LOVELY PROFESSIONAL UNIVERSITY

PROJECT SYNOPSIS REPORT

ON

Resume Analyzer and Job Matching System

SUBMITTED TO
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

FOR
Python Fullstack

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Resume Analyzer and Job Matching System

Abstract

The Resume Analyzer and Job Matching System is a comprehensive Django-based web application designed to automate the recruitment process through intelligent resume analysis and job matching. The system utilizes Natural Language Processing (NLP) techniques to extract skills, experience, and other relevant information from uploaded resumes (PDF/DOCX formats) and matches them with available job postings. The application features role-based authentication, automated skill matching algorithms, job application management, and administrative dashboards for efficient recruitment management.

Problem Statement

Traditional recruitment processes are time-consuming and often inefficient, requiring manual review of hundreds of resumes for each job posting. Recruiters spend significant time matching candidate skills with job requirements, leading to:

1. **Time-consuming manual review**: HR personnel manually review each resume against job requirements
2. **Inconsistent evaluation**: Human bias and varying evaluation criteria lead to inconsistent candidate assessment
3. **Missed opportunities**: Qualified candidates might be overlooked due to manual screening limitations
4. **Poor candidate experience**: Lengthy response times and lack of transparency in the application process
5. **Inefficient resource utilization**: Valuable HR time spent on repetitive tasks instead of strategic activities

Objective

The primary objectives of this system are:

1. **Automate resume parsing**: Extract structured data from unstructured resume documents
2. **Intelligent job matching**: Implement AI-driven algorithms to match candidates with suitable job opportunities
3. **Streamline application process**: Provide a seamless platform for job seekers to apply and track applications
4. **Enhance recruiter efficiency**: Offer administrative tools for job posting and application management
5. **Improve transparency**: Provide real-time application status updates and match scores
6. **Profile recommendations**: Suggest career paths based on candidate skills and experience

Major Modules

1. Authentication Module (`authentication/`)

1. **User Management**: Custom user model with role-based access control (Admin/User)

2. **Profile Management**: Extended user profiles with additional information
3. **Security**: Django's built-in authentication with custom user model

2. Resume Analyzer Module (`analyzer/`)

1. **Resume Upload**: File upload functionality supporting PDF and DOCX formats
2. **Data Extraction**: NLP-based parsing using spaCy for skill and information extraction
3. **Profile Suggestions**: AI-driven career profile recommendations based on extracted skills
4. **Cloud Storage**: Integration with Cloudinary for secure file storage

3. Job Management Module (`jobs/`)

1. **Job Posting**: Administrative interface for creating and managing job listings
2. **Application Processing**: Automated application handling with skill matching
3. **Status Tracking**: Real-time application status updates and notifications
4. **Match Scoring**: Algorithmic calculation of candidate-job compatibility scores

Minor Modules

1. File Processing Utils (`analyzer/utils.py`)

1. PDF text extraction using pdfminer
2. DOCX document processing
3. Named Entity Recognition (NER) for name extraction
4. Section-based content parsing (Experience, Education, Projects, Certificates)

2. Job Utilities (`jobs/utils.py`)

1. Resume-job matching algorithms
2. Skill comparison and scoring functions
3. Application status management utilities

3. Template Tags (`jobs/templatetags/`)

1. Custom Django template filters for enhanced UI functionality
2. Job-specific display utilities

4. Administrative Tools

1. Django admin interface customization
2. Bulk application management
3. Advanced filtering and search capabilities

Tools Used

Backend Technologies

1. **Django 5.2.3**: Python web framework for rapid development
2. **Python 3.13**: Programming language
3. **spaCy**: Natural Language Processing library for text analysis
4. **pdfminer**: PDF text extraction library
5. **python-docx**: Microsoft Word document processing

Frontend Technologies

1. **HTML5**: Markup language for web pages
2. **Tailwind CSS**: Utility-first CSS framework for responsive design
3. **JavaScript**: Client-side scripting for dynamic interactions

Cloud Services

1. **Cloudinary**: Cloud-based image and file management service
2. **PostgreSQL**: Production database (via DATABASE_URL configuration)

Development Tools

1. **Django ORM**: Object-Relational Mapping for database interactions
2. **Django Admin**: Administrative interface
3. **Django Forms**: Form handling and validation
4. **Django Migrations**: Database schema management

Database

Database Management System

1. **Development**: SQLite3 (default Django database)
2. **Production**: PostgreSQL (configured via environment variables)
3. **Cloud Integration**: Cloudinary for file storage

Key Database Models

1. CustomUser Model

- id (Primary Key)
- username (Unique)
- email (Unique)
- first_name
- last_name
- role (Admin/User)
- password (Hashed)

2. Resume Model

- id (Primary Key)
- name
- cv (FileField)
- cv_url (CloudinaryURL)

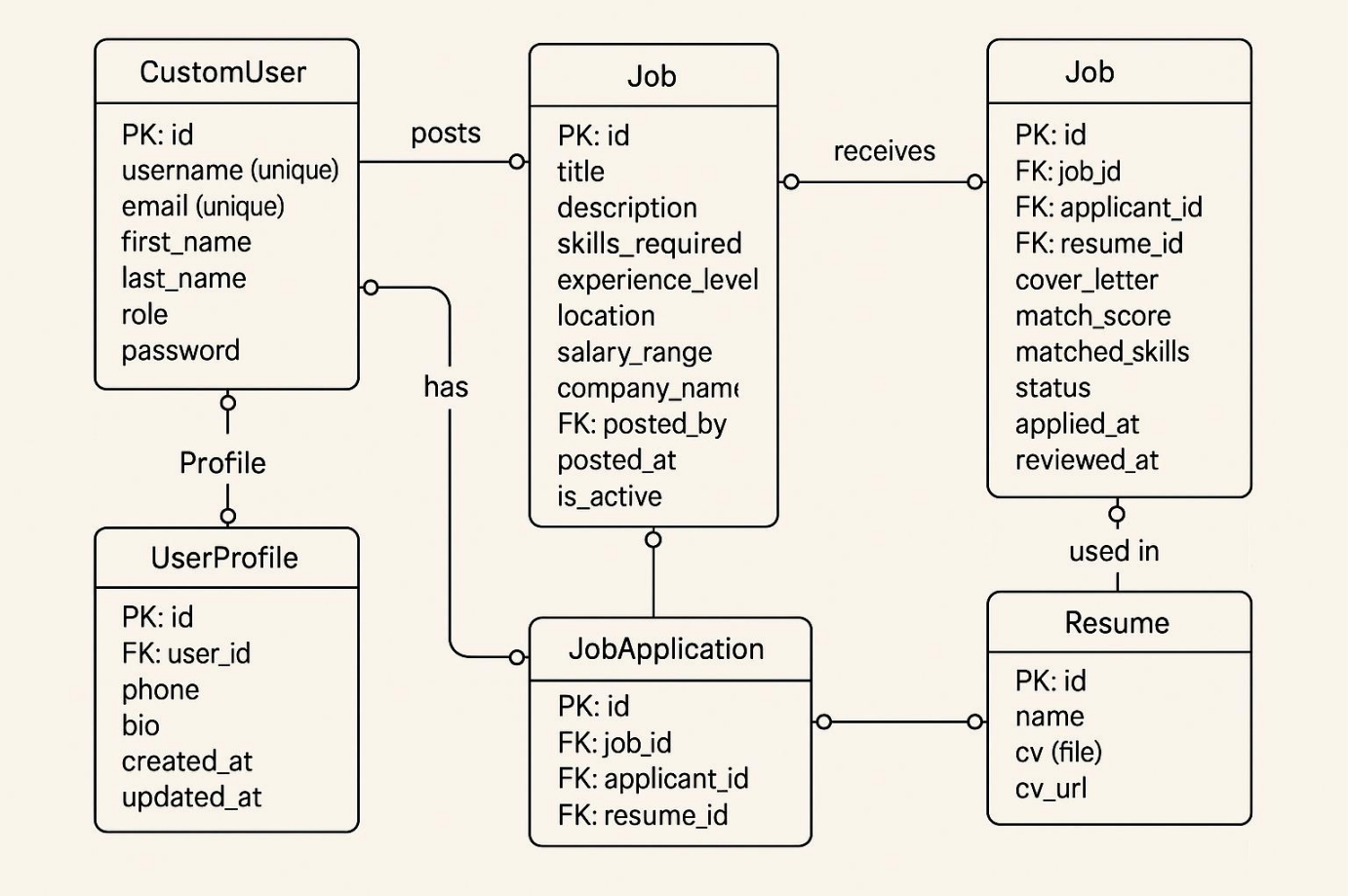
3. Job Model

- id (Primary Key)
- title
- description
- skills_required
- experience_level
- location
- salary_range
- company_name
- posted_by (Foreign Key to User)
- posted_at
- is_active

4. JobApplication Model

- id (Primary Key)
- job (Foreign Key to Job)
- applicant (Foreign Key to User)
- resume (Foreign Key to Resume)
- cover_letter
- match_score
- matched_skills (JSON)
- status
- applied_at
- reviewed_at

ER Diagram



Description

The Resume Analyzer and Job Matching System is designed to revolutionize the recruitment process through automation and intelligent matching. The system workflow operates as follows:

User Journey

1. **Registration**: Users register with role selection (Job Seeker/Admin)
2. **Resume Upload**: Job seekers upload their resumes in PDF/DOCX format
3. **Automatic Analysis**: The system extracts skills, experience, and other relevant data
4. **Job Matching**: AI algorithms match user profiles with available job postings
5. **Application Submission**: Users can apply to jobs with pre-filled information
6. **Status Tracking**: Real-time updates on application status and progress

Administrative Features

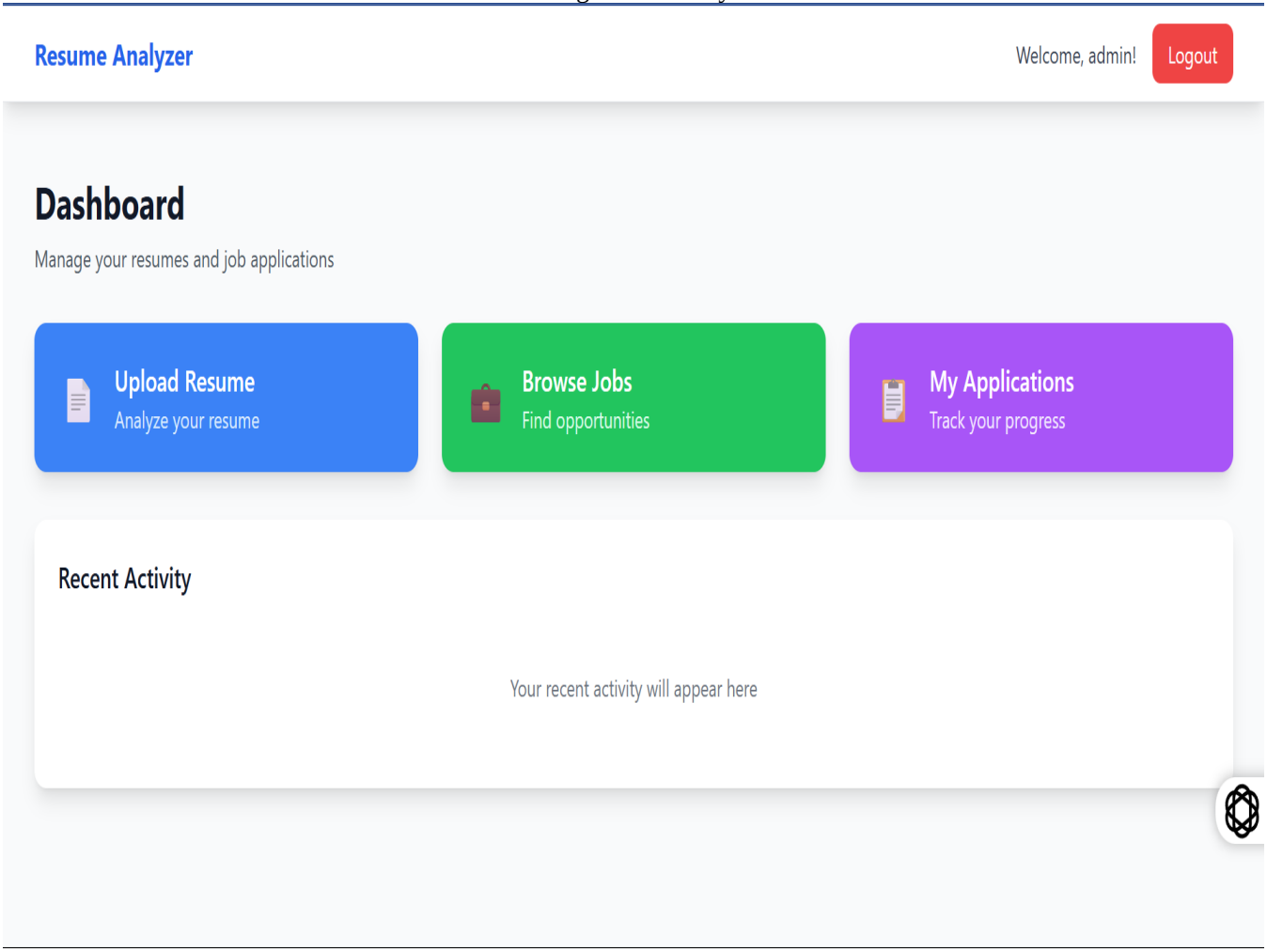
1. **Job Management**: Create, edit, and manage job postings
2. **Application Review**: Review applications with match scores and candidate details
3. **Bulk Operations**: Handle multiple applications efficiently
4. **Analytics Dashboard**: Track application metrics and system performance

Key Features

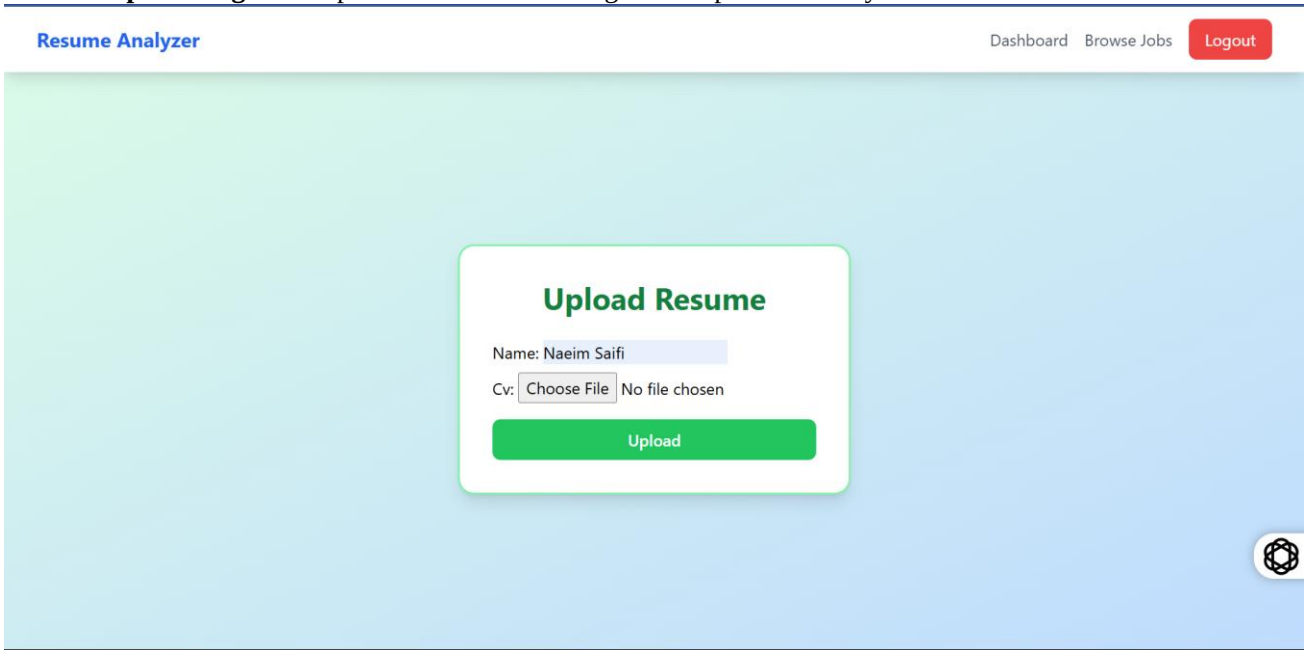
1. **Intelligent Parsing**: Advanced NLP techniques extract structured data from unstructured resumes
2. **Skill Matching**: Sophisticated algorithms calculate compatibility scores
3. **Auto-Application**: High-match candidates (80%+ score) are automatically applied and accepted
4. **Career Suggestions**: AI-driven career path recommendations
5. **Cloud Integration**: Secure file storage and management
6. **Responsive Design**: Mobile-friendly interface using Tailwind CSS

Screenshots

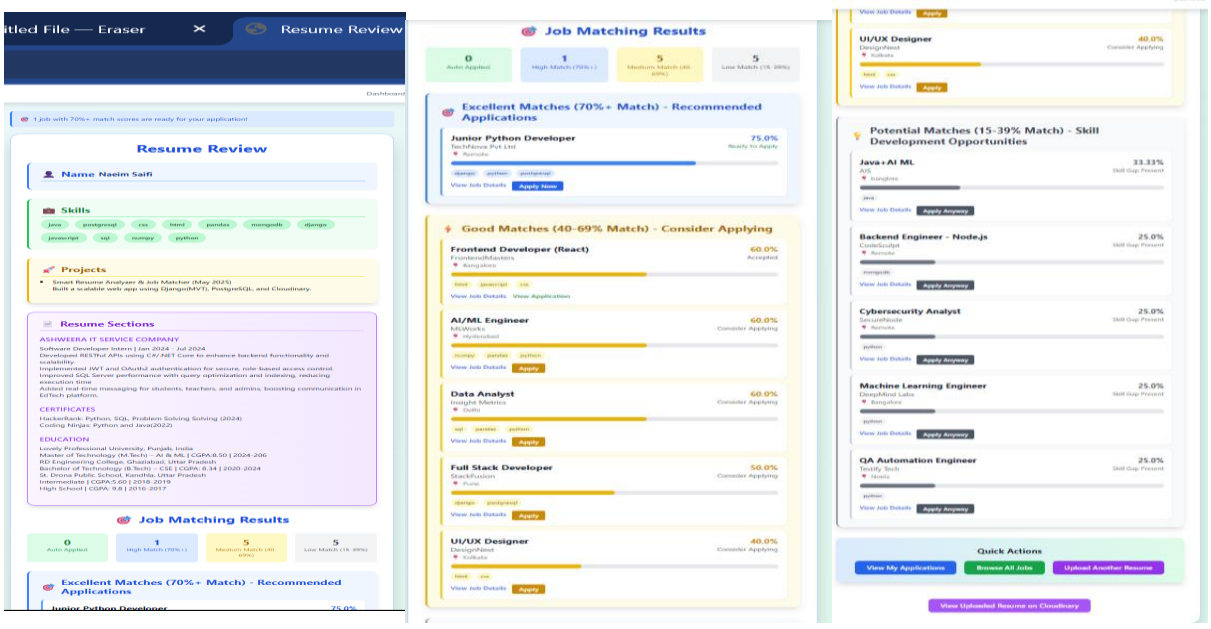
1. **Dashboard Interface**: Main user dashboard with navigation and key features



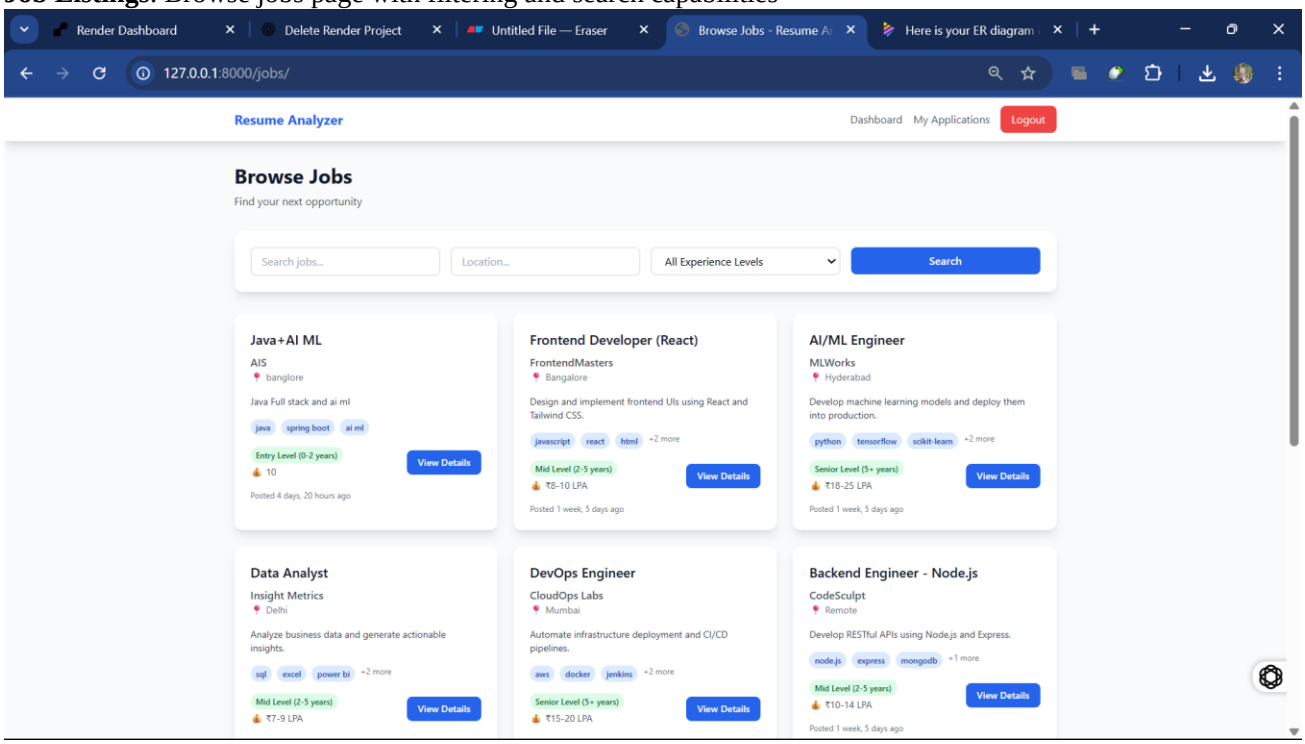
2. **Resume Upload Page**: File upload interface with drag-and-drop functionality



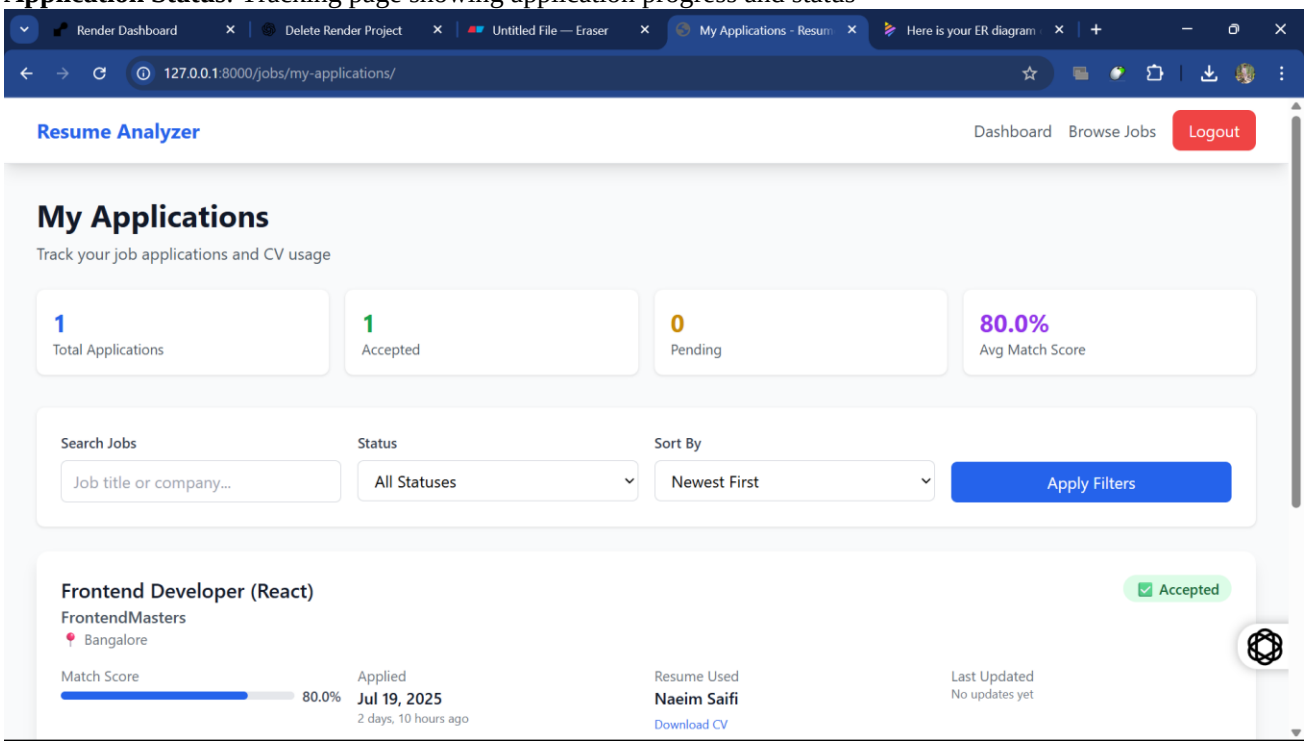
3. **Analysis Results**: Detailed resume analysis with extracted skills and job matches



4. **Job Listings**: Browse jobs page with filtering and search capabilities



5. **Application Status**: Tracking page showing application progress and status



Feature Enhancement

Proposed Enhancements

1. Advanced AI Integration

1. **Machine Learning Models**: Implement ML algorithms for improved matching accuracy
2. **Sentiment Analysis**: Analyze cover letters and job descriptions for better matching
3. **Predictive Analytics**: Forecast hiring success rates based on historical data

2. Communication Features

1. **In-app Messaging**: Direct communication between recruiters and candidates
2. **Interview Scheduling**: Integrated calendar system for interview management
3. **Notification System**: Real-time alerts and updates via email/SMS

3. Analytics and Reporting

1. **Performance Dashboards**: Comprehensive analytics for recruitment metrics
2. **Candidate Insights**: Detailed reports on candidate pools and trends
3. **ROI Tracking**: Measure recruitment efficiency and cost-effectiveness

4. Integration Capabilities

1. **ATS Integration**: Connect with existing Applicant Tracking Systems
2. **Social Media**: LinkedIn profile integration for enhanced candidate profiles
3. **Background Checks**: Third-party integration for verification services

5. Mobile Application

1. **Native Mobile Apps**: iOS and Android applications for better accessibility
2. **Offline Capabilities**: Allow offline resume viewing and basic operations
3. **Push Notifications**: Mobile-specific notification system

6. Enhanced Security

1. **Two-Factor Authentication**: Additional security layer for user accounts
2. **Data Encryption**: Enhanced data protection for sensitive information
3. **GDPR Compliance**: Complete compliance with data protection regulations

Conclusion

The Resume Analyzer and Job Matching System successfully addresses the challenges of traditional recruitment processes by leveraging modern web technologies and artificial intelligence. The system demonstrates significant improvements in efficiency, accuracy, and user experience compared to manual recruitment methods.