

Alumni Management & Career Bridge System – AI Friendly Blueprint

1. Problem Description

Most institutions lack a centralized alumni management system. Data gets scattered, communication is limited to informal groups, and institutions lose opportunities for engagement, mentorship, internships, and fundraising.

2. Core Principles

1. All alumni data must be accurate, verified, secure, auditable.
2. Alumni cannot directly add jobs or courses.
3. Only Colleges, Employers, and Course Providers can update or verify records.
4. Each record goes through an Approval Workflow:
 - Alumni Request → Employer/Provider Verify → College Final Approval → Record Locked.
5. Once verified, records are immutable except via a dispute process.

3. Stakeholders

- Alumni
- Colleges / Universities
- Employers / Recruiters
- Course Providers
- Administrators
- Current Students (benefit via mentorship, internships)

4. Major Features

- Aadhaar OTP Verification for alumni
- Centralized Repository (academic, career, courses, achievements)
- Approval Workflow with Audit Trail
- AI Career Bridge (mentors, job suggestions, career roadmap)
- Digital Alumni ID (QR code)
- Interactive Alumni Map
- Job Referral System
- Messaging & Networking Hub
- Fundraising & Donations

5. Database Tables (19 Entities with Columns)

(S.No – TableName – Columns)

1. User

- **userId** (PK, UUID)
 - **email** (VARCHAR)
 - **passwordHash** (VARCHAR)
 - **role** (ENUM: UserRole)
2. **College**
- **collegeId** (PK)
 - **name**
 - **verificationStatus** (ENUM)
3. **Company**
- **companyId** (PK)
 - **name**
 - **verificationStatus** (ENUM)
4. **Course_Provider**
- **providerId** (PK)
 - **name**
 - **verificationStatus** (ENUM)
5. **AlumniProfile**
- **alumniUserId** (PK, FK → User)
 - **collegeId** (FK → College)
 - **firstName**
 - **lastName**
 - **phone**
 - **privacySettings** (JSON)
6. **Digital_ID**
- **idToken** (PK)
 - **alumniUserId** (FK → AlumniProfile)
 - **isValid** (BOOLEAN)
7. **Audit_Log**
- **logId** (PK, BIGINT)
 - **targetRecordId** (UUID)
 - **recordType**
 - **action**
 - **actionByUserId** (FK → User)
8. **Academic_Record**
- **recordId** (PK)
 - **alumniUserId** (FK)
 - **collegeId** (FK)
 - **degreeName**
 - **status** (ENUM: RecordStatus)
9. **Work_Experience**
- **experienceId** (PK)
 - **alumniUserId** (FK)
 - **companyId** (FK)
 - **jobTitle**
 - **status** (ENUM: RecordStatus)
10. **Professional_Course**

- **courseRecordId (PK)**
- **alumniUserId (FK)**
- **providerId (FK)**
- **courseName**
- **status (ENUM: RecordStatus)**

11. **Message**

- **messageId (PK, BIGINT)**
- **senderId (FK → User)**
- **receiverId (FK → User)**
- **content (TEXT)**

12. **Job_Posting**

- **jobId (PK)**
- **postedByUserId (FK → User)**
- **companyId (FK)**
- **title**
- **type (ENUM: JobType)**
- **status (ENUM: JobStatus)**

13. **Event**

- **eventId (PK)**
- **collegeId (FK → College)**
- **title**
- **location**

14. **Internship_Feedback**

- **feedbackId (PK)**
- **internUserId (FK → User)**
- **companyId (FK)**
- **feedbackContent (JSON)**

15. **Fundraising_Campaign**

- **campaignId (PK)**
- **collegeId (FK → College)**
- **title**
- **goalAmount (DECIMAL)**
- **status (ENUM: CampaignStatus)**

16. **Donation**

- **donationId (PK)**
- **campaignId (FK → Campaign)**
- **donorUserId (FK → AlumniProfile)**
- **amount (DECIMAL)**

17. **Connection**

- **requesterId (FK → User)**
- **approverId (FK → User)**
- **status (ENUM: ConnectionStatus)**

18. **Event_RSVP**

- **eventId (FK → Event)**
- **alumniUserId (FK → AlumniProfile)**
- **status (ENUM: RsvpStatus)**

19. User_Affiliation

- `userId` (FK → User)
- `entityId` (College/Company/Provider)

◆ Backend Project Structure (Spring Boot)

`src/main/java/com/yourorg/alumni/`

| — `AlumniApplication.java` // Main entrypoint

|

| — `config/` // App-level Configurations

| | — `SwaggerConfig.java`

| | — `DatabaseConfig.java`

| | — `AadhaarConfig.java`

| | — `SecurityConfig.java`

|

| — `entity/` // 19 Entities (map 1:1 with DB tables)

| | — `User.java`

| | — `College.java`

| | — `Company.java`

| | — `CourseProvider.java`

| | — `AlumniProfile.java`

| | — `DigitalId.java`

| | — `AuditLog.java`

| | — `AcademicRecord.java`

| | — `WorkExperience.java`

- | |—— ProfessionalCourse.java
- | |—— Message.java
- | |—— JobPosting.java
- | |—— Event.java
- | |—— InternshipFeedback.java
- | |—— FundraisingCampaign.java
- | |—— Donation.java
- | |—— Connection.java
- | |—— EventRsvp.java
- | |—— UserAffiliation.java
- |
- |—— repository/ // Spring Data JPA Interfaces
- | |—— UserRepository.java
- | |—— CollegeRepository.java
- | |—— CompanyRepository.java
- | |—— CourseProviderRepository.java
- | |—— AlumniProfileRepository.java
- | |—— DigitalIdRepository.java
- | |—— AuditLogRepository.java
- | |—— AcademicRecordRepository.java
- | |—— WorkExperienceRepository.java
- | |—— ProfessionalCourseRepository.java
- | |—— MessageRepository.java
- | |—— JobPostingRepository.java
- | |—— EventRepository.java
- | |—— InternshipFeedbackRepository.java

| |—— FundraisingCampaignRepository.java

| |—— DonationRepository.java

| |—— ConnectionRepository.java

| |—— EventRsvpRepository.java

| |—— UserAffiliationRepository.java

|

|—— dto/ // Request/Response DTOs

| |—— LoginRequest.java

| |—— RegisterRequest.java

| |—— AadhaarVerificationRequest.java

| |—— UserResponse.java

| |—— AlumniProfileRequest.java

| |—— AlumniProfileResponse.java

| |—— AcademicRecordDto.java

| |—— WorkExperienceRequest.java

| |—— WorkExperienceResponse.java

| |—— CourseRequest.java

| |—— CourseResponse.java

| |—— JobRequest.java

| |—— JobResponse.java

| |—— EventRequest.java

| |—— EventResponse.java

| |—— CampaignRequest.java

| |—— CampaignResponse.java

| |—— DonationRequest.java

| |—— DonationResponse.java

```
| |—— ConnectionRequest.java
| |—— ConnectionResponse.java
| |—— MessageRequest.java
|
|—— service/           // Service Interfaces
```

```
| |—— UserService.java
| |—— AuthService.java
| |—— AlumniService.java
| |—— CollegeService.java
| |—— CompanyService.java
| |—— CourseProviderService.java
| |—— AcademicService.java
| |—— WorkExperienceService.java
| |—— ProfessionalCourseService.java
| |—— JobService.java
| |—— EventService.java
| |—— FundraisingService.java
| |—— DonationService.java
| |—— ConnectionService.java
| |—— MessageService.java
| |—— VerificationService.java
|
```

```
|—— service/impl/      // Implementations
| |—— UserServiceImpl.java
| |—— AuthServiceImpl.java
| |—— AlumniServiceImpl.java
```

- | |—— **CollegeServiceImpl.java**
- | |—— **CompanyServiceImpl.java**
- | |—— **CourseProviderServiceImpl.java**
- | |—— **AcademicServiceImpl.java**
- | |—— **WorkExperienceServiceImpl.java**
- | |—— **ProfessionalCourseServiceImpl.java**
- | |—— **JobServiceImpl.java**
- | |—— **EventServiceImpl.java**
- | |—— **FundraisingServiceImpl.java**
- | |—— **DonationServiceImpl.java**
- | |—— **ConnectionServiceImpl.java**
- | |—— **MessageServiceImpl.java**
- | |—— **VerificationServiceImpl.java**

|—— **web/ // REST Controllers**

- | |—— **AuthController.java**
- | |—— **AlumniController.java**
- | |—— **CollegeAdminController.java**
- | |—— **EmployerController.java**
- | |—— **JobController.java**
- | |—— **EventController.java**
- | |—— **FundraisingController.java**
- | |—— **DonationController.java**
- | |—— **ConnectionController.java**
- | |—— **MessageController.java**

|—— security/ // Security & Auth

| |—— JwtUtil.java

| |—— JwtFilter.java

| |—— SecurityConfig.java

| |—— AadhaarOtpValidator.java

|

|—— util/ // Helpers & Utilities

| |—— EmailUtil.java

| |—— HashUtil.java

| |—— DateUtil.java

| |—— PdfGeneratorUtil.java

| |—— MapUtil.java

|

|—— audit/ // Auditing

| |—— AuditLog.java

| |—— AuditService.java

|

|—— exception/ // Error Handling

|—— ApiException.java

|—— NotFoundException.java

|—— UnauthorizedException.java

|—— ValidationException.java

|—— ConflictException.java

|—— GlobalExceptionHandler.java