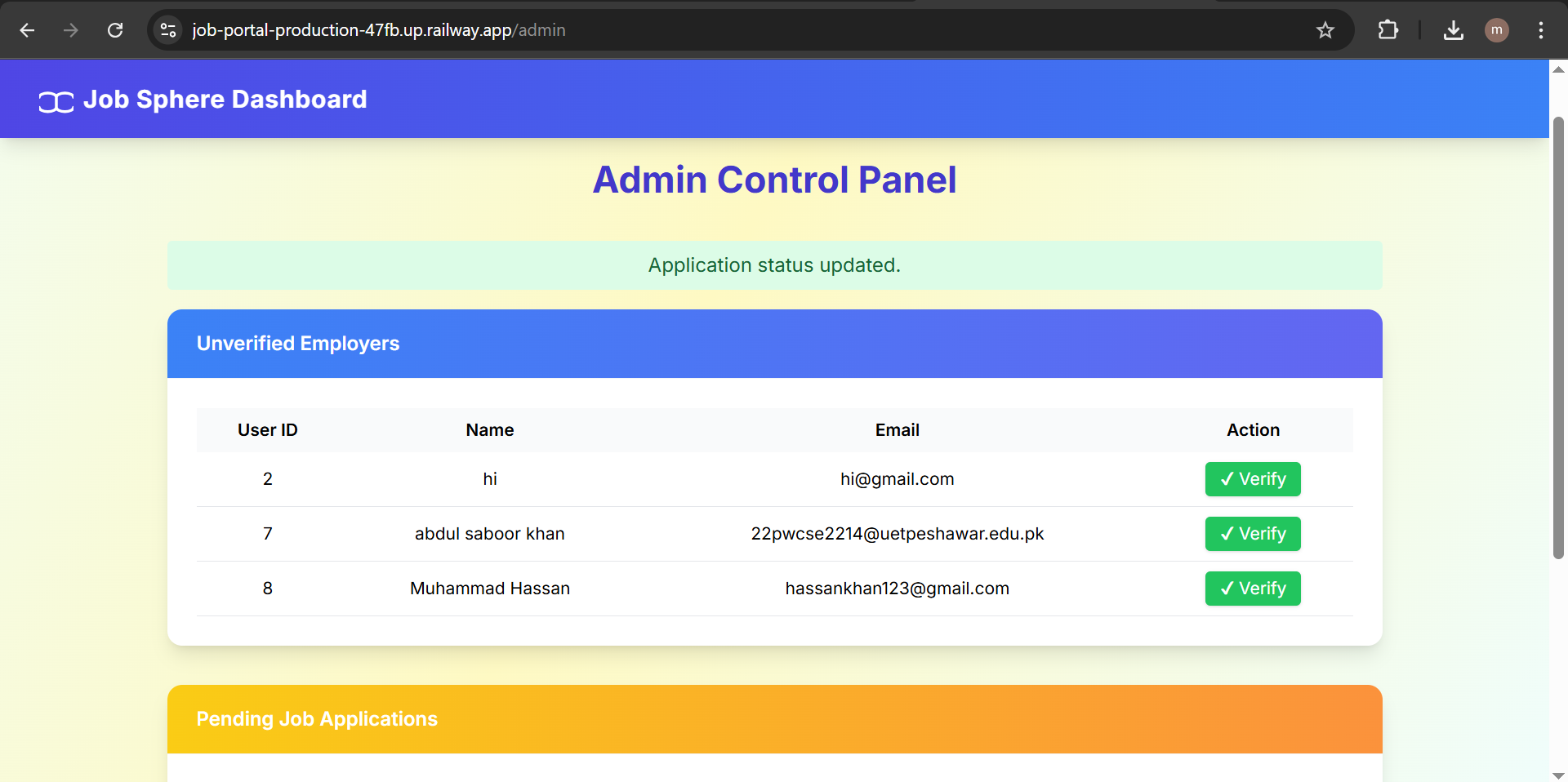
**8.1 ROLE-BASED ACCESS CONTROL (RBAC)**

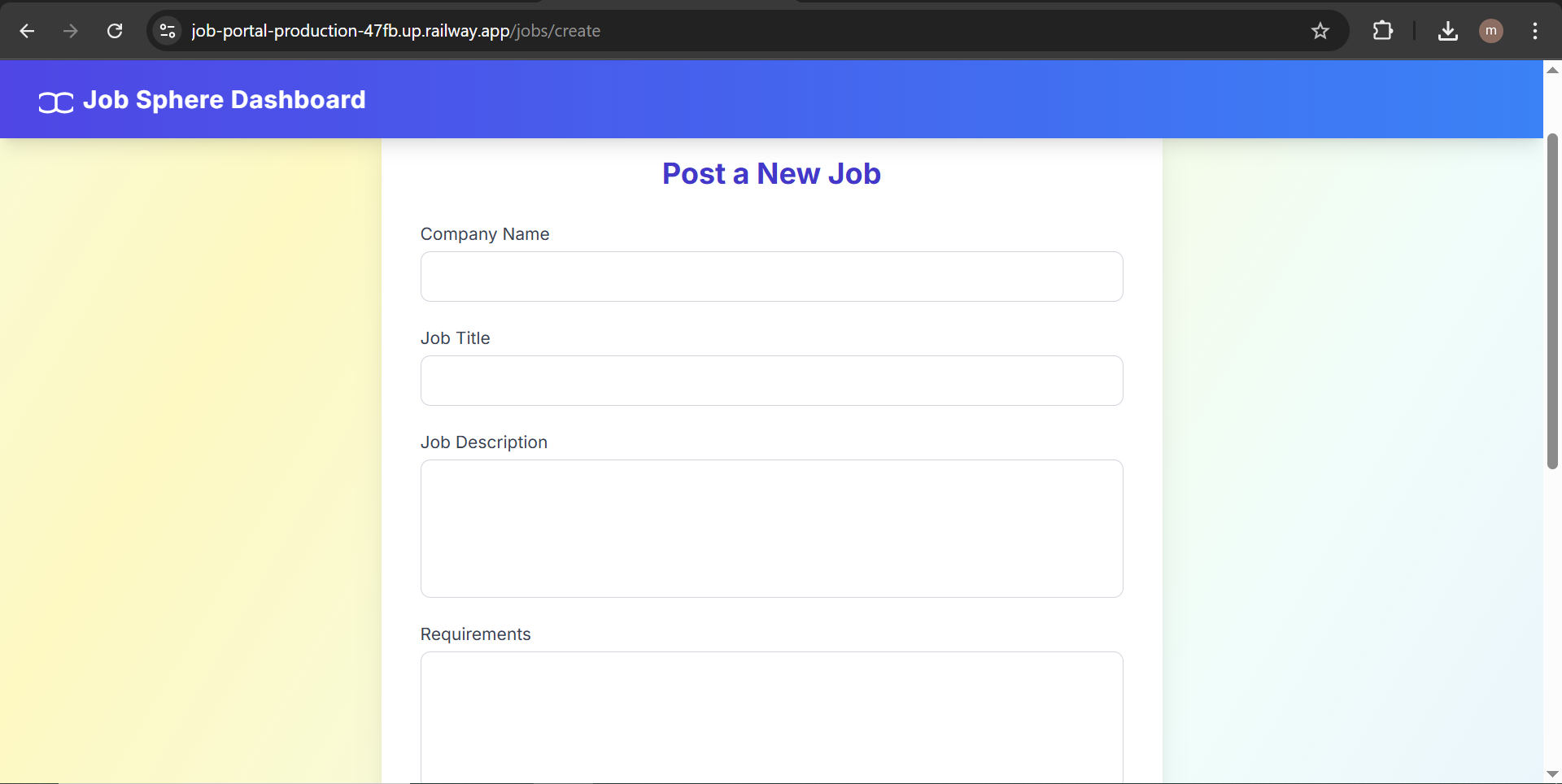
#### **8.1.1 ADMINISTRATOR FUNCTIONS**

* **User Management:** View, verify, and manage user accounts
* **Content Moderation:** Review and approve job postings
* **Application Oversight:** Monitor application status and statistics
* **System Analytics:** Generate reports on platform usage
* **Employer Verification:** Approve or reject employer registrations



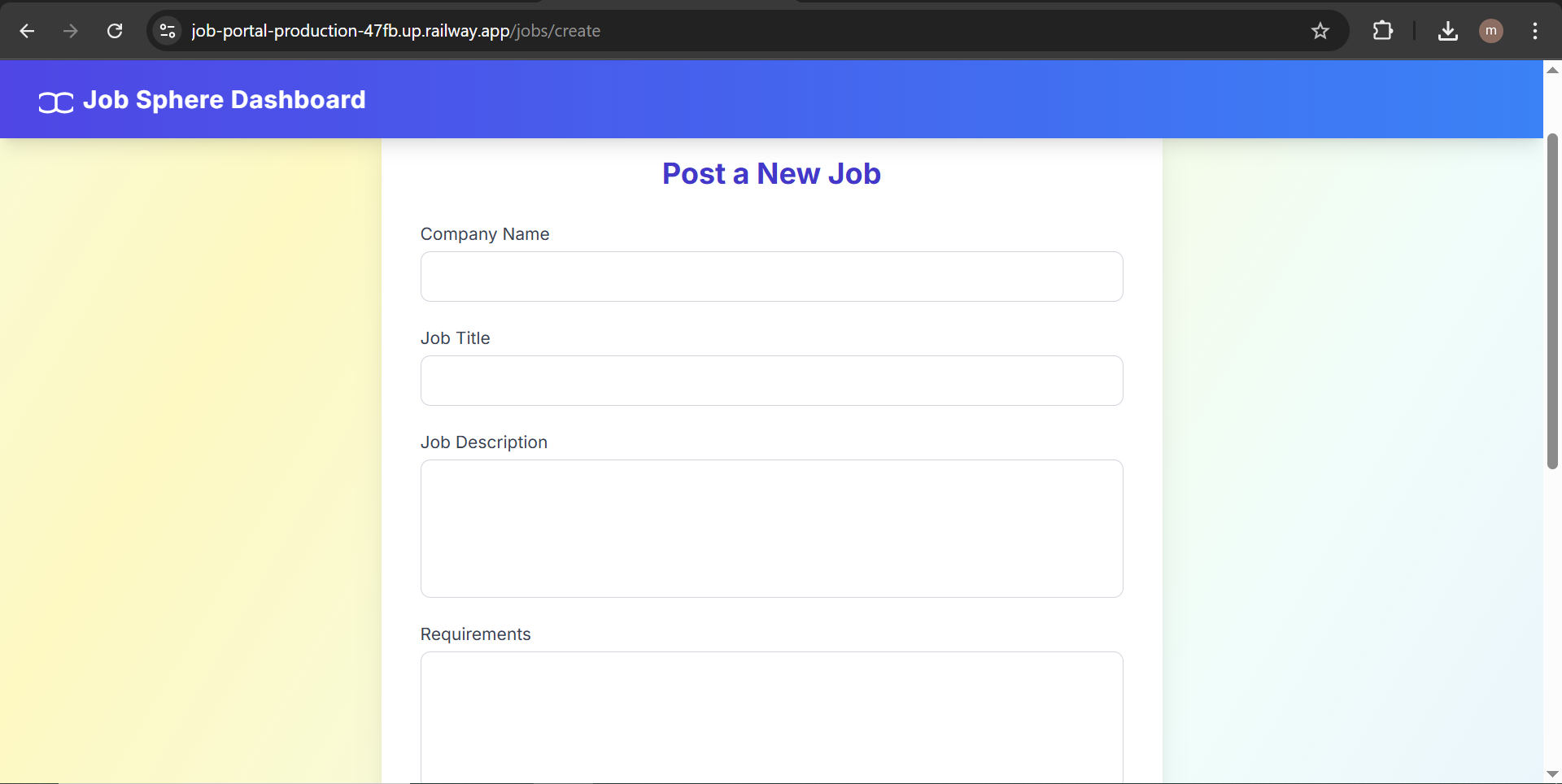






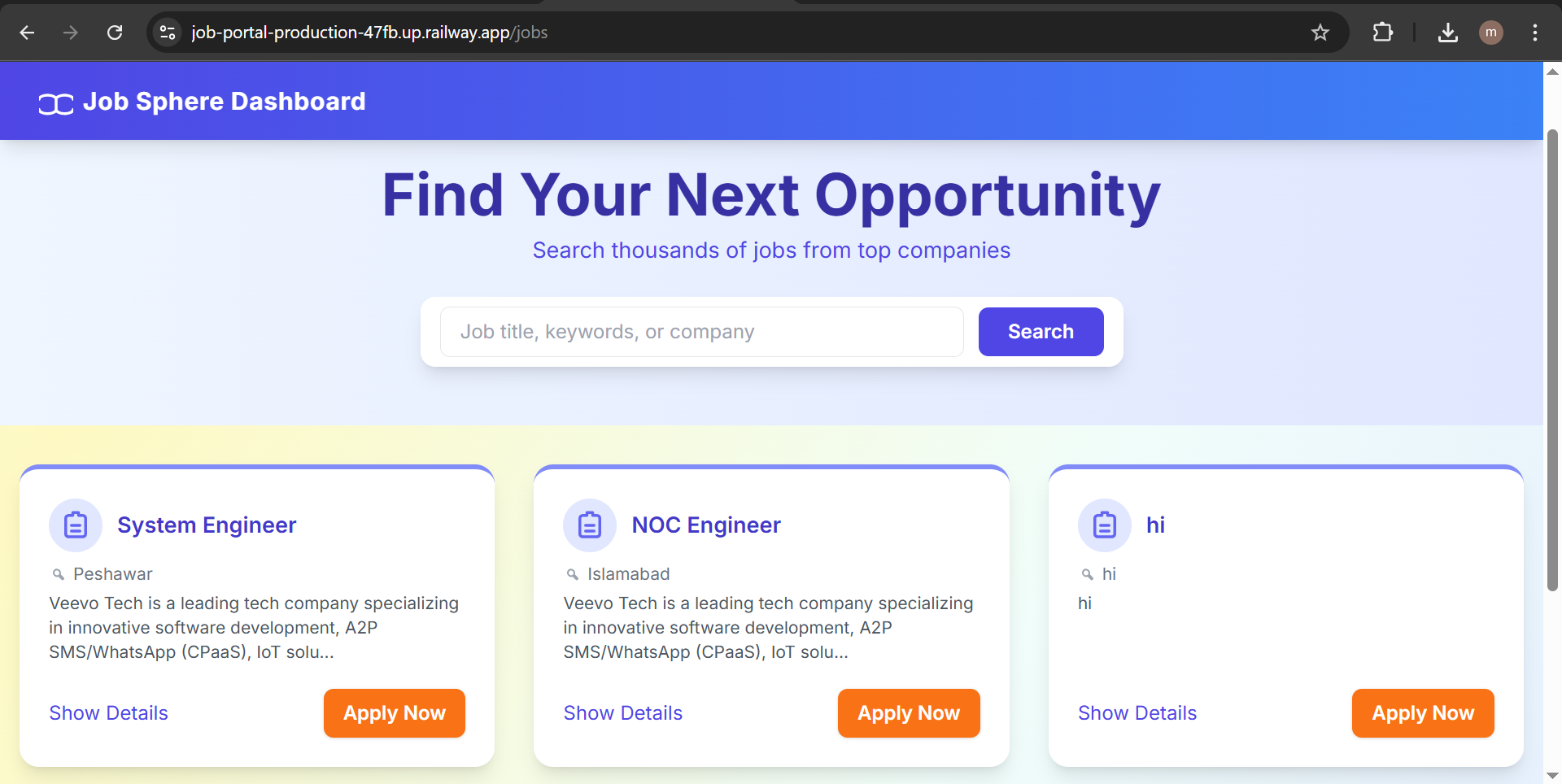
#### **8.1.2 EMPLOYER FUNCTIONS**

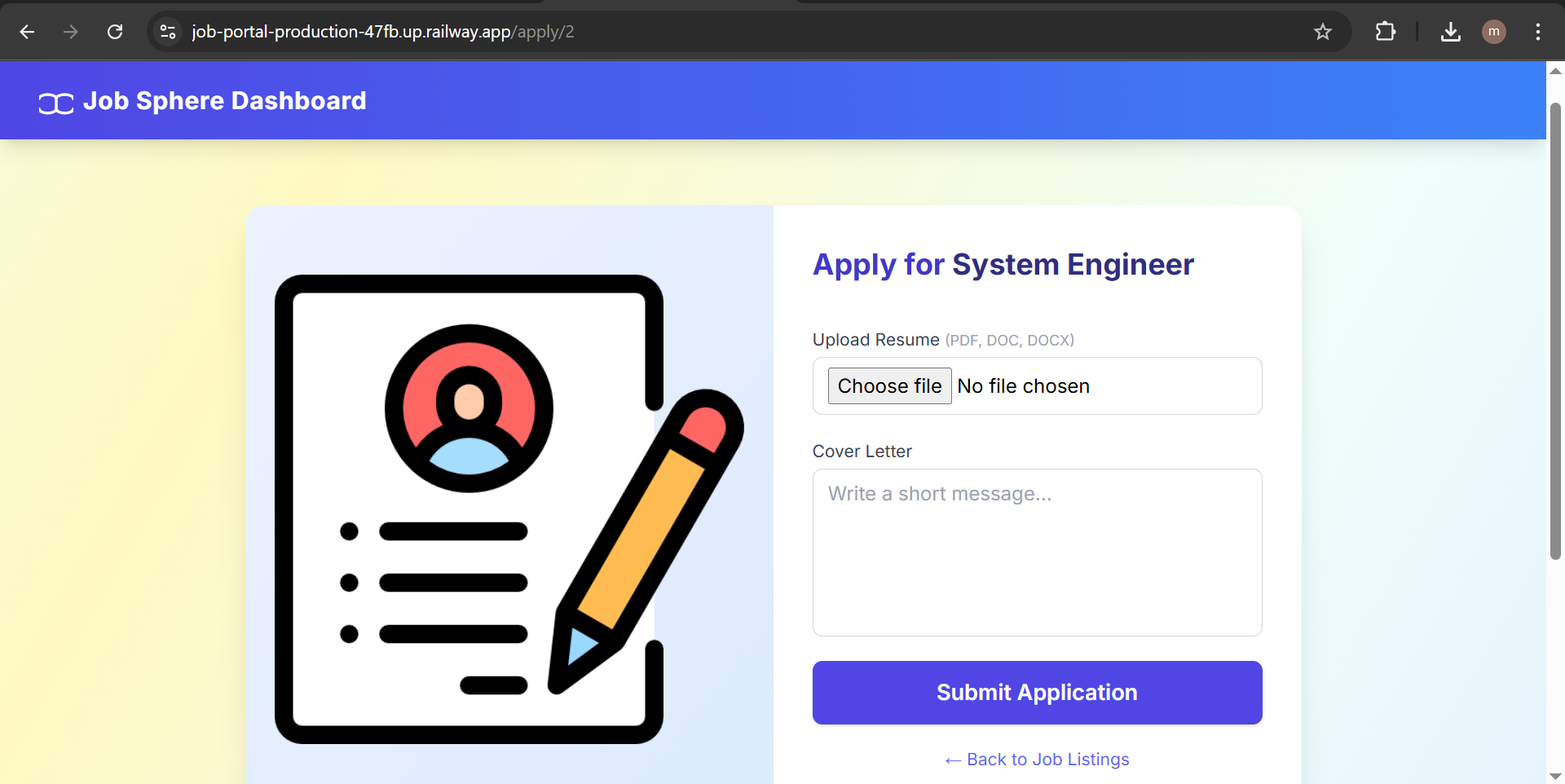
* **Job Management:** Create, edit, and delete job postings
* **Application Review:** View and manage received applications
* **Company Profile:** Update company information and branding
* **Candidate Communication:** Send messages to applicants
* **Analytics Dashboard:** Track job posting performance

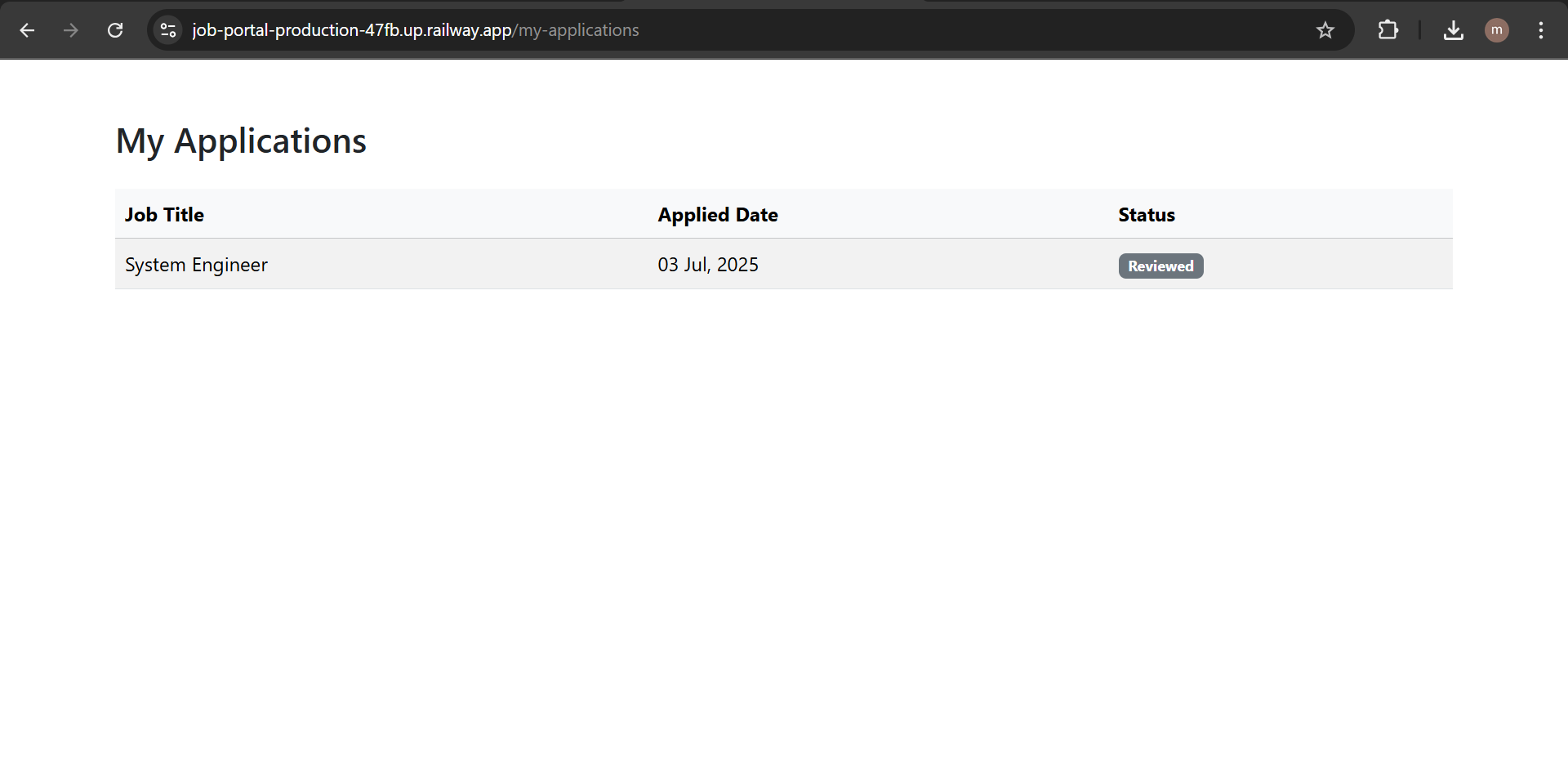


#### **8.1.3 JOB SEEKER FUNCTIONS**

* **Profile Management:** Update personal information and skills
* **Resume Upload:** Store and manage multiple resume versions
* **Job Search:** Filter and search available positions
* **Application Tracking:** Monitor application status and history
* **Notification Center:** Receive updates on application progress





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## **9. SECURITY IMPLEMENTATION**

**9.1 ACCESS CONTROL**

* **Authentication:** Multi-factor authentication support
* **Authorization:** Role-based permissions system
* **Data Validation:** Server-side input validation
* **File Upload Security:** MIME type validation and virus scanning
* **Rate Limiting:** API request throttling

## 

## **10. FUTURE ENHANCEMENTS**

**10.1 SCALABILITY IMPROVEMENTS**

* **Microservices Architecture:** Service decomposition for better scalability
* **API Development:** RESTful API for mobile app integration
* **Real-time Features:** WebSocket integration for instant notifications
* **Machine Learning:** Job recommendation algorithms
* **Analytics Platform:** Advanced reporting and business intelligence

**10.2 FEATURE EXPANSIONS**

* **Video Interviews:** Integrated video conferencing
* **Skills Assessment:** Online testing and certification
* **Social Features:** Professional networking capabilities
* **Mobile Application:** Native iOS and Android apps
* **Multi-language Support:** Internationalization features

## 

## **11. CONCLUSION**

11.1 CONCLUSION:

Job Sphere represents a comprehensive demonstration of database management system principles applied to real-world problem-solving. Through careful design, implementation, and deployment, we have created a scalable, secure, and user-friendly platform that addresses genuine market needs.

11.2 THE PROJECT SUCCESSFULLY DEMONSTRATES:

* **Database Design Excellence:** Normalized schema with proper relationships
* **Full-stack Development:** Complete web application with modern technologies
* **Cloud Deployment:** Production-ready hosting with proper CI/CD
* **Security Implementation:** Industry-standard security practices
* **Performance Optimization:** Efficient queries and caching strategies

This experience has provided invaluable insights into enterprise-level application development, from conception through deployment, preparing us for professional software development careers.



## **12. REFERENCES**

12.1 REFERENCES

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12.2 DEPLOYMENT URL:

**Live Application URL:** <https://job-portal-production-47fb.up.railway.app>

12.3 GITHUB LINK:

**GitHub Repository:** <https://github.com/AK-programming/job-portal.git>

### 