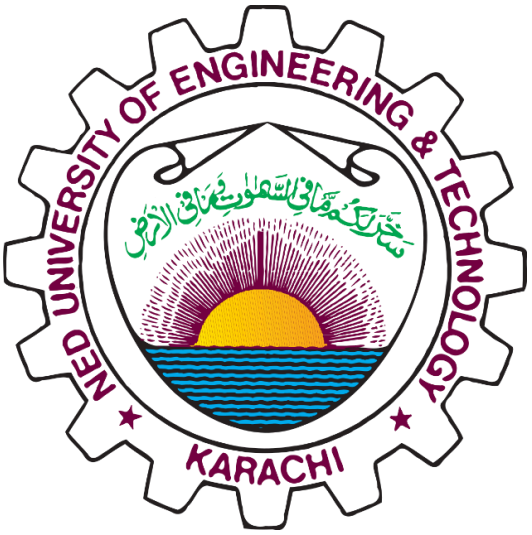


Department of Computer Science and Information Technology

Project Report

Course: Artificial Intelligence & Expert System (CT-361)
Submitted To: Sir. Abdullah Siddique

Group Members:

1. **Aina Hyder (CT-22017)**
2. **Iffat Iqbal (CT-22013)**
3. **Manahil Abdul Kareem (CT-22015)**
4. **Dua Salman (CT-22009)**

Smart Resume Parser & Career Recommendation

Introduction

In today's fast-paced corporate environment, the recruitment process demands efficiency, accuracy, and speed. With thousands of applications being submitted to job postings, manual resume screening has become a bottleneck. To solve this, a **Resume Parser** application automates the process of extracting structured information from unstructured resume documents (PDFs, DOCX, etc.).

This report describes the architecture, features, design, technologies, and future direction of a web-based Resume Parser that significantly streamlines recruitment and HR workflows.

Objective

The main goals of developing a Resume Parser are:

- **Automate Resume Analysis:** Reduce manual intervention in resume screening.
- **Accurate Data Extraction:** Extract fields like name, contact, skills, experience, education.
- **Improve Efficiency:** Save time and allow HR to focus on evaluation rather than data entry.
- **Standardized Output:** Normalize diverse resume styles into a common format.
- **Profile Generation:** Automatically generate structured candidate profiles from resumes.

System Overview

The Resume Parser is a cloud-hosted, web-based application that allows users (typically HR recruiters) to:

- Upload resumes in supported formats.
- Automatically extract relevant candidate data using Gen AI and parsing techniques.
- Store and visualize parsed information.

- Filter, search, and export resume data.

Key Features:

- Upload Panel
- Resume Parsing Engine
- Structured Candidate Display
- Search and Filter Interface
- Export Options (CSV/JSON)

Functional Specifications

4.1 Resume Upload Module

- Supports drag-and-drop and file picker.
- Accepts PDF and DOCX formats.
- Performs file type validation.
- Limits upload size.

4.2 Parsing Engine

- Extracts text content from resumes.
- Applies regex and NLP techniques to identify data fields.
- Maps data to profile sections (e.g., work experience, education).

4.3 Candidate Data Display

- Tabular view of all candidates.
- Detailed view for individual resume data.
- Editable fields.

4.4 Search and Filter

- Search by name, skills, company.

- Filter by years of experience, degree, location.

4.5 Export Functionality

- Export selected resumes in CSV/JSON format.
- Data backup options.

User Interface Design

The UI of the Resume Parser is designed with simplicity and usability in mind.

Main UI Elements:

- **Sidebar:** Navigation (Dashboard, Upload, Parsed Resumes, Settings)
- **Main Panel:** Displays candidate data or file upload window.
- **Top Bar:** Search, notifications, profile settings.

UI Principles:

- Mobile responsive
- Tooltips and inline help
- Consistent font and color theme

Technology Stack Used:

Frontend:

- Javascript, Chart.js
- HTML5, CSS or Bootstrap

Backend:

- Python (Flask), MongoDB, Google Gen AI
- RESTful APIs

Parsing Tools:

- PyPDF2 (PDF parsing)
- Python-docx (DOCX parsing)
- Built-in text file parsing (TXT files)

Database:

- MongoDB

Others:

- JSON for API responses
- JWT for user authentication
- GitHub for version control

User Interface Design

The UI of the Resume Parser is designed with simplicity and usability in mind.

Main UI Elements:

- **Sidebar:** Navigation (Dashboard, Upload, Parsed Resumes, Settings)
- **Main Panel:** Displays candidate data or file upload window.
- **Top Bar:** Search, notifications, profile settings.

UI Principles:

- Dark/light mode toggle
- Tooltips and inline help
- Consistent font and color theme

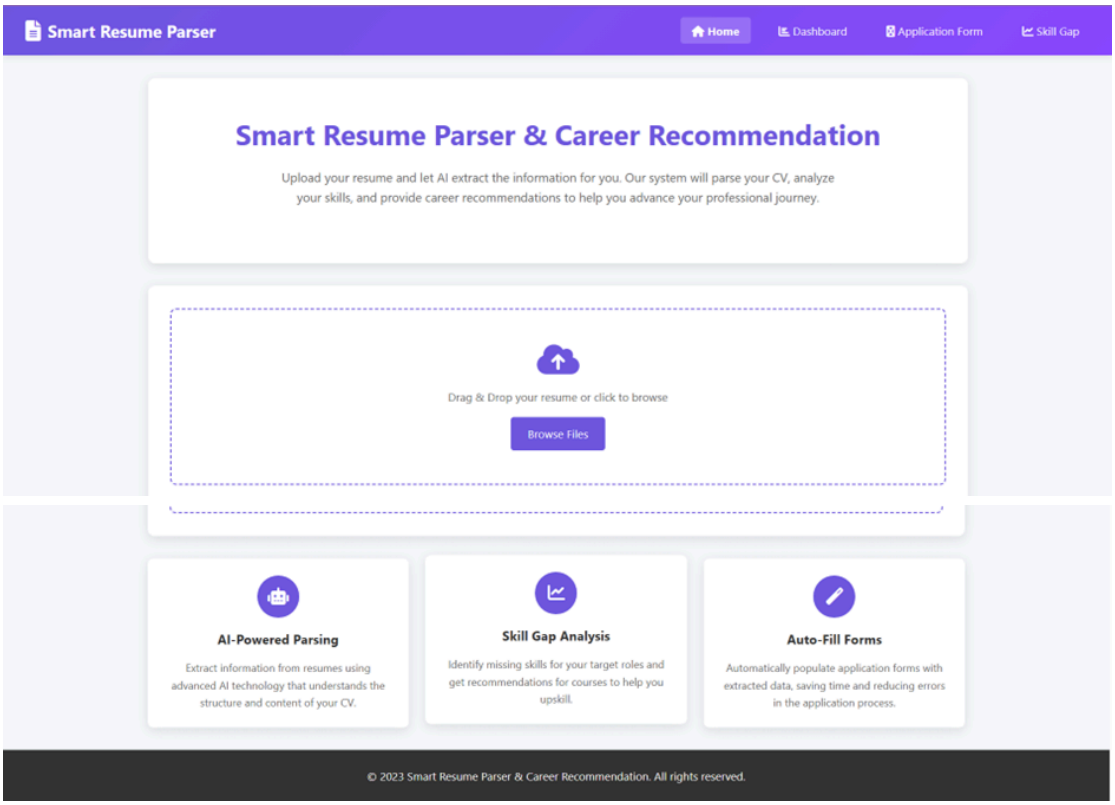
Home/Upload Page

The landing page where users can upload resumes for parsing. It provides an intuitive interface for file submission and displays the parsed results.

Key Features:

Resume Upload Section

- Drag-and-drop file upload area with visual feedback
- Support for multiple file formats (PDF, DOCX, TXT, CSV)
- File size validation and format checking
- Progress indicator during upload and parsing

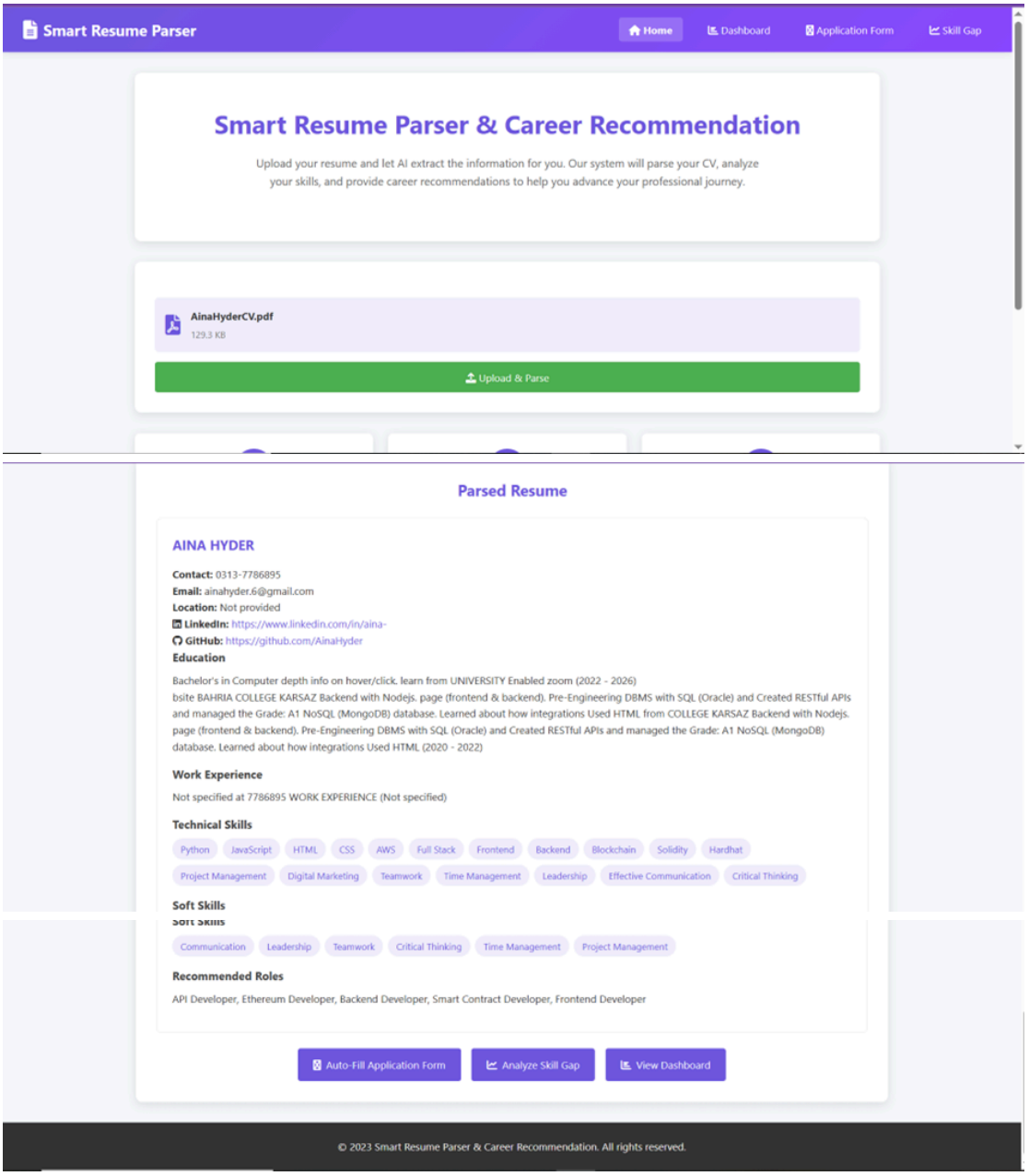


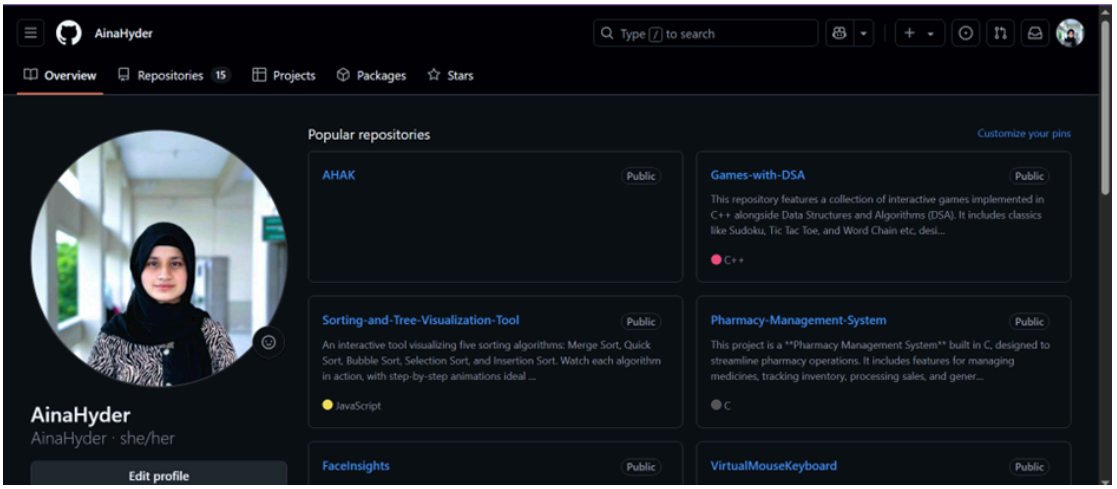
Parsed Resume Display

- Structured view of extracted information
- Tabs for different sections (Personal Info, Education, Experience, Skills)
- Option to edit incorrectly parsed information
- Confidence score indicators for AI-extracted fields

Action Buttons

- **View in Dashboard** button to navigate to the dashboard
- **Fill Application Form** button for auto-filling application forms
- **Analyze Skill Gap** button to perform skill gap analysis
- **Upload** Another Resume option





Dashboard Page

Overview: A comprehensive overview page displaying all parsed resumes with statistics, visualizations, and search functionality to help recruiters analyze their candidate pool.

Key Features:

Statistics Cards

- Total number of parsed resumes
- Most common skills across all resumes
- Distribution of education levels
- Average years of experience

Interactive Charts

- Skills distribution pie chart
- Experience level bar chart
- Education background breakdown
- Job roles distribution

Search and Filter

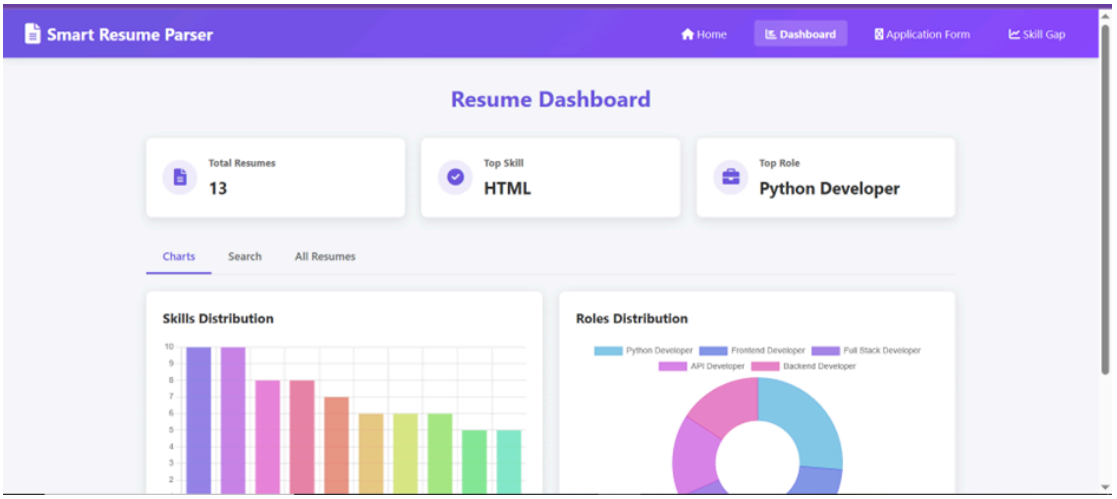
- Skill-based search with intelligent ranking
- Filters for education level, years of experience, and location
- Advanced search with multiple criteria
- Saved search templates for common queries

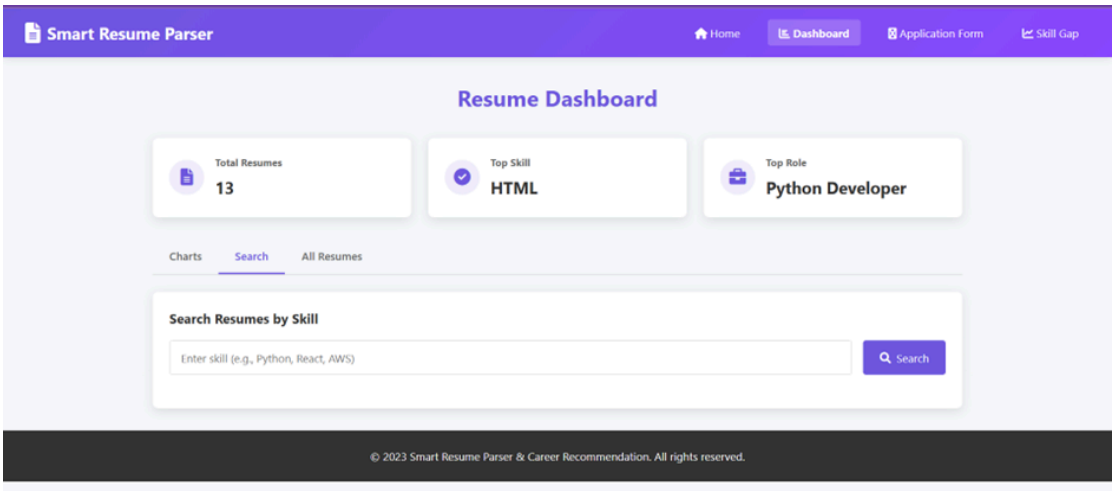
Resume List View

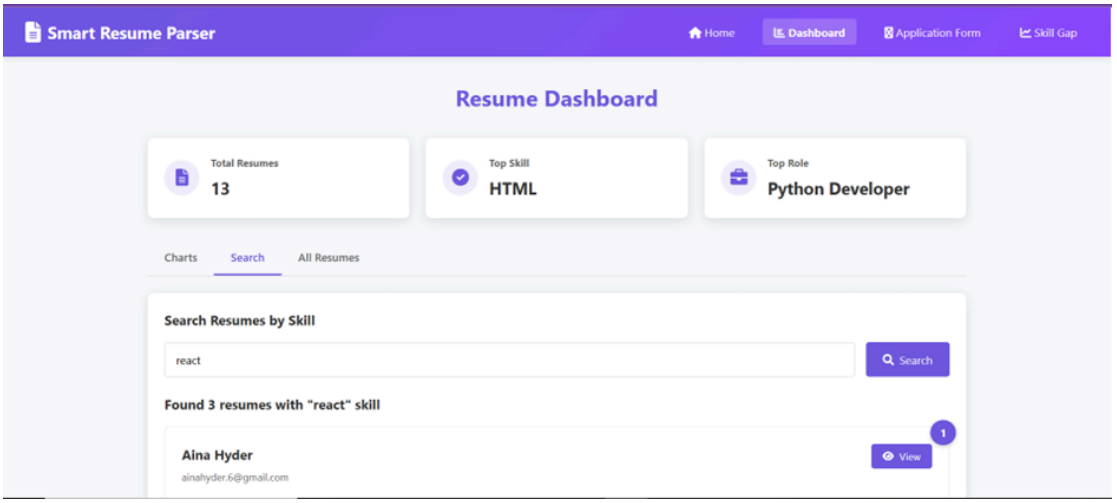
- Sortable table of all parsed resumes
- Quick preview cards with key information
- Visual indicators for match quality (when searching)
- Bulk actions (export, tag, delete)

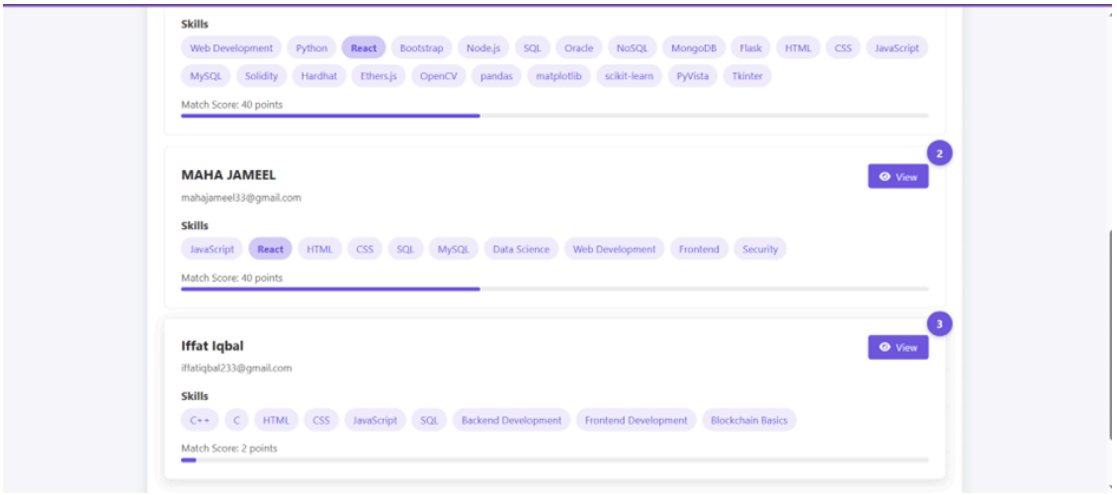
Detailed Resume View

- Modal dialog for viewing complete resume details
- Side-by-side comparison of multiple candidates
- Option to download original resume file
- Quick links to perform skill gap analysis or auto-fill forms









Form Submission Page

Overview: An intelligent application form that can be auto-filled with parsed resume data, saving candidates time and ensuring consistent data collection.

Key Features:

Auto-Fill Functionality

- One-click auto-fill from parsed resume data
- Option to select which resume to use (if multiple are uploaded)
- Visual indicators showing which fields were auto-filled
- Manual override for any auto-filled field

Personal Information Section

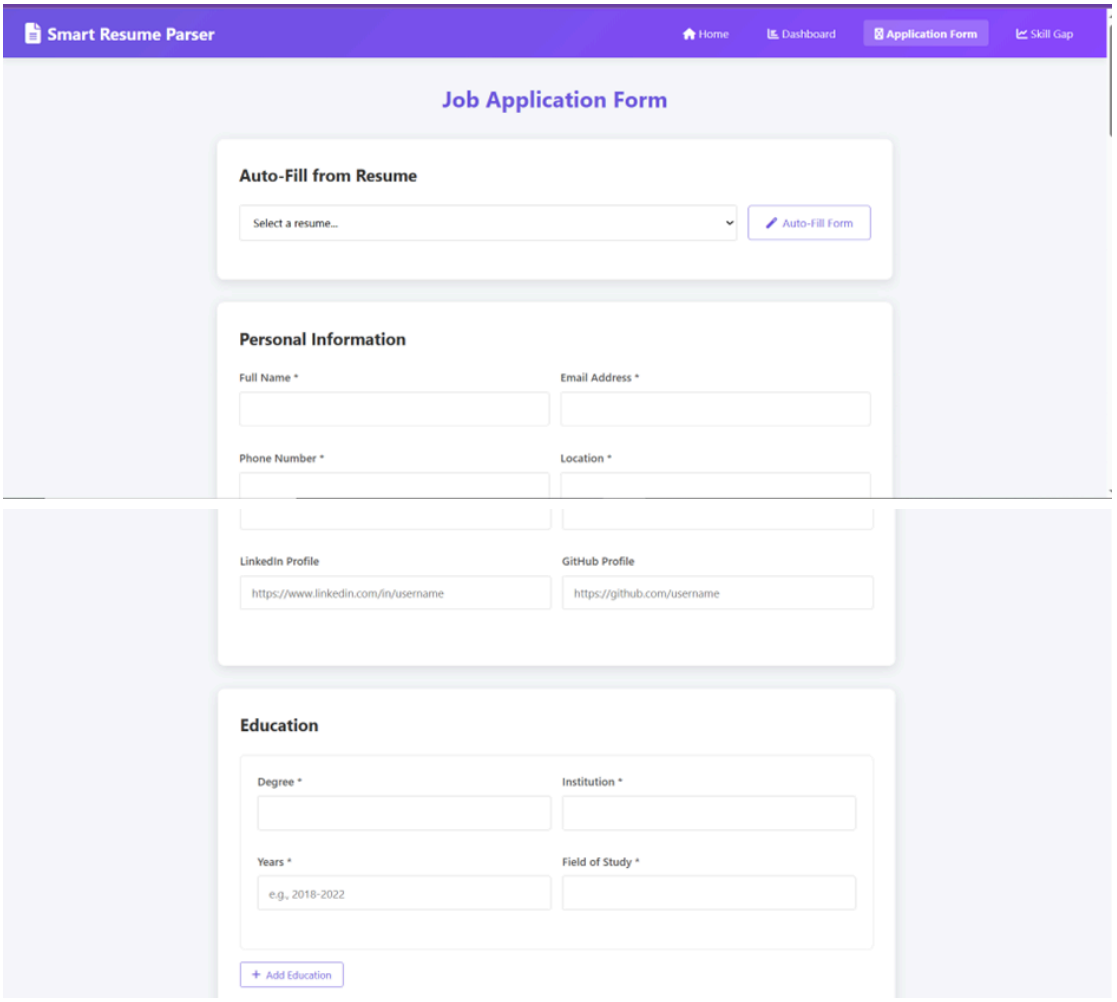
- Name, contact details, and address fields
- Professional summary/objective field
- LinkedIn and GitHub profile links
- Availability and preferred work arrangement options

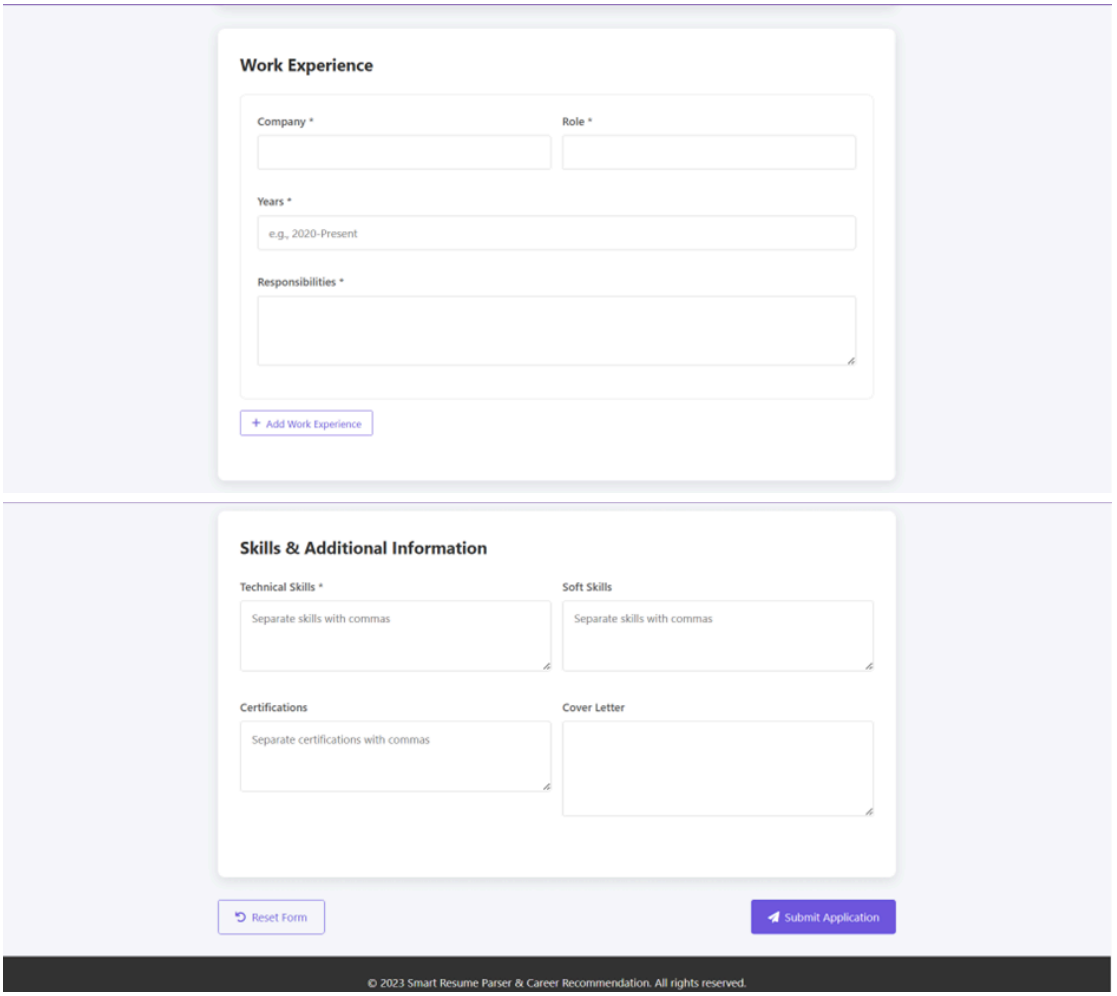
Skills and Certifications

- Categorized skill selection (technical vs. soft skills)
- Skill proficiency level indicators
- Certification details with expiration dates
- Option to add portfolio links for skill demonstration

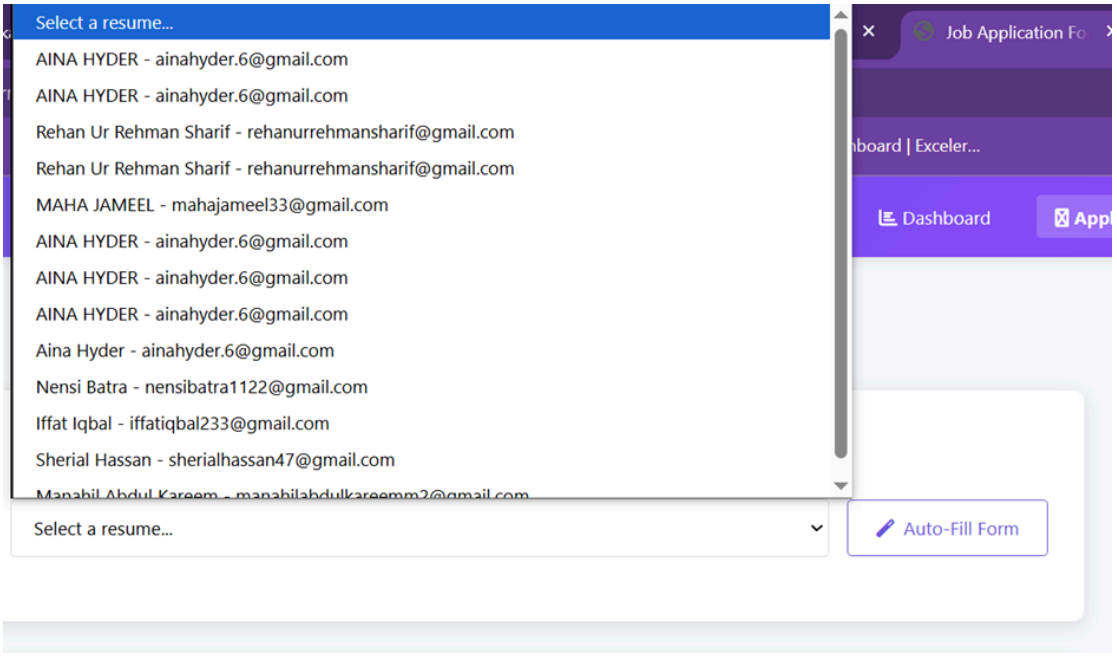
Form Validation

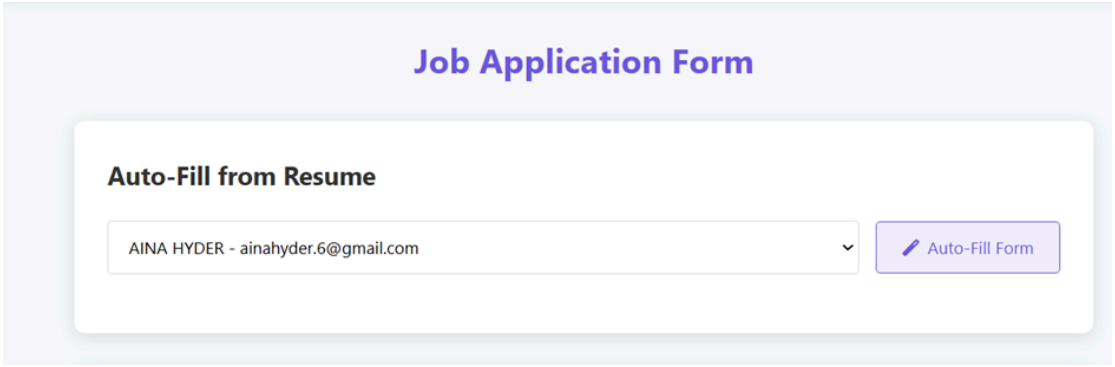
- Real-time validation with helpful error messages
- Required field indicators
- Format validation for emails, phone numbers, dates
- Form completion progress indicator

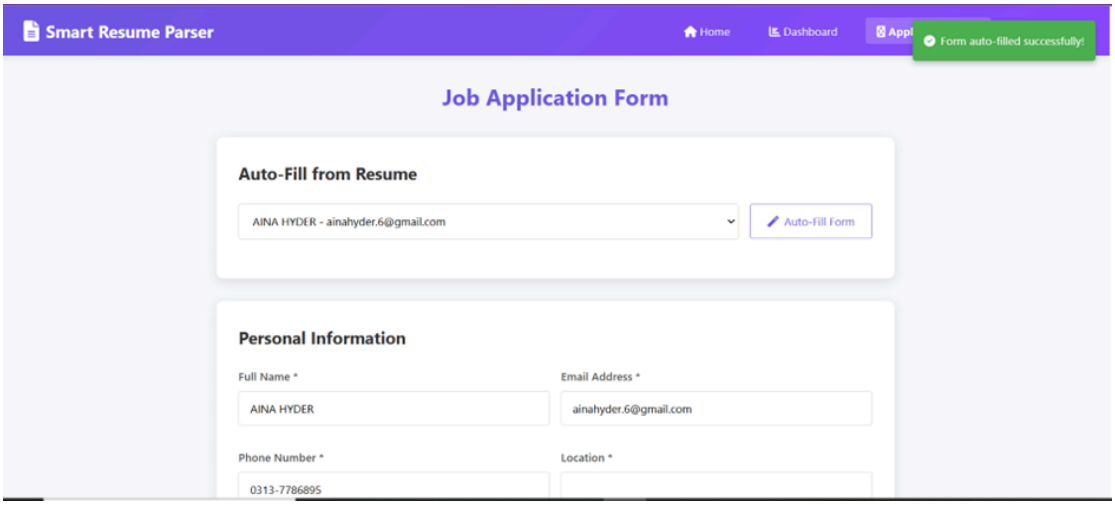


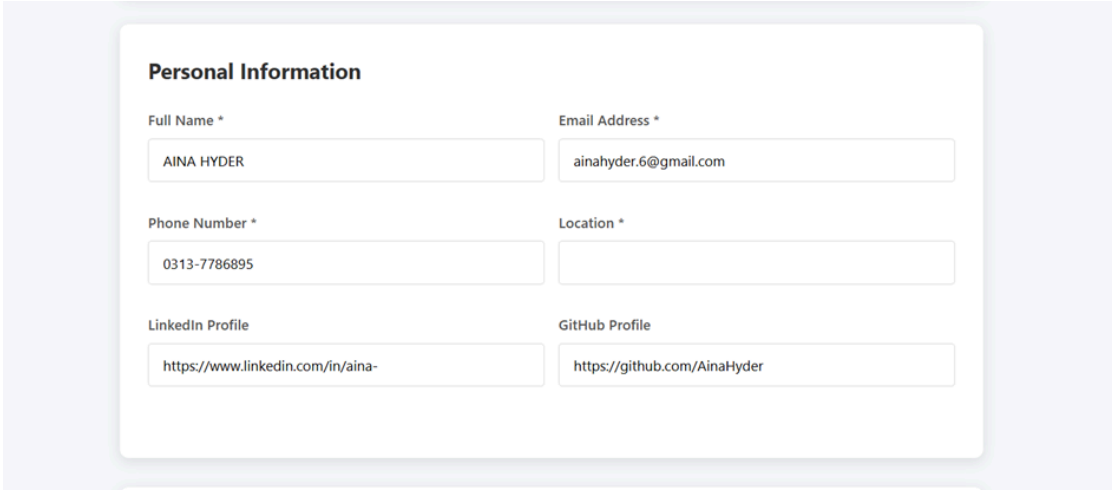


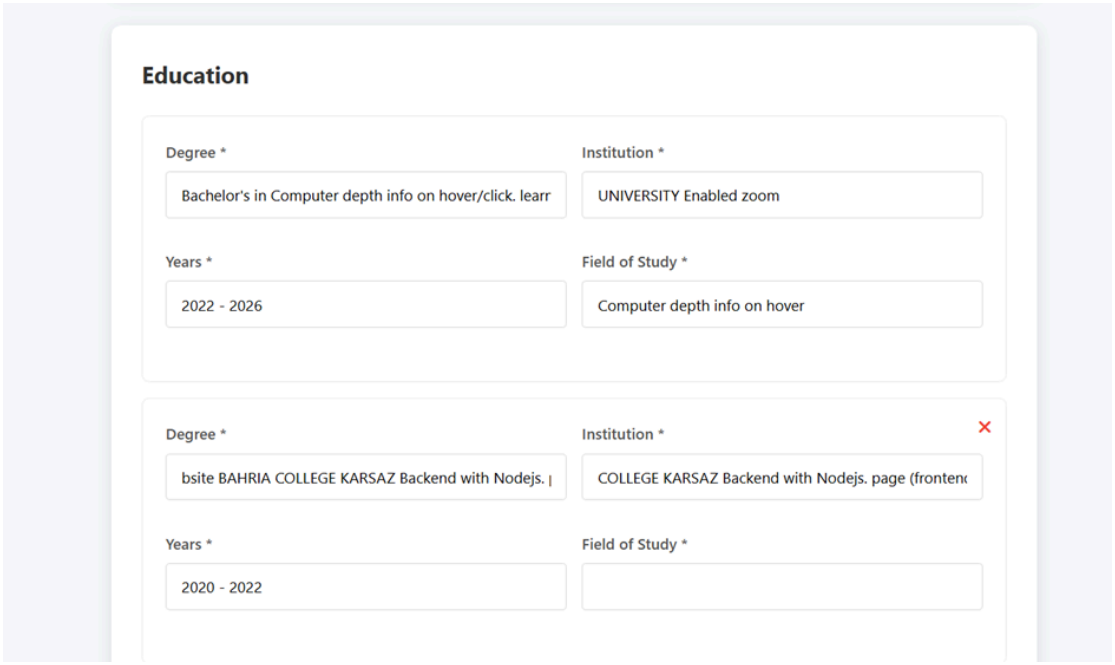
Form Filling

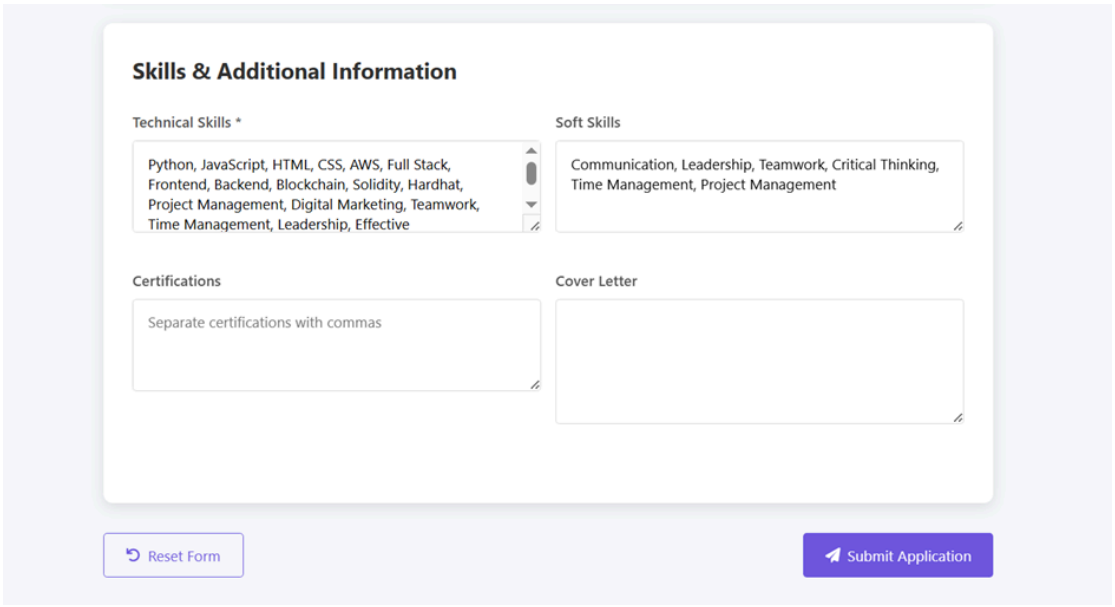


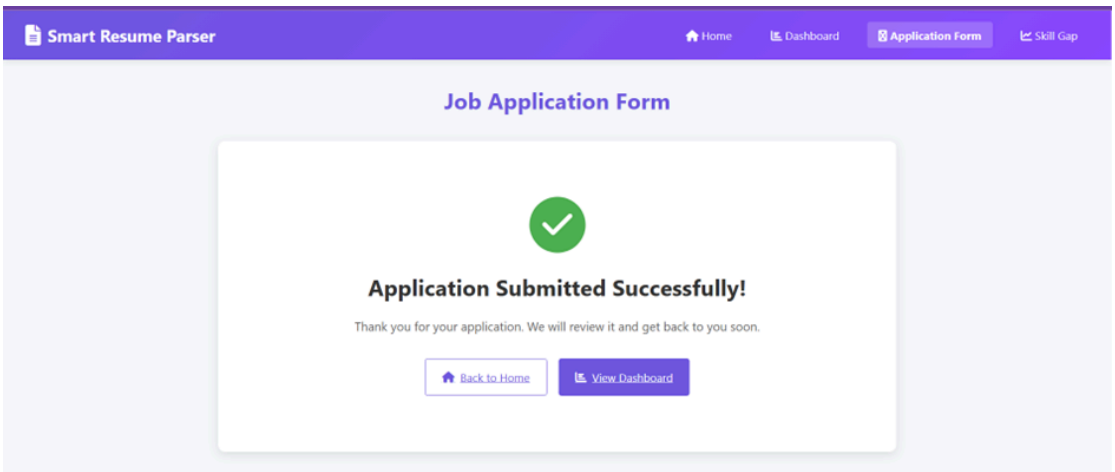

Job Application Form
Auto-Fill from Resume
AINA HYDER - ainahyder.6@gmail.com
Auto-Fill Form


Smart Resume Parser
Home
Dashboard
Form auto-filled successfully!
Job Application Form
Auto-Fill from Resume
AINA HYDER - ainahyder.6@gmail.com
Auto-Fill Form
Personal Information
Full Name *
AINA HYDER
Email Address *
ainahyder.6@gmail.com
Phone Number *
0313-7786895
Location *


Personal Information
Full Name *
AINA HYDER
Email Address *
ainahyder.6@gmail.com
Phone Number *
0313-7786895
Location *
LinkedIn Profile
https://www.linkedin.com/in/aina-
GitHub Profile
https://github.com/AinaHyder


Education
Degree *
Bachelor's in Computer depth info on hover/click. learr
Institution *
UNIVERSITY Enabled zoom
Years *
2022 - 2026
Field of Study *
Computer depth info on hover
Degree *
bsite BAHRIA COLLEGE KARSAZ Backend with Nodejs.
Institution *
COLLEGE KARSAZ Backend with Nodejs. page (frontenc
Years *
2020 - 2022
Field of Study *


Skills & Additional Information
Technical Skills *
Python, JavaScript, HTML, CSS, AWS, Full Stack, Frontend, Backend, Blockchain, Solidity, Hardhat, Project Management, Digital Marketing, Teamwork, Time Management, Leadership, Effective
Soft Skills
Communication, Leadership, Teamwork, Critical Thinking, Time Management, Project Management
Certifications
Separate certifications with commas
Cover Letter
Reset Form
Submit Application


Smart Resume Parser
Home
Dashboard
Application Form
Skill Gap
Job Application Form
Application Submitted Successfully!
Thank you for your application. We will review it and get back to you soon.
Back to Home
View Dashboard

Skill Gap Analysis

Overview: An analytical tool that compares a candidate's skills against job requirements, identifying gaps and providing personalized development recommendations.

Key Features:

Job Role Selection

- Predefined job roles with standard skill requirements
- Custom job role creation with skill specification
- Industry-specific role templates
- Option to import job description for automatic skill extraction

Skill Comparison Visualization

- Side-by-side comparison of candidate skills vs. job requirements
- Color-coded indicators (green for match, red for gap)
- Skill match percentage calculation
- Radar chart showing strength areas and gaps

Missing Skills Analysis

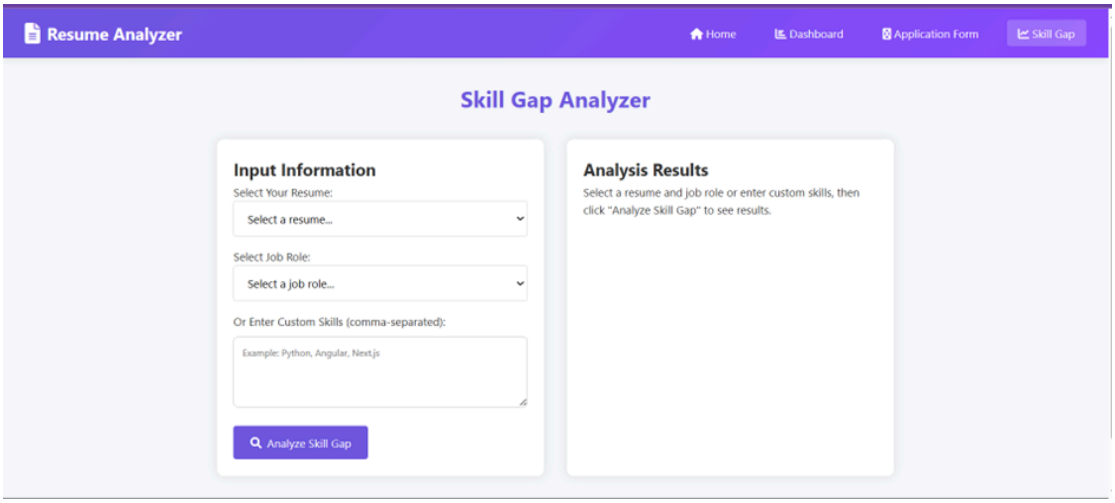
- Prioritized list of missing skills by importance
- Difficulty level indicators for skill acquisition
- Estimated time to learn each missing skill
- Related skills the candidate already possesses

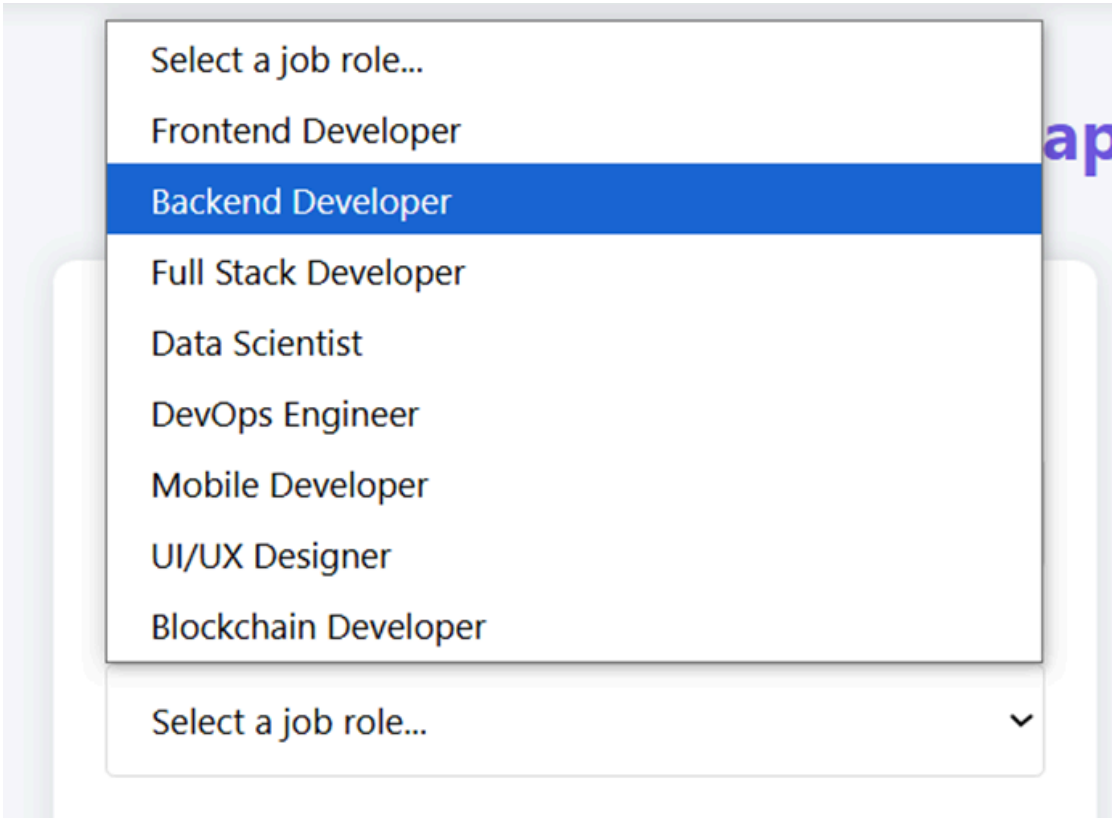
Learning Recommendations

- Personalized course suggestions for each missing skill
- Links to online learning resources (Coursera, Udemy, etc.)
- Certification paths for critical skills
- Learning roadmap with suggested sequence

Career Path Insights

- Alternative roles that better match current skills
- Career progression suggestions based on skill set
- Industry demand indicators for different skill combinations
- Salary range information based on skill acquisition


Resume Analyzer
Home
Dashboard
Application Form
Skill Gap
Skill Gap Analyzer
Input Information
Select Your Resume:
Select a resume...
Select Job Role:
Select a job role...
Or Enter Custom Skills (comma-separated):
Example: Python, Angular, Next.js
Analyze Skill Gap
Analysis Results
Select a resume and job role or enter custom skills, then click "Analyze Skill Gap" to see results.


Select a job role...
Frontend Developer
Backend Developer
Full Stack Developer
Data Scientist
DevOps Engineer
Mobile Developer
UI/UX Designer
Blockchain Developer
Select a job role...

Missing Skills & Recommended Courses

Node.js
Recommended Course

SQL
Recommended Course

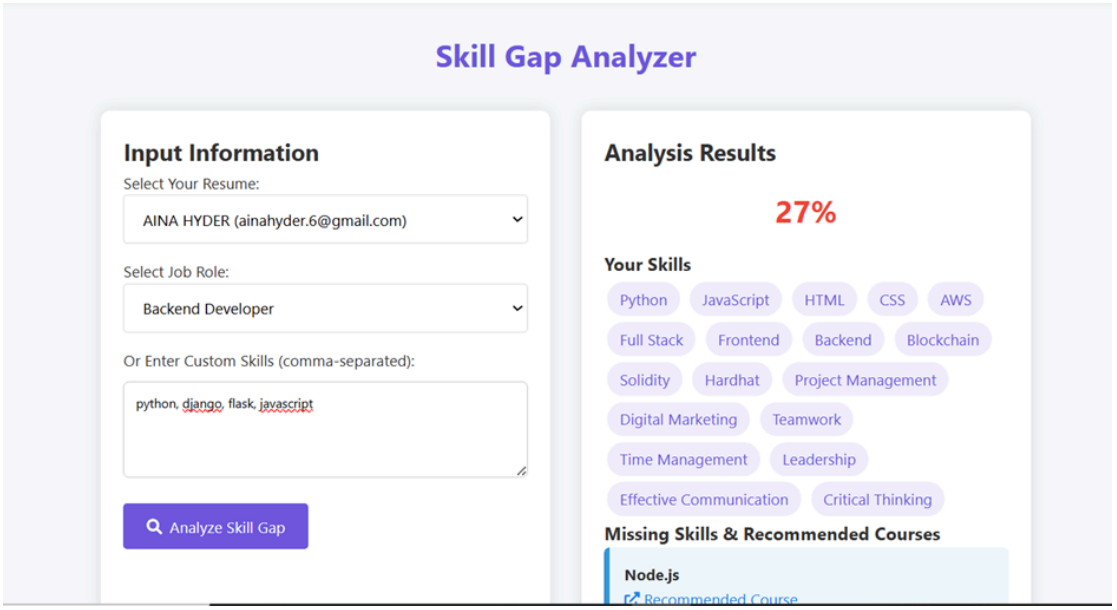
NoSQL
Recommended Course

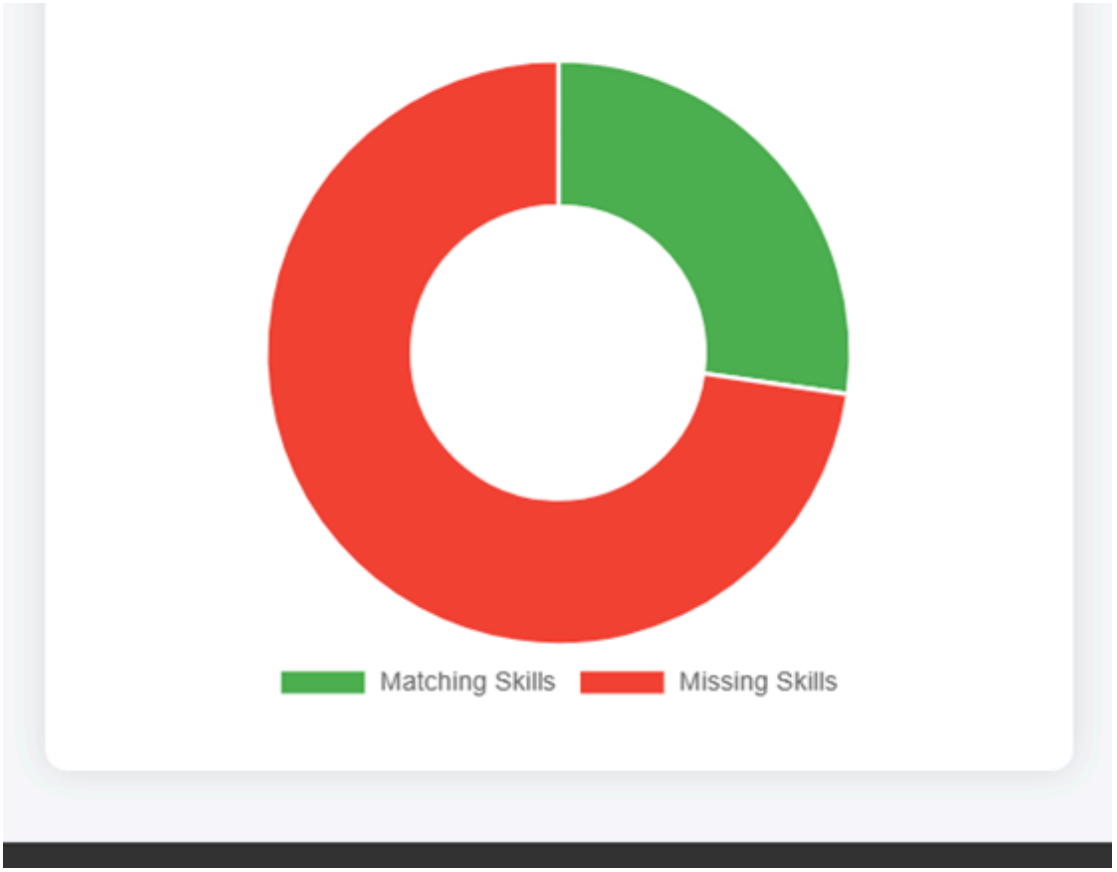
API Design
Recommended Course

Security
Recommended Course

Docker
Recommended Course

Microservices
Recommended Course


Skill Gap Analyzer
Input Information
Select Your Resume:
AINA HYDER (ainahyder.6@gmail.com)
Select Job Role:
Backend Developer
Or Enter Custom Skills (comma-separated):
python, django, flask, javascript
Analyze Skill Gap
Analysis Results
27%
Your Skills
Python
JavaScript
HTML
CSS
AWS
Full Stack
Frontend
Backend
Blockchain
Solidity
Hardhat
Project Management
Digital Marketing
Teamwork
Time Management
Leadership
Effective Communication
Critical Thinking
Missing Skills & Recommended Courses
Node.js
Recommended Course


Matching Skills
Missing Skills

Workflow of the Resume Parsing

- **Resume Upload:** User uploads a resume file.
- **Text Extraction:** System extracts text using PDF/DOCX parsers.
- **Data Processing:** NLP models extract entities like name, email, education.
- **Storage:** Parsed data is stored in a database.
- **Display:** Data is presented to the user in tabular and profile views.
- **Actions:** Users can edit, delete, or export profiles.

Data Storage and Management

Parsed data fields:

- Name
- Contact Info
- Skills
- Work Experience
- Education
- Projects
- Languages
- Certifications

Database Design:

- Collection/Table: `Candidates`
- Fields stored in structured format (JSON)

Data Access:

- Indexing on name, skills for fast retrieval
- Daily backups

- Role-based access to data

Future Scope and Enhancements

- **OCR Integration:** Parse scanned resumes with image-to-text conversion.
- **Job Matching:** Rank resumes based on match to a given job description.
- **Bulk Uploads:** Support ZIP file uploads with multiple resumes.
- **Resume Templates:** Allow users to download parsed data in clean templates.
- **AI Recommendations:** Suggest best-fit candidates for open roles.
- **Multilingual Support:** Extend parsing for resumes in French, Spanish, etc.

Testing and Validation

Testing Types:

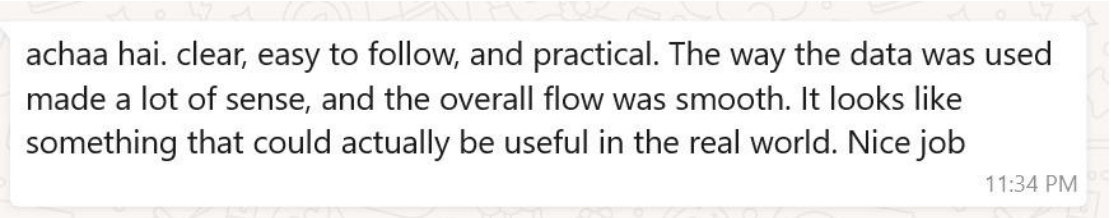
- **Unit Testing:** Validate parsing functions, file processing.
- **Integration Testing:** Check end-to-end flow from upload to display.
- **UI Testing:** Ensure responsiveness and usability.
- **Performance Testing:** Simulate bulk uploads.
- **Security Testing:** File upload vulnerability scans.

Company Reviews and Testimonials

These reviews were shared by industry professionals and collaborators who reviewed the Resume Parser system through a detailed demo video. Their feedback reflects their impressions of the system's functionality, user interface, and real-world potential based on the walkthrough presented.

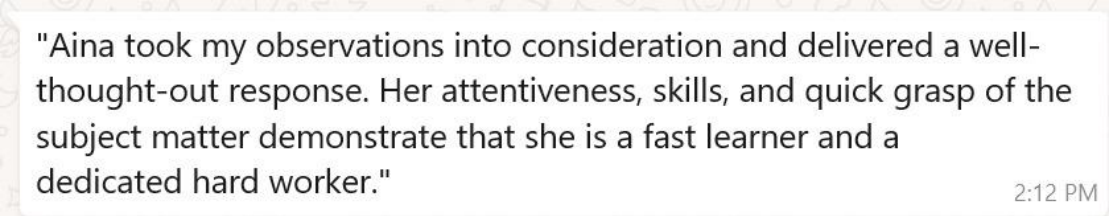
Review 1:

Name/Title: Senior Data Scientist, Venture Dive
Industry: Technical Review



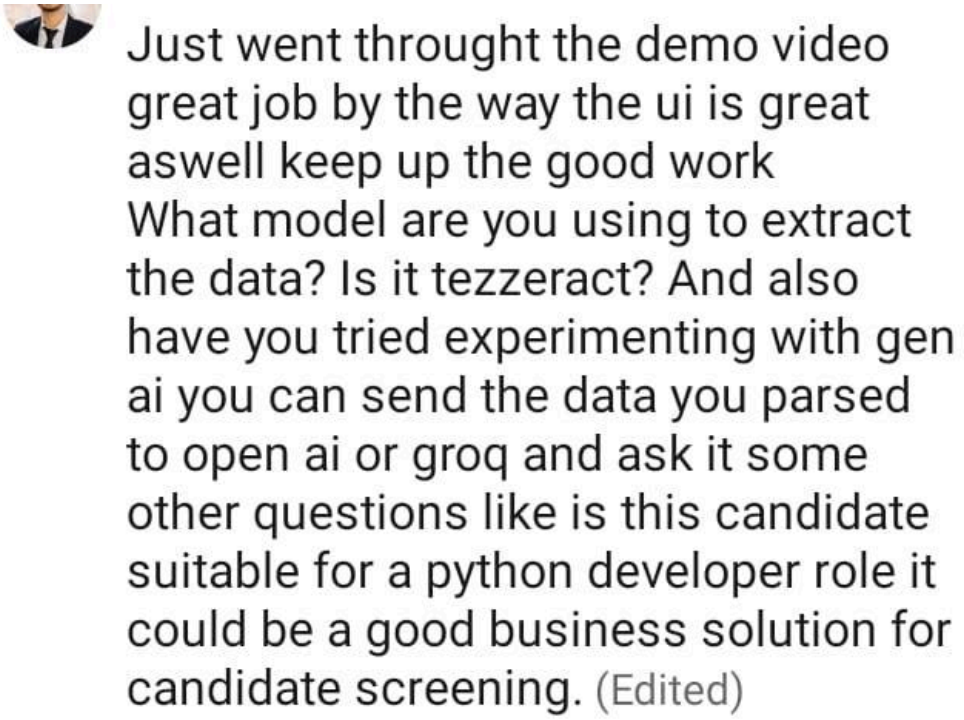
Review 2:

Name/Title: Umer Farooqui
Recruitment Lead, BADRI Management Consultancy
Industry: Academic & Industry Supervision



Review 3:

Name/Title: Software Engineer, Folio3 Pakistan
Industry: AI / Software Engineering



Conclusion

The Resume Parser Web Application is a powerful tool that revolutionizes the traditional recruitment process. By automating data extraction from resumes, it saves time, reduces human error, and enhances productivity. The intuitive UI, robust backend, and extensible architecture make it suitable for HR departments, recruitment platforms, and job portals. With future enhancements like job matching and AI analysis, it has the potential to evolve into a comprehensive talent acquisition system.

Project Links:

https://github.com/AinaHyder/Resume_Parser_Project