


សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ

**ROYAL UNIVERSITY OF PHNOM PENH**


# ប្រធានបទរបាយការណ៍ស្រាវជ្រាវ
# Job Portal Web Application

A Research Report
In Partial Fulfilment of the Requirement for the Degree of
Bachelor of Engineering in Information Technology Engineering


**Chem Indraboth**


**June 2026**

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**Examination committee:** Mr. Chhim Bunchhun (Advisor)
Dr. Khim Chamroeun
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# June 2026

# មូលន័យសង្ខេប

ការស្រាវជ្រាវនេះបង្ហាញពីការរចនា និងការអភិវឌ្ឍកម្មវិធីវិបផតថលការងារដែលមានមូលដ្ឋានលើគេហទំព័រ ដែលមានគោលបំណងដោះស្រាយភាពគ្មានប្រសិទ្ធភាពនៅក្នុងដំណើរការជ្រើសរើសបុគ្គលិក។ ប្រព័ន្ធនេះផ្តល់នូវវេទិកាឌីជីថលកណ្តាលដែលភ្ជាប់អ្នកស្វែងរកការងារ និងនិយោជកក្នុងលក្ខណៈដែលមានប្រសិទ្ធភាព និងរៀបចំបានកាន់តែល្អ។ លក្ខណៈពិសេសសំខាន់មួយនៃវេទិកានេះគឺប្រព័ន្ធណែនាំការងារ ដំណើរការដោយ AI ដែលប្រើការវិភាគន័យដើម្បីប្រៀបធៀបប្រវត្តិរូបអ្នកប្រើប្រាស់ បទពិសោធន៍ ជំនាញ ជាមួយនឹងការប្រកាសការងារ ដើម្បីផ្តល់នូវការងារដែលត្រឹមត្រូវសម្រាប់អ្នកស្វែងរកការងារ។

វេទិកានេះមានតួនាទីអ្នកប្រើប្រាស់សំខាន់ៗចំនួនបី៖ អ្នកស្វែងរកការងារ និយោជក និងអ្នកគ្រប់គ្រង។ មុខងារសំខាន់ៗរួមមាន ការចុះឈ្មោះ និងការផ្ទៀងផ្ទាត់អ្នកប្រើប្រាស់ ការគ្រប់គ្រងប្រវត្តិរូប និងការវិភាគប្រវត្តិរូបសង្ខេប ការណែនាំការងារដែលដំណើរការដោយ AI ការប្រកាសការងារ និងការគ្រប់គ្រង ការស្វែងរកការងារ និង ការតាមដានកម្មវិធី និងការវិភាគផ្ទាំងគ្រប់គ្រងសម្រាប់តាមដានសកម្មភាពជ្រើសរើសបុគ្គលិក។ ប្រព័ន្ធនេះត្រូវបានបង្កើតឡើងដោយប្រើបច្ចេកវិទ្យាគេហទំព័រទំនើប និង ML Library ត្រូវបានរួមបញ្ចូលដើម្បីគាំទ្រប្រព័ន្ធផ្គូផ្គងការងារឆ្លាតវៃ។

កម្មវិធីដែលបានស្នើឡើងមានគោលបំណងធ្វើឱ្យមានការប្រសើរឡើងនូវបទពិសោធន៍ជ្រើសរើសបុគ្គលិកទាំងមូលដោយកាត់បន្ថយវិធីសាស្ត្រជ្រើសរើសបុគ្គលិកបែបប្រពៃណី ដូចជាការត្រួតពិនិត្យដោយដៃដែលចំណាយពេលច្រើន ឱកាសការងារមានកំណត់ និងកង្វះប្រព័ន្ធគ្រប់គ្រងកណ្តាល។ តាមរយៈប្រព័ន្ធនេះការផ្គូផ្គងឆ្លាតវៃ វេទិកានេះជួយអ្នកស្វែងរកការងារក្នុងការស្វែងរកឱកាសការងារដែលពាក់ព័ន្ធដោយផ្អែកលើលក្ខណៈសម្បត្តិ និងចំណាប់អារម្មណ៍របស់ពួកគេ។

លទ្ធផលពីការអនុវត្តប្រព័ន្ធ និងការសាកល្បងបង្ហាញថា វេទិកានេះទទួលបានជោគជ័យក្នុងការបង្កើនប្រសិទ្ធភាពជ្រើសរើសបុគ្គលិក បង្កើនបទពិសោធន៍អ្នកប្រើប្រាស់ និងផ្តល់នូវដំណោះស្រាយដែលអាចធ្វើមាត្រដ្ឋាន និងការគ្រប់គ្រងការងារតាមអ៊ីនធឺណិតទំនើប។ កម្មវិធីនេះផ្តល់ជូននូវចំណុចប្រទាក់ងាយស្រួលប្រើដែលធ្វើឱ្យការទំនាក់ទំនង អន្តរកម្មរវាងនិយោជក និងអ្នកស្វែងរកការងារមានភាពសាមញ្ញ ដែលធ្វើឱ្យដំណើរការជ្រើសរើសបុគ្គលិកកាន់តែលឿន ងាយស្រួលចូលប្រើ និងអាចទុកចិត្តបានកាន់តែច្រើន។

## ABSTRACT

This research presents the design and development of a web-based Job Portal Application aimed at addressing inefficiencies in traditional recruitment and hiring processes. The system provides a centralized digital platform that connects job seekers and employers in a more efficient and organized manner. A key feature of the platform is its AI-powered job recommendation and matching system, which uses semantic analysis to compare user profiles, experience, skills, and uploaded CVs with job postings in order to provide more accurate and personalized job recommendations.

The platform supports three main user roles: job seekers, employers, and admin. Key functionalities include user registration and authentication, profile management, CV upload and parsing, AI-powered job recommendations, job posting and management, advanced job search and filtering, application tracking, and dashboard analytics for monitoring recruitment activities. The system was developed using modern web technologies for both the front-end and back-end components, while machine learning libraries were integrated to support the intelligent job matching subsystem.

The proposed application aims to improve the overall recruitment experience by reducing the limitations of traditional hiring methods, such as time-consuming manual screening, limited accessibility to job opportunities, and the lack of centralized management systems. Through automation and intelligent matching, the platform helps job seekers finding relevant employment opportunities based on their qualifications and interests.

Results from the system implementation and testing demonstrate that the platform successfully improves recruitment efficiency, enhances user experience, and provides a solution for modern online hiring and job management. The application offers a user-friendly interface that simplifies communication and interaction between employers and job seekers, making the recruitment process faster, more accessible, and more reliable.

## SUPERVISOR'S RESEARCH SUPERVISION STATEMENT

TO WHOM IT MAY CONCERN

Name of program: Bachelor of Engineering in Information Technology Engineering
Name of candidate: Chem Indraboth

Title of research report: Job Portal Web Application

This is to certify that the research carried out for the above titled Bachelor's final report was completed by the above named candidate under my direct supervision. This thesis material has not been used for any other degree. I played the following part in the preparation of this research report: Job Portal Web Application

Supervisor's name: Mr. Chhim Bunchhun

Supervisor's signature: .....

Date: .....

## CANDIDATE'S STATEMENT

TO WHOM IT MAY CONCERN

This is to certify that the research report that I (Chem Indraboth) hereby present entitled "Job Portal Web Application".

for the degree of Bachelor of Engineering at the Royal University of Phnom Penh is entirely my own work and, furthermore, that it has not been used to fulfill the requirements of any other qualification in whole or in part, at this or any other University or equivalent institution.

No reference to, or quotation from, this document may be made without the written approval of the author.

Signed by (the candidate): .....

Date: .....

Sign by Supervisor: .....

Supervisor's signature: .....

Date: .....

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# CHAPTER 1

# INTRODUCTION

## 1.1 Background to the Study

Traditional job-seeking methods such as newspaper advertisements, physical notice boards, and walk-in applications are becoming less effective and increasingly time-consuming. In an era of rapid digital transformation, both job seekers and employers are demanding faster, more efficient, and more accessible means of connecting with one another.

Today, job seekers prefer online platforms that provide faster access to job information and recruitment opportunities. The global proliferation of internet access has made web-based platforms the preferred medium for job searching, particularly among younger demographics in developing countries such as Cambodia.

The motivation for this project arose from observing the gap between available digital tools and the actual needs of job seekers in the Cambodian context. Existing platforms either cater to large enterprises or focus on very specific sectors, leaving a significant portion of the workforce underserved. This research aims to design and develop a user-friendly and efficient job portal web application that simplifies the recruitment process and improves accessibility for all stakeholders.

## 1.2 Problem Statement

The current recruitment landscape presents several significant challenges for both job seekers and employers. These challenges highlight the need for a comprehensive digital solution:

- **Finding Relevant Opportunities:** Job seekers face considerable difficulty finding relevant job opportunities that match their skills, qualifications, and career aspirations. The lack of effective filtering and matching mechanisms in many existing platforms means that candidates spend excessive time reviewing mismatched listings.
- **Employer Resource Expenditure:** Employers spend significant time and resources advertising vacancies and screening candidates manually. Without automated systems, the recruitment process becomes costly and inefficient, particularly for small and medium-sized enterprises.

- **Lack of Centralized Management System:** There is an absence of an integrated system to manage job postings, applications, and applicant information in a streamlined manner. This fragmentation leads to miscommunication and delays in the hiring process.
- **Limited Access:** Users in remote areas face limited access to job opportunities without an organized online platform. Geographic barriers further compound the challenges faced by job seekers outside major urban centers.

### 1.3 Aim and Objectives

I aim to design and develop a modern web-based Job Portal Application that efficiently connects job seekers and employers through a centralized, intelligent, and user-friendly platform. The system is designed to simplify and improve the recruitment process by allowing employers to post job vacancies and enabling job seekers to search and apply for suitable jobs online. In addition, the application integrates AI-powered job recommendation features to provide users with more accurate and personalized job suggestions based on their profiles, skills, and qualifications.

The objectives of this project are to provide a centralized platform for managing job postings and job applications efficiently for all stakeholders involved in the recruitment process. The system also aims to enable job seekers to search, filter, and receive AI-based job recommendations that match their profiles, making the job search process easier and more effective. Furthermore, the project seeks to reduce the time, cost, and effort required in traditional recruitment processes for employers while improving access to job opportunities for a broader audience, including users living in remote or underserved areas. Additionally, the application aims to deliver a secure, responsive, and user-friendly experience that enhances communication and interaction between employers and applicants.

### 1.4 Rationale of the Study

The rapid growth of digital technology in Cambodia has created a significant opportunity to modernize the recruitment process. Despite the availability of several online job platforms, both local and international, none adequately addresses the specific needs of Cambodian job seekers and employers at a small to medium scale. Existing platforms are either too complex for local users, too narrow in their industry focus, or lack the localized features necessary to serve the Cambodian job market effectively.

The traditional methods of job seeking newspaper advertisements, physical notice boards, and walk-in applications remain prevalent in many parts of Cambodia, particularly in areas outside the capital. These methods are inefficient, time-consuming, and geographically limiting, leaving a large portion of the workforce without adequate access to employment opportunities.

Furthermore, employers, especially small and medium-sized enterprises, continue to rely on manual screening and advertising processes that consume considerable time and resources. The absence of a centralized system to manage job postings, applications, and candidate information compounds this inefficiency and increases the cost of recruitment.

This project is therefore justified by the clear need for a purpose-built, locally relevant job portal that bridges the gap between job seekers and employers in Cambodia. By integrating AI-powered matching capabilities with a simple and accessible interface, the proposed system aims to reduce recruitment barriers, improve job accessibility, and bring greater efficiency to the hiring process ultimately contributing to a more connected and productive labor market in Cambodia.

## 1.5 Limitation and Scope

### 1.5.1 Limitations

The system is only available on the web platform and requires an active internet connection. This focuses on small to medium-scale job seekers and may have limited performance with a very large number of concurrent users. Advanced features such as mobile application support and fake job detection are not included in this version.

### 1.5.2 Scope

Within these boundaries, however, the system delivers a comprehensive and well-rounded experience for all three groups of stakeholders it serves.

- For job seekers: the platform provides end-to-end support throughout the jobs hunting journey from creating a profile and uploading a CV to receiving AI-powered job recommendations, searching and filtering positions, submitting applications, and tracking application status in real time.

- For employers: the system offers a complete recruitment management toolkit. Companies can build their profiles, publish and manage job postings, review incoming applications,

screen candidate CVs, and monitor recruitment activity through a dedicated analytics dashboard.

- For admin: the platform provides full oversight of the entire ecosystem — managing users and employer accounts, reviewing and approving employer registrations, monitoring all postings and applications, and accessing system-wide analytics to support informed decision-making.

- AI Matching Engine: which elevates the platform beyond a simple job board. By combining semantic analysis, skill matching, and experience compatibility scoring, the engine delivers personalized job recommendations that help job seekers find the right opportunities faster and helps employers reach the most relevant candidates with less effort.

### 1.6 Structure of Study

This research report is organized into 6 chapters:

- Chapter 1 Introduction: Lays the foundation of the study by introducing the context and motivation behind the project. It covers the background, problem statement, aims and objectives, rationale, and the limitation and scope of the system.

- Chapter 2 Literature Review: Provides a critical review of existing job portal platforms, examining both local and international systems. It identifies the strengths and shortcomings of current solutions and establishes the gap that this project seeks to fill.

- Chapter 3 Methodology: Details the methodology adopted in designing and building the system. This includes the overall research design, the technology stack selected for development, and the system architecture that underpins the platform.

- Chapter 4 Result: presents the developed system in full, showcasing the features and interfaces built for each user role.

- Chapter 5 Discussion: Interprets the findings, discussing what the results mean in the context of recruitment technology and user experience, including both expected outcomes and unexpected discoveries.

- Chapter 6 Conclusion and Future Work: brings the report to a close by summarizing the key contributions of the project, acknowledging its current limitations, and outlining promising directions for future research and development.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Overview of the Research Topic

A job portal is a web-based platform that acts as an intermediary between job seekers and employers, providing a centralized space where vacancies can be posted, searched, and applied for. Beyond simple listings, modern job portals have evolved to incorporate intelligent features such as AI-powered matching, automated CV parsing, skill assessments, and real-time application tracking all of which contribute to a more streamlined recruitment experience for both parties.

In the context of Cambodia, the adoption of digital recruitment platforms is still in a growing phase. While internet penetration and smartphone usage have increased significantly in recent years, many job seekers and employers particularly outside of Phnom Penh continue to rely on informal networks and traditional methods. This highlights the importance of developing locally relevant, accessible, and user-friendly digital recruitment solutions that reflect the realities of the Cambodian labor market.

## 2.2 Previous Study and Finding

Research on CV parsing found that Natural Language Processing (NLP) is an effective technique for automatically extracting key sections from a candidate's CV such as personal summary, skills, and work experience without requiring manual input. This allows the system to structure and utilize candidate information more efficiently, which directly supports the CV parsing approach adopted in this project.

Studies on text-based similarity matching found that TF-IDF (Term Frequency-Inverse Document Frequency) is a reliable and computationally efficient method for measuring semantic similarity between two text documents. Researchers demonstrated that TF-IDF performs well in comparing user profiles against job descriptions by identifying the most significant and relevant terms, making it well suited for job recommendation systems with structured text data.

Studies on user experience further found that simplicity is the most critical factor in platform adoption, especially among users with limited digital literacy. Platforms that are overloaded with features or require complex navigation tend to have higher abandonment rates, while clean and intuitive interfaces consistently drive greater user satisfaction and engagement.

## 2.3 Comparative Analysis

To better understand the current landscape and identify the gap this project seeks to address, three widely used job portal platforms were selected for comparative analysis. These platforms were chosen based on their relevance to the Cambodian job market and their varying levels of reach from locally focused platforms to global networks. Each platform was evaluated across four dimensions: name, description, key features, and observed results from a user perspective.

The three platforms reviewed are **Jobify,** a Cambodia-based IT-specialized job matching platform; **LinkedIn,** a globally recognized professional networking and recruitment platform; and **JobNet.com.kh,** one of Cambodia's major general-purpose job portals. Together, these platforms represent the range of options currently available to Cambodian job seekers and employers, making them a suitable basis for comparison.

Each platform has its own strengths yet falls short in areas that matter most to Cambodian users. **Jobify** within the IT niche but excludes a large portion of job seekers from other industries. **LinkedIn** offers the most powerful feature set but sacrifices simplicity, making it poorly suited for local small-scale adoption. **JobNet.com.kh** comes closest to serving the general Cambodian market but struggles with matching accuracy and user experience friction.

These weaknesses collectively highlight the need for a platform that combines broad accessibility, intelligent matching, and a simple user experience all tailored to the Cambodian context which is precisely what this project aims to deliver.

### 2.3.1 Table of Summary

*Table 1: Comparative Summary of Existing Job Portal Platforms*

| Name | Description | Strength | Weakness |
|---|---|---|---|
| **Jobify** | Cambodia's #1 Job Matching focused mainly on IT and tech jobs. | IT-specialized jobs, skill test & certification, keyword/category search, featured employers. | Very limited filtering options, Favors senior-level positions, Interface not modern |
| **LinkedIn** | Global professional networking and recruitment platform for building careers and business. | Professional profile, networking, recruiter messaging, Easy Apply, company pages, learning courses, AI job search. | Too complex for beginners, Difficult to filter for local users, Overwhelming for small employers |
| **JobNet.com.kh** | Cambodia's major online job portals connecting employers and job seekers across many industries. | CV upload, direct company applications, job alerts, filters by industry/location/level, AI matching tools. | Low job matching accuracy, Too much requirement to apply, Hard to find relevant jobs from large data |

**Hole / Remaining issues:**

- None of the platforms offer a truly personalized and accurate job matching experience.
- All three platforms lack a simple, clean, and locally adapted user experience suited to the Cambodian market.
- Entry-level and less digitally experienced users are underserved across all platforms.
- No platform fully bridges the gap between job seekers and employers at a small to medium scale in Cambodia.

# CHAPTER 3

# METHODOLOGY

## 3.1 Research Design

This research adopts a design science research methodology, which is appropriate for the development of information systems artifacts such as web applications. The methodology involves iterative design, development, and evaluation cycles to ensure the final product meets the identified requirements.

The research process began with a thorough needs analysis informed by the problem statements identified in Chapter 1 and the gaps identified in the literature review in Chapter 2. Requirements were gathered through observation of existing systems and analysis of user needs within the Cambodian job market context.

The development process followed an Agile methodology, allowing for incremental feature additions and continuous refinement based on testing feedback. Each module of the system was designed, developed, and tested independently before integration into the complete platform.

Finally, the completed system was evaluated against the original requirements to verify that all intended features functioned correctly and that the user experience met the simplicity and accessibility standards identified as critical in previous studies.

## 3.2 Technology Stack

The system was built using a carefully selected set of modern technologies chosen for their reliability, performance, and suitability for web-based application development. The stack encompasses front-end technologies, back-end technologies, and AI/ML libraries.

### 3.2.1 Front-end Technologies

The front-end was developed using modern frameworks and libraries that support component-based development, enabling a clean, responsive, and maintainable user interface. The design prioritizes simplicity and accessibility to accommodate users with varying levels of technical expertise.

- **Laravel Blade:** lightweight templating engine included with the Laravel framework, designed to provide a clean and concise syntax for embedding PHP logic within HTML.

- **Tailwind CSS:** Utility-first CSS framework that provides pre-defined styles, enabling rapid UI development and ensuring responsiveness without leaving HTML.
- **Vite:** Modern and lightning-fast frontend build tool and dev server for bundling JavaScript and CSS, replacing Webpack for faster hot module replacement.




*Figure 1: Front-end Technologies*

### 3.2.2 Back-end Technologies

The back-end infrastructure handles all server-side logic, database management, authentication, and API services. The chosen technologies provide robust handling of concurrent users and efficient data storage and retrieval.

- **PHP 8.2:** Server-side programming language used for backend development, offering improved performance, strict type declarations, and modern language features.
- **Flask:** Lightweight Python web framework for creating the API to the Laravel as a service.
- **Laravel 11:** A robust PHP web application framework providing MVC architecture, RESTful routing, middleware, and built-in features like authentication, authorization, and database abstraction.
- **Filament:** A modern admin panel and form builder for Laravel that enables rapid development of administrative interfaces for managing jobs, users, and applications.

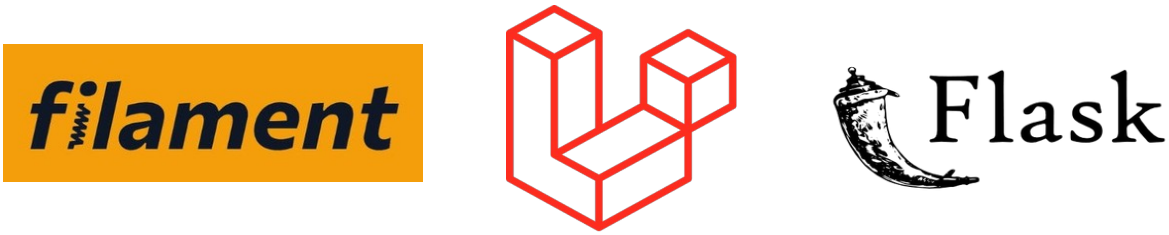



*Figure 2: Back-end Technologies*

### 3.2.3 Database Technologies

This is what we store, manage, and retrieve raw data to this web application. Relational Databases Store data in structured tables with rows and columns. They are highly organized and ideal for applications requiring strict data integrity.

- **MySQL:** A relational database management system used to store and manage all user, employer, job, and application data securely.




*Figure 3: Database Technology*

### 3.2.4 Development Tools

The following tools were used throughout the development process to support coding, version control, database management, and package installation.

- **Visual Studio Code (VS Code):** The primary code editor used for writing and managing all front-end and back-end source code, chosen for its lightweight performance, extensive extension support, and developer-friendly interface.

- **Git / GitHub:** Used to track changes in the codebase and manage version control throughout the development cycle. GitHub served as the remote repository, enabling organized code management and backup of all project files.

- **MySQL Workbench:** Used to design, manage, and query the MySQL database. It provided a visual interface for creating and maintaining the database schema, running SQL queries, and monitoring data integrity.

- **Npm (Node Package Manager):** Used to install and manage all front-end dependencies and JavaScript packages required by the React.js application.

- **Composer:** Used to install and manage all back-end dependencies and PHP packages required by the Laravel framework.

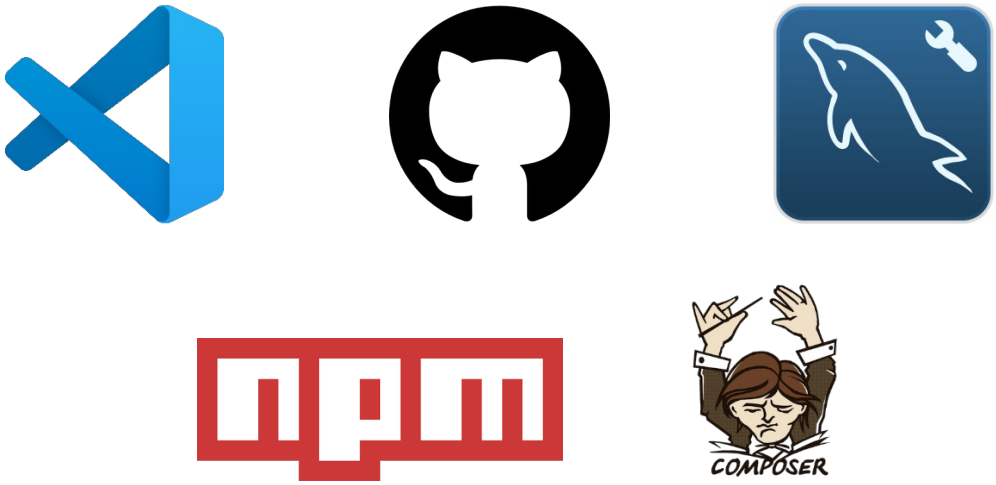



*Figure 4: Development Tools*

### 3.2.5 AI/ML Libraries

The AI matching subsystem employs natural language processing and machine learning libraries to perform semantic analysis of job descriptions and user profiles. The system computes similarity scores across semantic content, specific skills, and experience levels, combining these into a composite recommendation score.

- **Scikit-learn:** Machine learning library providing TF-IDF (Term Frequency-Inverse Document Frequency) vectorization for text analysis and cosine similarity calculations for job-user matching.
- **NumPy:** Numerical computing library for efficient array operations and matrix calculations used in TF-IDF vectors.
- **SpaCy:** Advanced NLP library for Named Entity Recognition (NER) to identify organizations, institutions, and proper nouns. Pre-trained English model (en_core_web_sm) for processing resume text.
- **Dateparser:** Intelligent date parsing library for extracting and parsing date ranges from resumes (employment dates).

- **Fuzzywuzzy:** Fuzzy string matching library for tolerant skill matching with typos and variations.
- **PyMuPDF:** PDF extraction library for extracting text content from uploaded CV/resume.




*Figure 5: AI/ML Libraries Technologies*

### 3.3 ML Algorithms Implemented

TF-IDF Vectorization the first stage converts raw text from the candidate's CV and job descriptions into numerical vectors using TF-IDF (Term Frequency-Inverse Document Frequency). This process transforms unstructured text data into a structured mathematical representation that the system can compute and compare effectively, Cosine Similarity - Calculates semantic similarity between job and candidate profiles.

Skill Extraction and Matching In parallel, the system performs skill extraction from the candidate's CV using pattern matching and fuzzy matching techniques. This stage identifies and isolates specific skills mentioned in the CV and compares them against the skills required in the job posting, producing a skill match score that reflects how well the candidate's competencies align with the job requirements.

Skill Extraction and Matching In parallel, the system performs skill extraction from the candidate's CV using pattern matching and fuzzy matching techniques. This stage identifies and isolates specific skills mentioned in the CV and compares them against the skills required in the job posting, producing a skill match score that reflects how well the candidate's competencies align with the job requirements.

Job Matching Engine The final stage combines all computed scores into a single weighted match score using the following formula:

*Table 2: Job Matching Engine Weighted Scoring Components*

| Component | Method | Weight |
|---|---|---|
| Semantic Similarity | TF-IDF + Cosine Similarity | 40% |
| Skill Match Score | Pattern & Fuzzy Matching | 40% |
| Years of Experience | Experience Weight Calculation | 20% |

### 3.4 System Design

#### 3.4.1 Use Case Diagram

- User (Job Seeker) use case: Job seekers can browse job listings, build their professional profile, upload CV, and apply for jobs with intelligent matching recommendations.

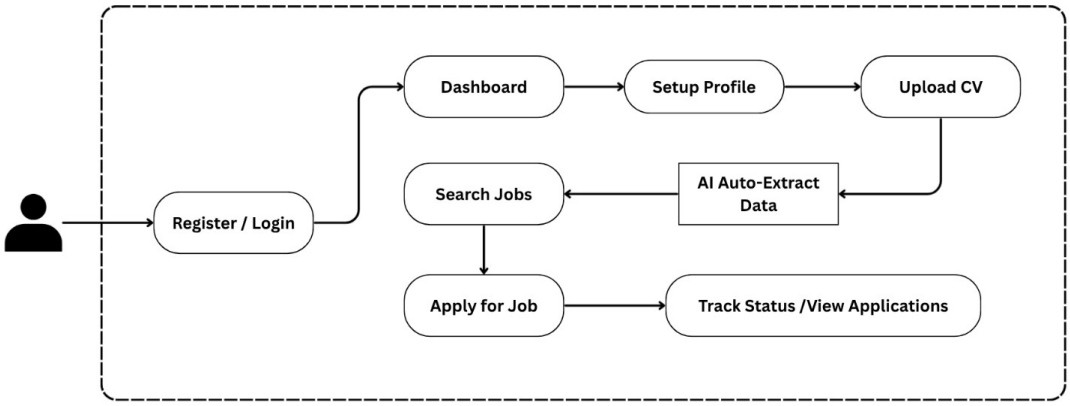



*Figure 6: User use case*

- Employer use case: Employers can create and manage job postings, review applications, manage company information, and track hiring progress. Must be verified by admin to post jobs.

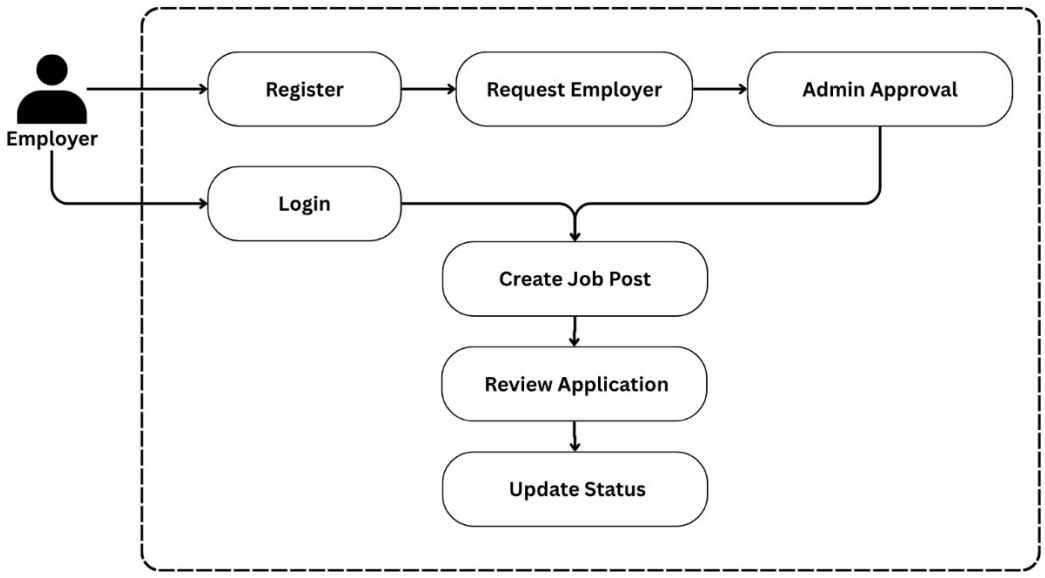



*Figure 7: Employer use case*

- Admin use case: Admins have full control over the system. They manage users, companies, jobs, applications, employer verifications, and system-wide operations through the Filament Admin Panel.

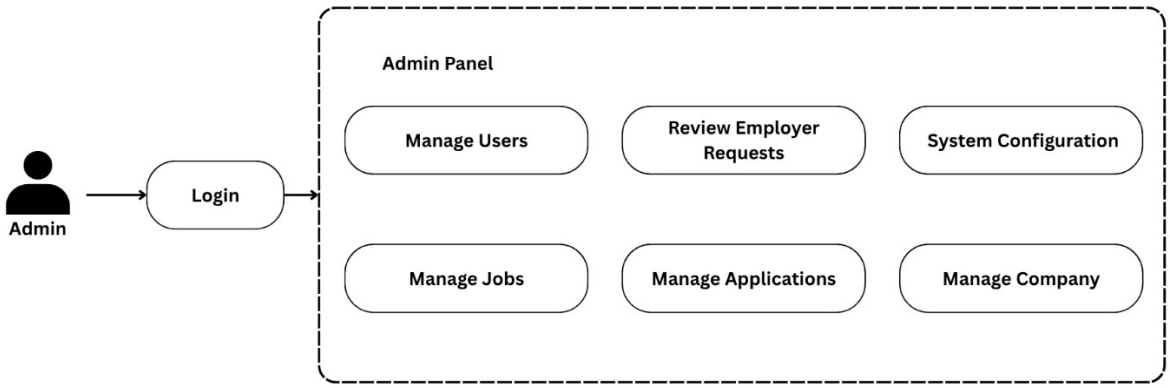



*Figure 8: Admin use case*

### 3.4.2 System Architecture

The Laravel Web Application serves as the core of the system, handling all incoming requests, business logic, and data operations. The system serves three types of browser-based users. The User Browser sends HTTP requests directly to the Laravel Web Application to access all job seeker features. The Admin and Employer Browser sends HTTP requests to the Filament Panel. It is composed of four main components:

- **Controllers**: Handle all incoming HTTP requests and return appropriate responses to the browser.
- **Models**: Manage data access and database interactions using Eloquent ORM.
- **Services**: Contain the core business logic of the system, including the JobMatchingEngine, TFIDFService, and SkillExtractionService.
- **Filament Resources**: Manage all admin CRUD operations through the Filament Admin Panel.

The Python service operates as a standalone microservice built with Flask. It handles all AI-related processing and is composed of three specialized components:

- **PDF Text Extraction**: Uses PyMuPDF to extract raw text from uploaded PDF resumes, making the content available for further processing.
- **Skill Extraction**: Uses spaCy, PyMuPDF, dateparser, and fuzzy matching to identify, extract, and normalize skills and entities from the extracted CV text.
- **TF-IDF Calculation**: Uses scikit-learn to compute TF-IDF vectors for both the candidate's profile and job postings, after which Cosine Similarity is applied to generate a match score.

The MySQL Database serves as the central data store shared between both the Laravel Web Application and the Python TF-IDF Service. It stores all persistent data including user accounts, employer profiles, job postings, applications, extracted CV data, and computed TF-IDF matching results.

This architecture ensures a clear separation between the web application logic and the AI processing logic, allowing each component to be developed, maintained, and scaled independently without affecting the overall system performance.

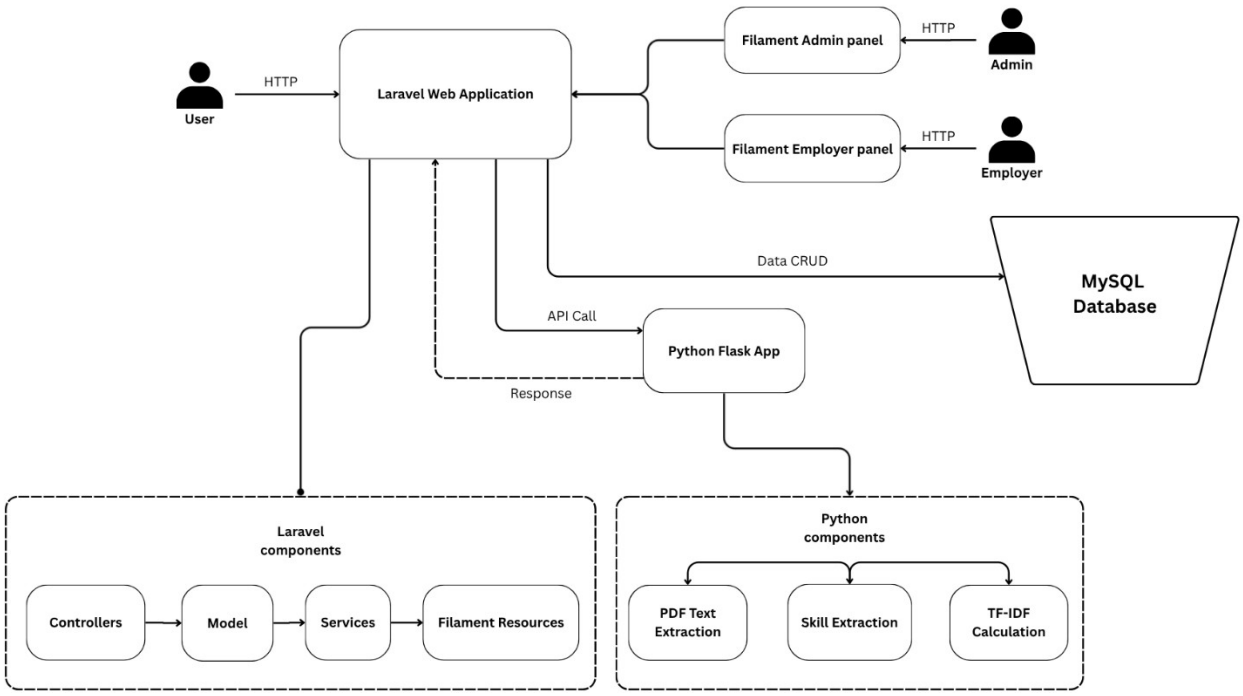



*Figure 9: System Architecture*

### 3.4.3 Database design

The system uses MySQL as its primary relational database, designed to support all operations across the three user roles — job seekers, employers, and administrators.

The database is structured around several core tables, each responsible for storing a specific category of data required by the system. These tables cover user and employer account information, job postings, job applications, parsed CV data, and computed TF-IDF matching results. Each table is carefully designed to store only the data relevant to its purpose, keeping the structure clean and easy to maintain.

All tables are linked through relational foreign keys, establishing clear relationships between users, employers, job postings, and applications. These relationships ensure data integrity throughout the system, preventing inconsistencies and maintaining accuracy across all operations.

The database is also designed with query performance in mind. Frequently accessed data such as job listings, application statuses, and matching scores are structured to support fast and efficient retrieval, ensuring a smooth and responsive experience for all users.

Overall, the database design prioritizes clarity, consistency, and performance — providing a solid and reliable foundation for all system operations and ensuring that data flows smoothly between the Laravel application, the Python TF-IDF service, and the end user interface.

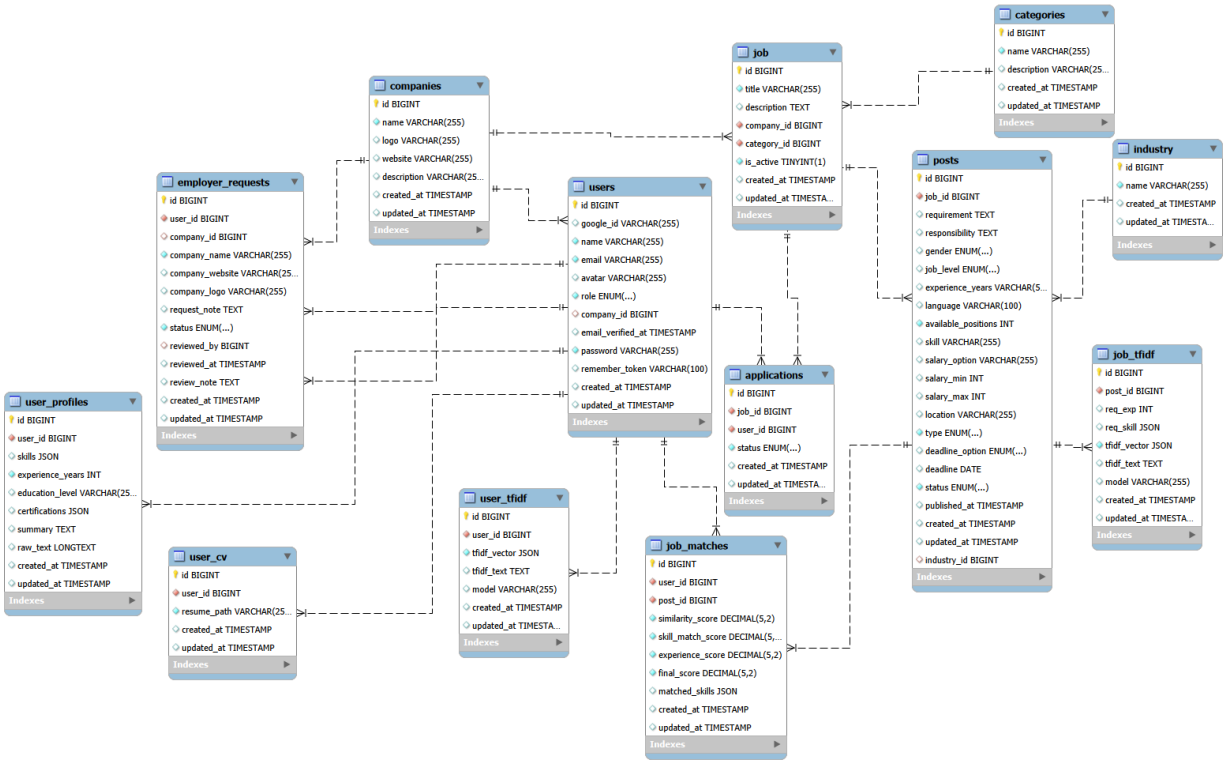



*Figure 10: Database diagram*

# CHAPTER 4

# RESULTS

## 4.1 User Features

The developed system provides a comprehensive set of features for job seekers. The user-facing interface was designed with simplicity and clarity as primary concerns, ensuring accessibility for users with varying levels of digital literacy.

### 4.1.1 Login and Registration

The system provides a secure login and registration interface for users. New users can create accounts by providing essential information, after which they receive access to the full suite of job-seeking features. The authentication system ensures data security and user privacy.

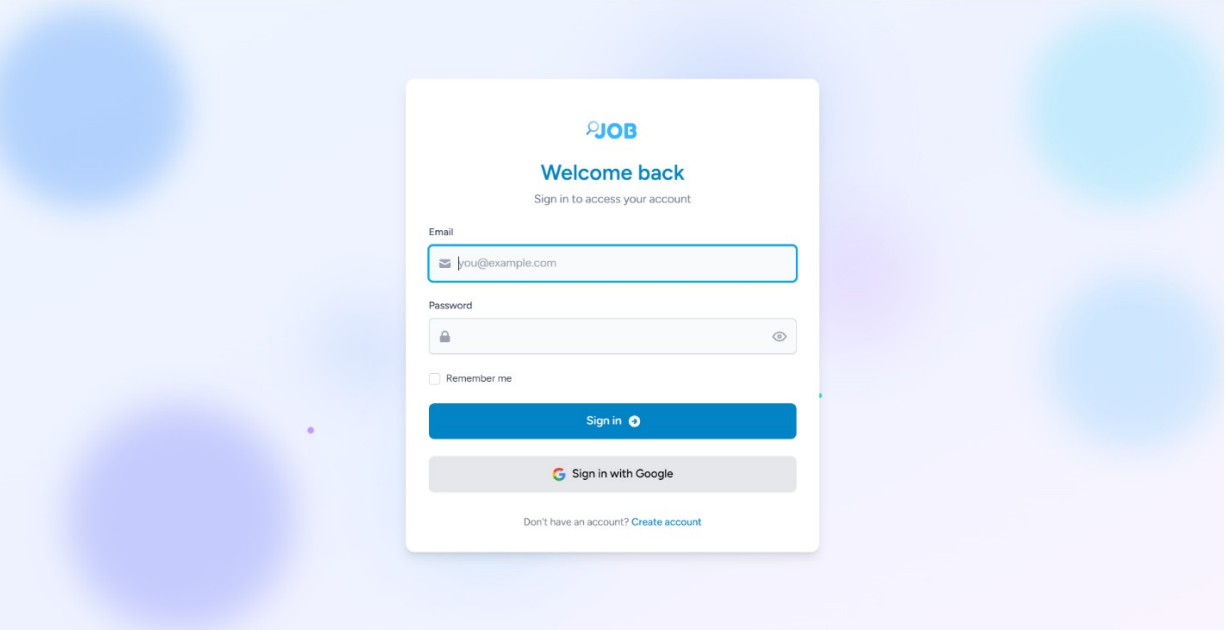



*Figure 11: Login page*

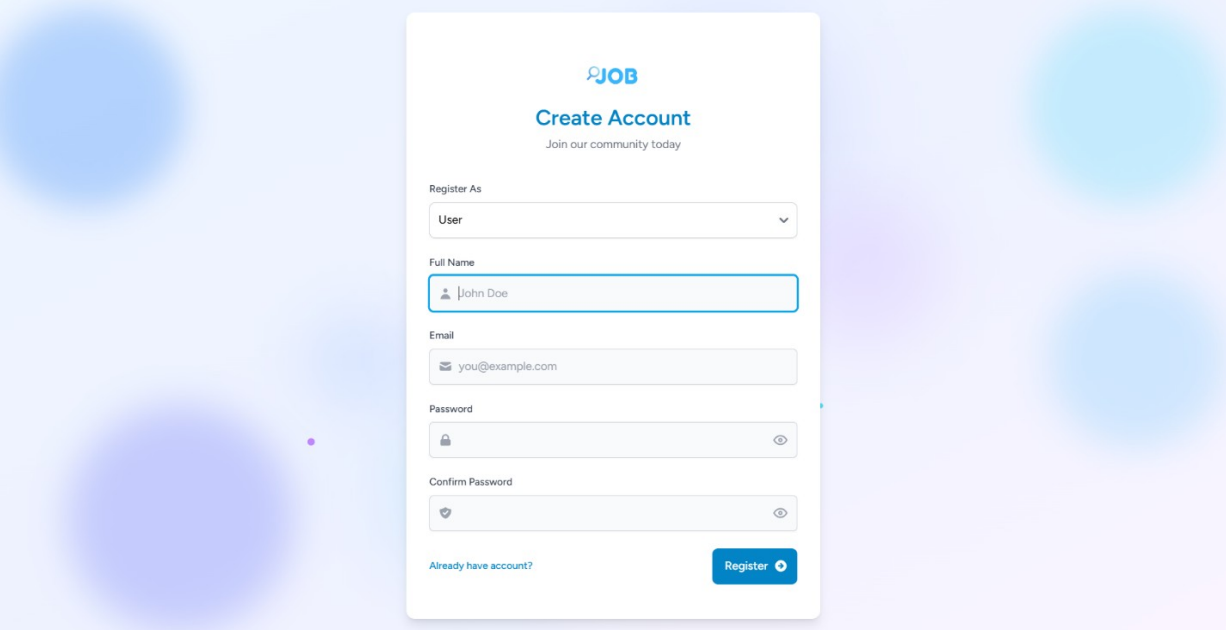



*Figure 12: Register page*

### 4.1.2 User Dashboard

Upon login, users are presented with a personalized dashboard that provides an overview of their job application status and recent activity. The dashboard serves as the central hub for all user activities within the platform.

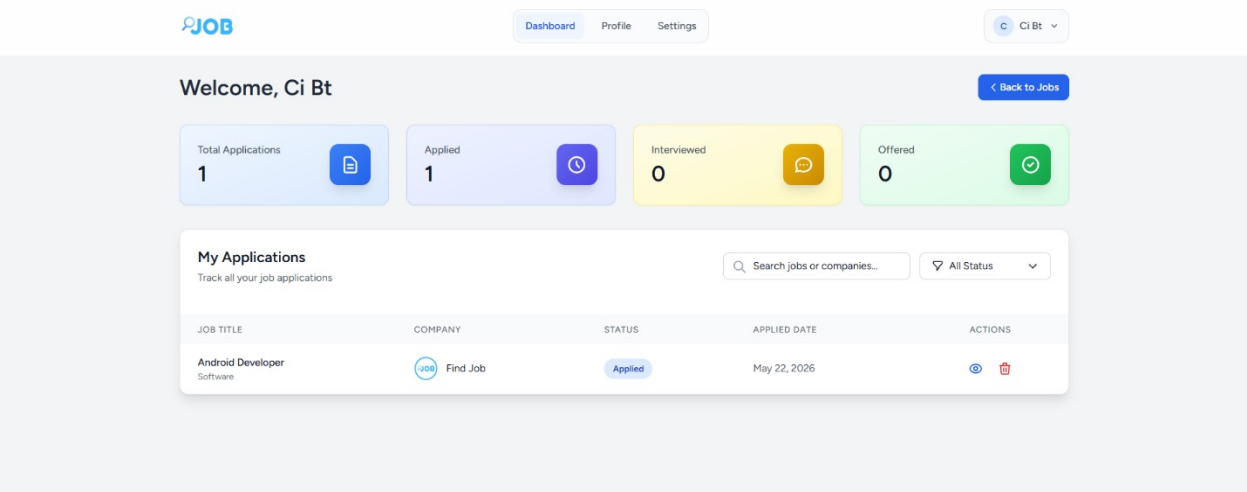



*Figure 13: User dashboard page*

### 4.1.3 User Profile and CV Management

Users can create and manage comprehensive profiles including personal information, educational background, work experience, and skills. The CV upload and parsing feature

automatically extracts relevant information from uploaded documents, populating the user profile and improving the accuracy of AI-powered recommendations.

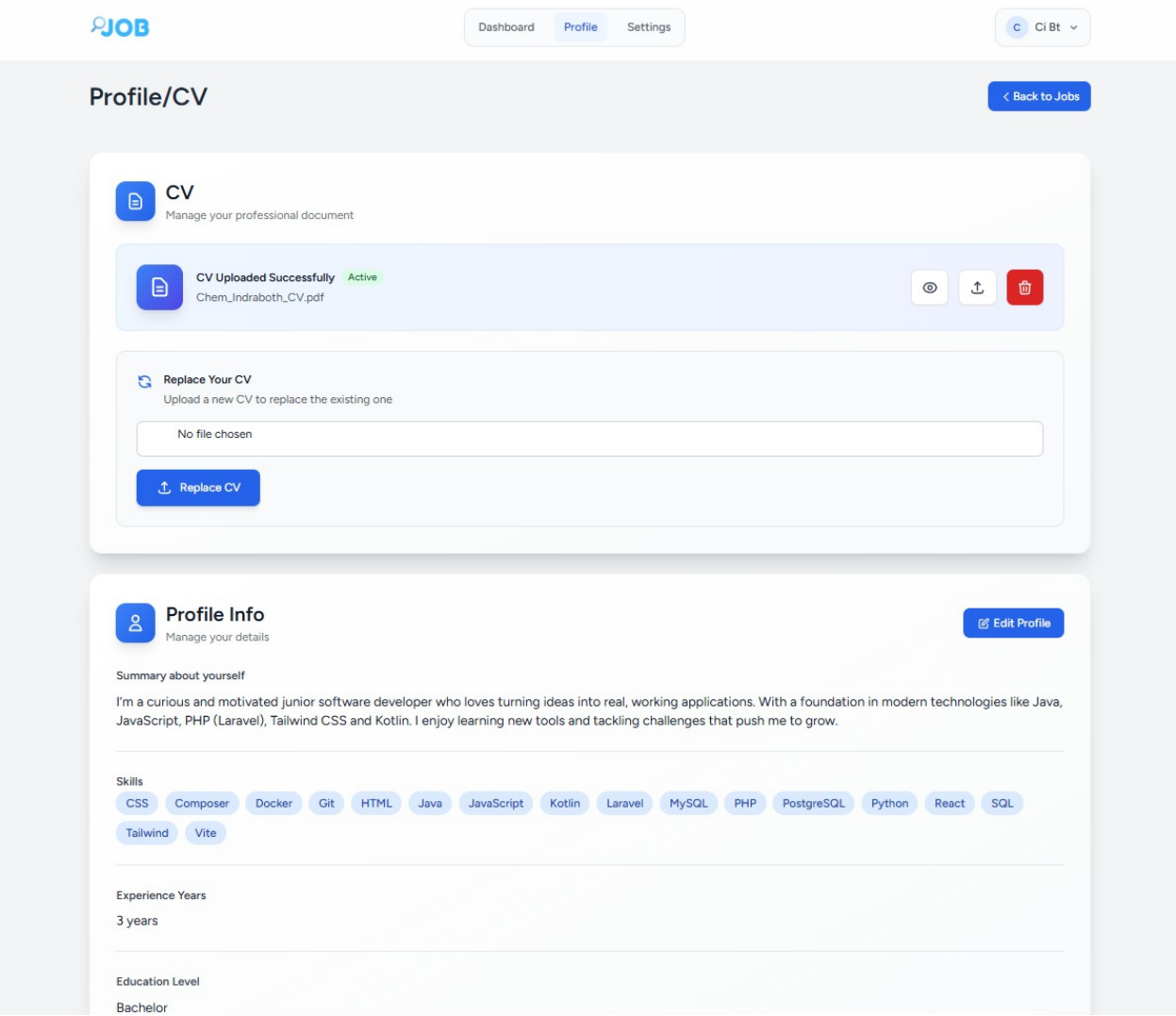



*Figure 14: User Profile page*

### 4.1.4 Job Search and Application

The job search interface allows users to browse all available job positions posted on the platform in a clean and organized layout. To help users find the most relevant opportunities quickly, the interface provides filtering options by industry, job category, location, experience level, and employment type. Users can apply one or multiple filters simultaneously, significantly narrowing down the results and saving time compared to manually browsing through all available listings.

Each job listing page presents comprehensive information about the position, including the job title, responsibilities, required qualifications, required skills, experience level, salary range, and application deadline. Company information is also displayed alongside the job details, giving candidates a better understanding of the employer and the work environment before deciding to apply.

When a user finds a suitable position, they can submit their application directly through the platform with a single click. The system automatically attaches the user's profile and uploaded CV to the application, eliminating the need to repeatedly fill in personal information for every job applied to. This streamlined process reduces the friction that is commonly associated with job applications on other platforms and encourages more users to complete the application process.

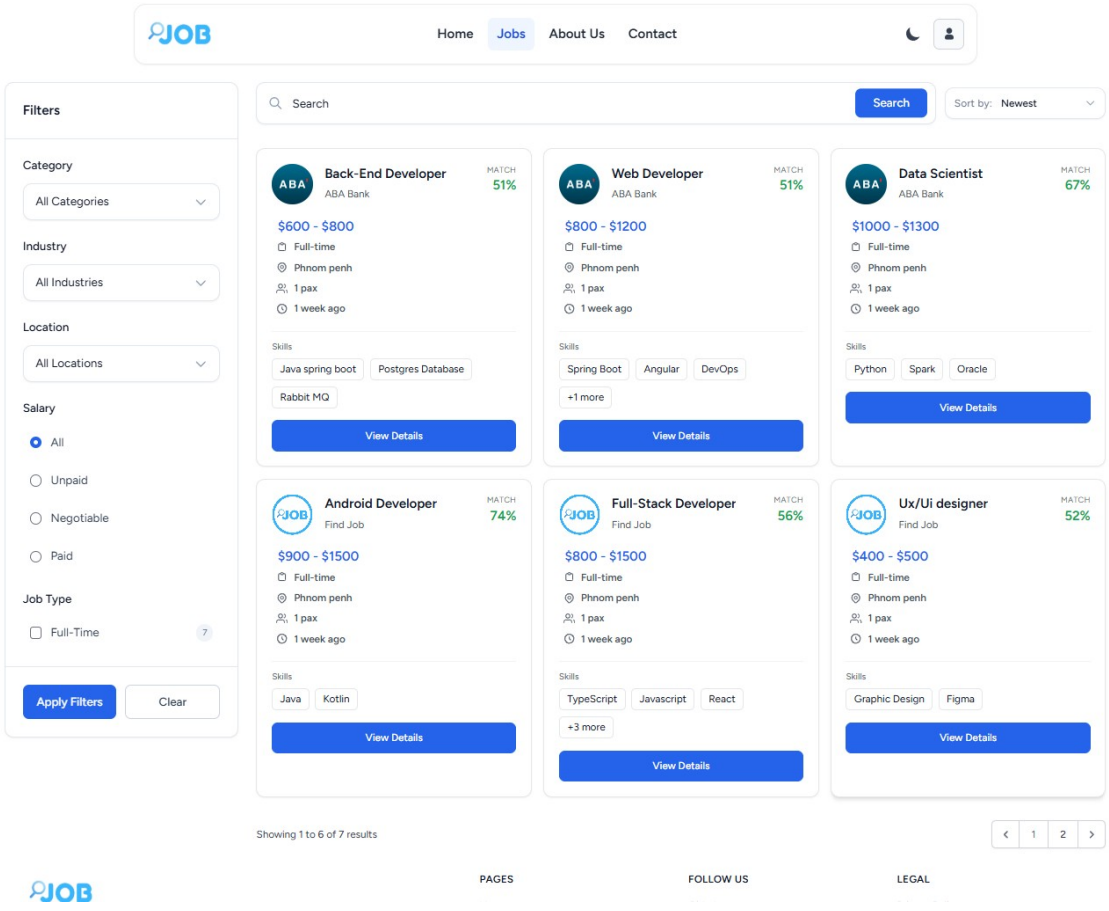



*Figure 15: Job Search page*

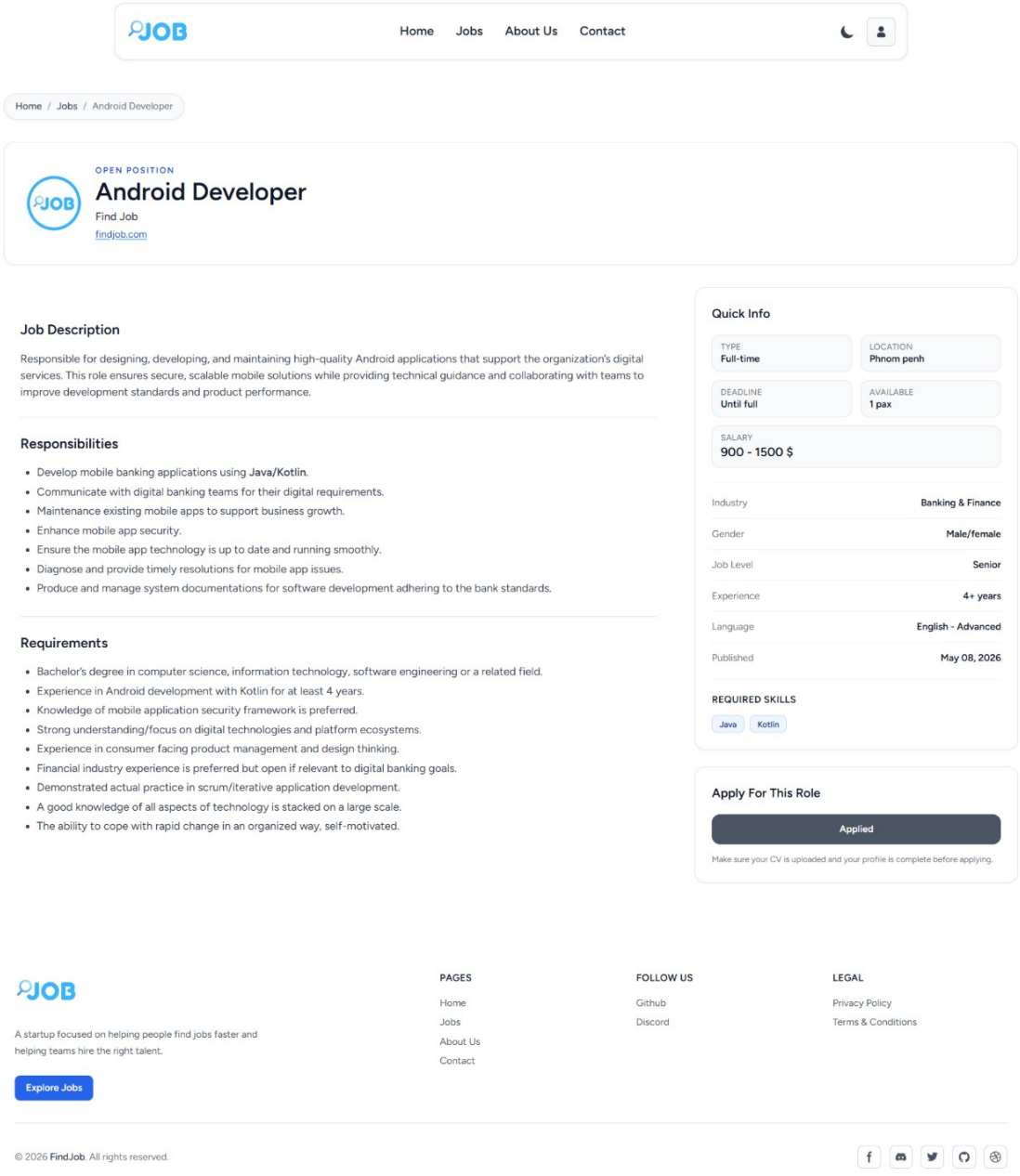



*Figure 16: Job Detail page*

## 4.2 Employer Features

Employer users have access to a dedicated set of features designed to streamline the recruitment process. These features allow employers to manage their company presence, post jobs, and review applications efficiently.

### 4.2.1 Employer Register

Here for employer to register their own company to the system for posting the job. Employer need to input some information within company logo, Company name, Link to social media of the company and wait for Admin to approve to access employer dashboard.

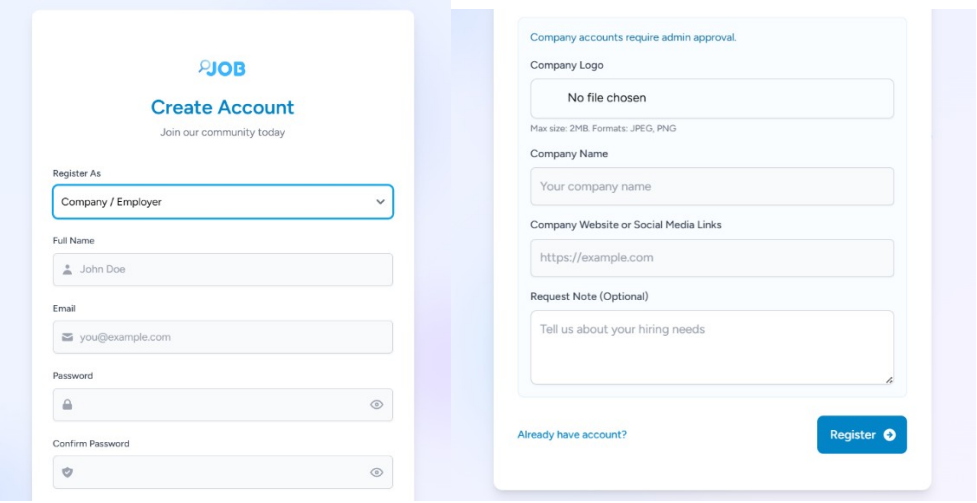



*Figure 17: Employer Register page*

### 4.2.2 Employer Dashboard

The employer dashboard provides an overview of active job postings and recent applications. Employers can quickly assess the status of their recruitment activities and take action on pending items.

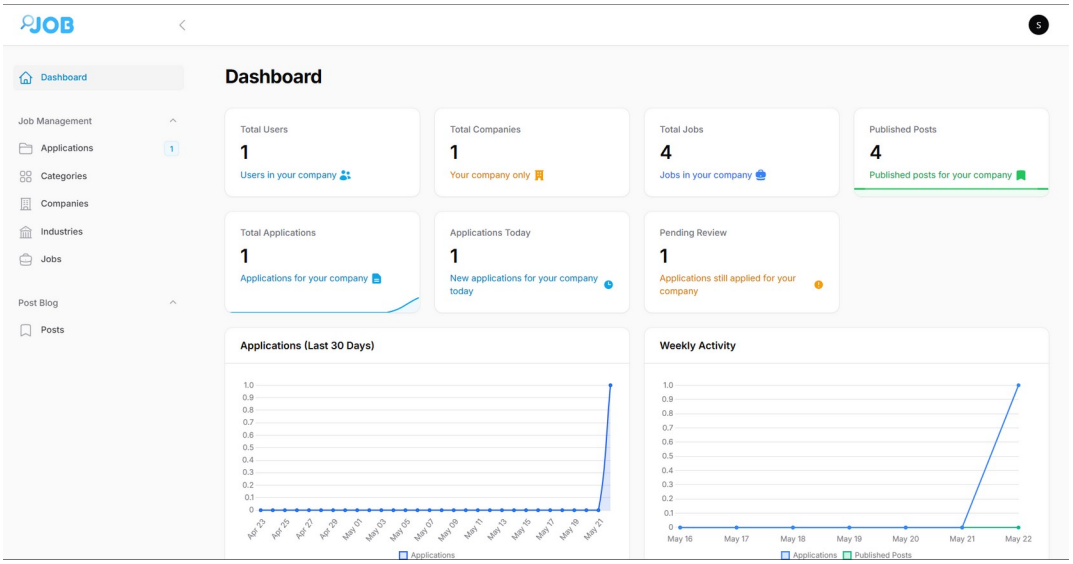



*Figure 18: Employer dashboard*

### 4.2.3 Job Posting and Management

Employers can create detailed job postings specifying position requirements, responsibilities, qualifications, and compensation. Posted jobs can be edited or deactivated as needed. The platform also provides blog post functionality for employers to share company news and updates.

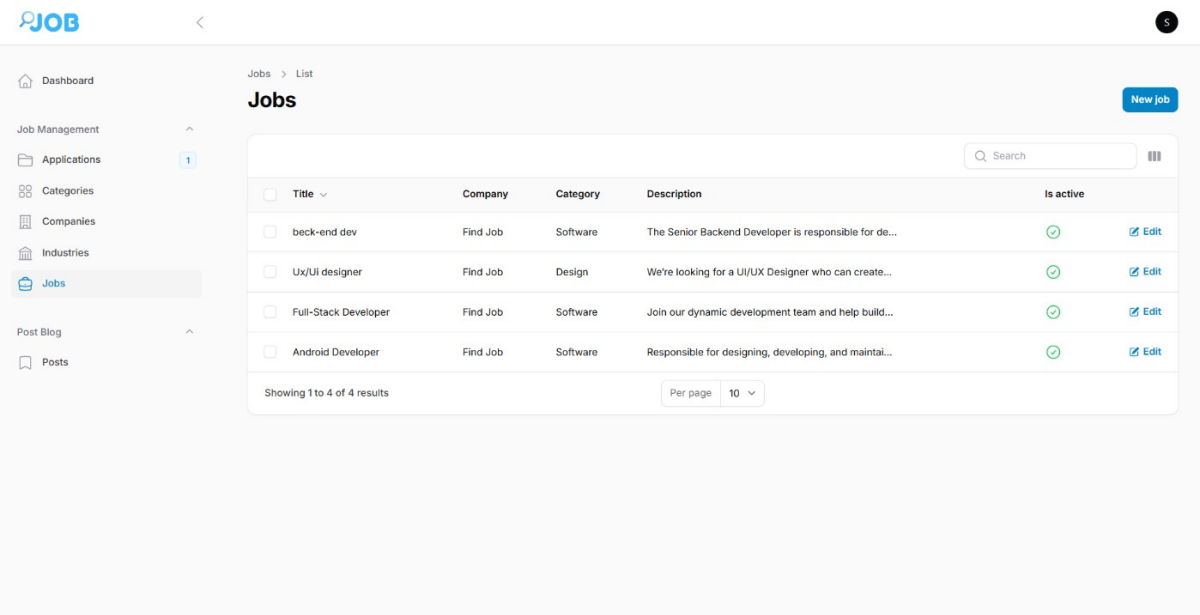



*Figure 19: Job List*

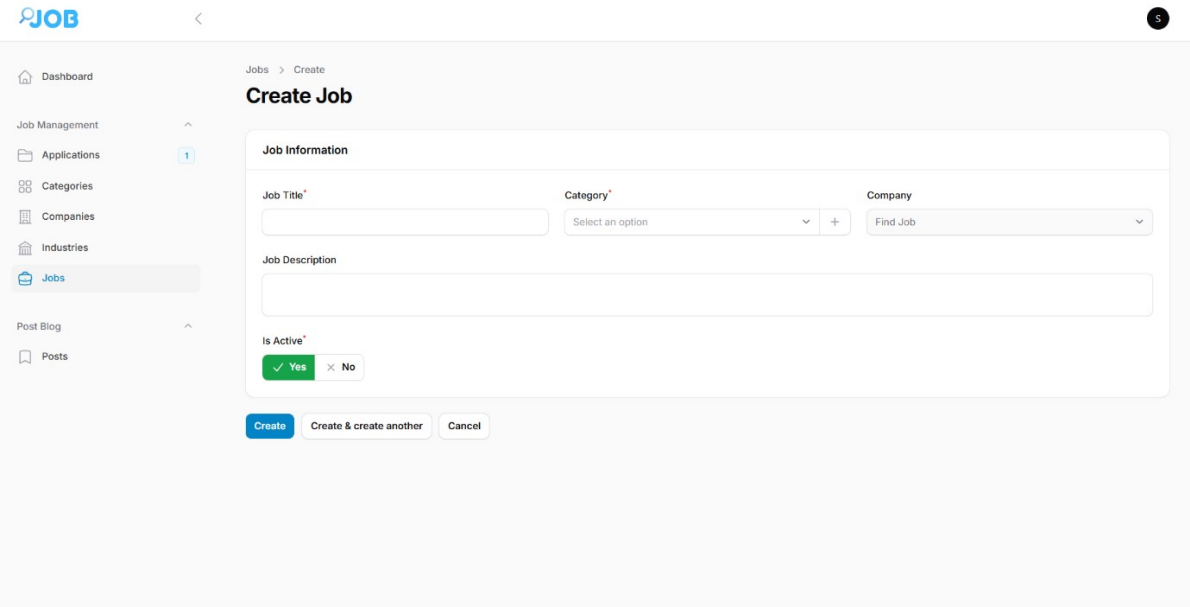



*Figure 20: Create Job*

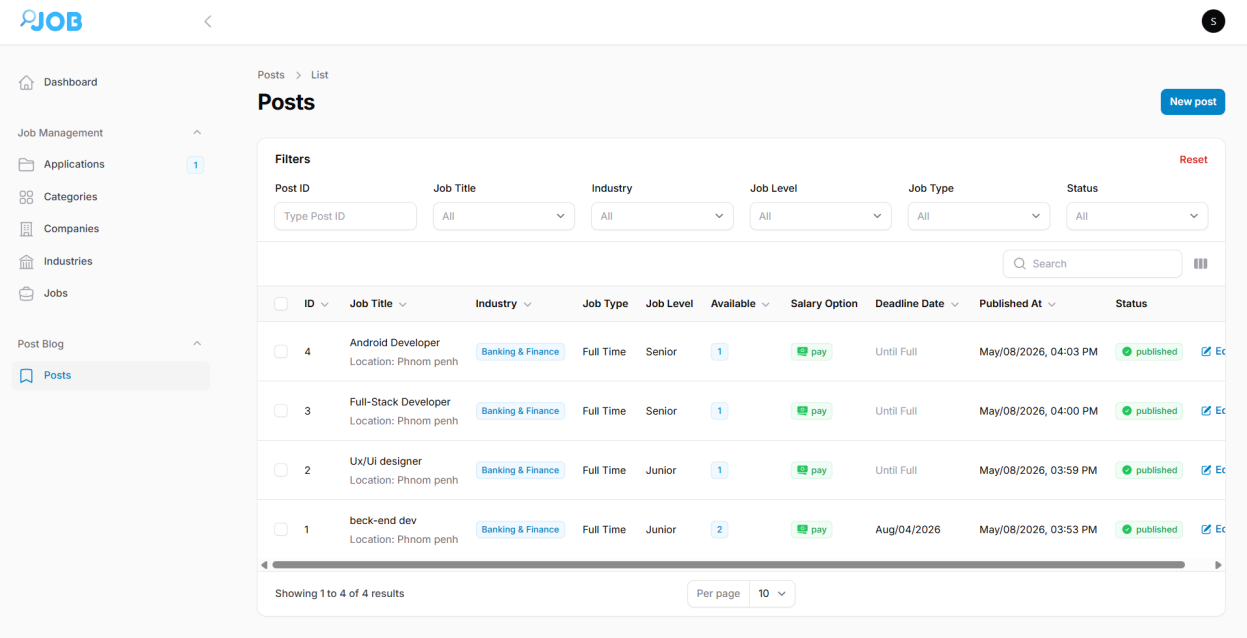



*Figure 21: Post List*

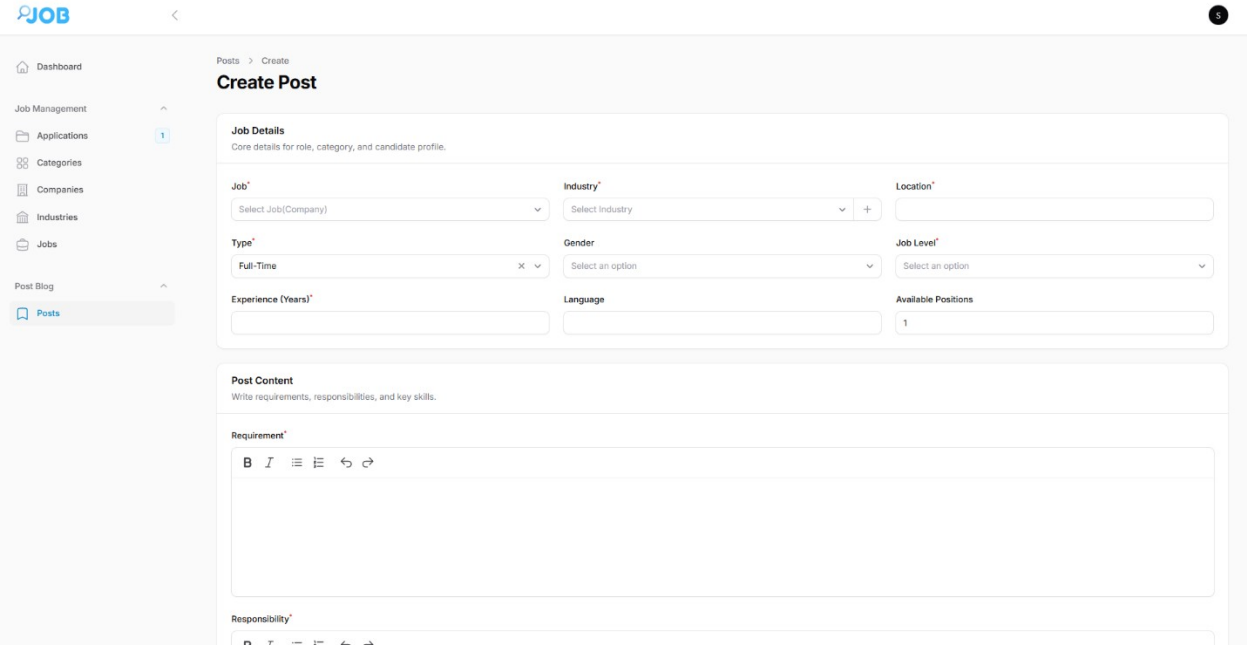



*Figure 22: Create Post*

### 4.2.4 Application Review

Employers can review applications submitted for their positions, access uploaded CVs, and update application statuses. The interface is designed to simplify the screening process and reduce the time required to identify suitable candidates.

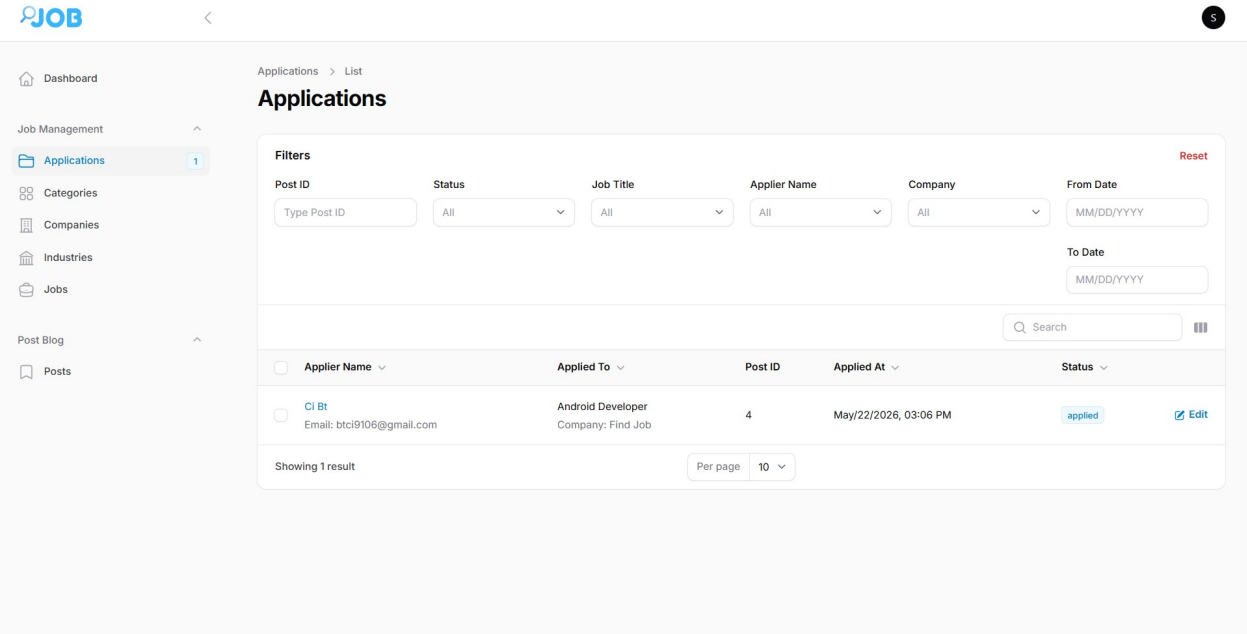



*Figure 23: Application List*

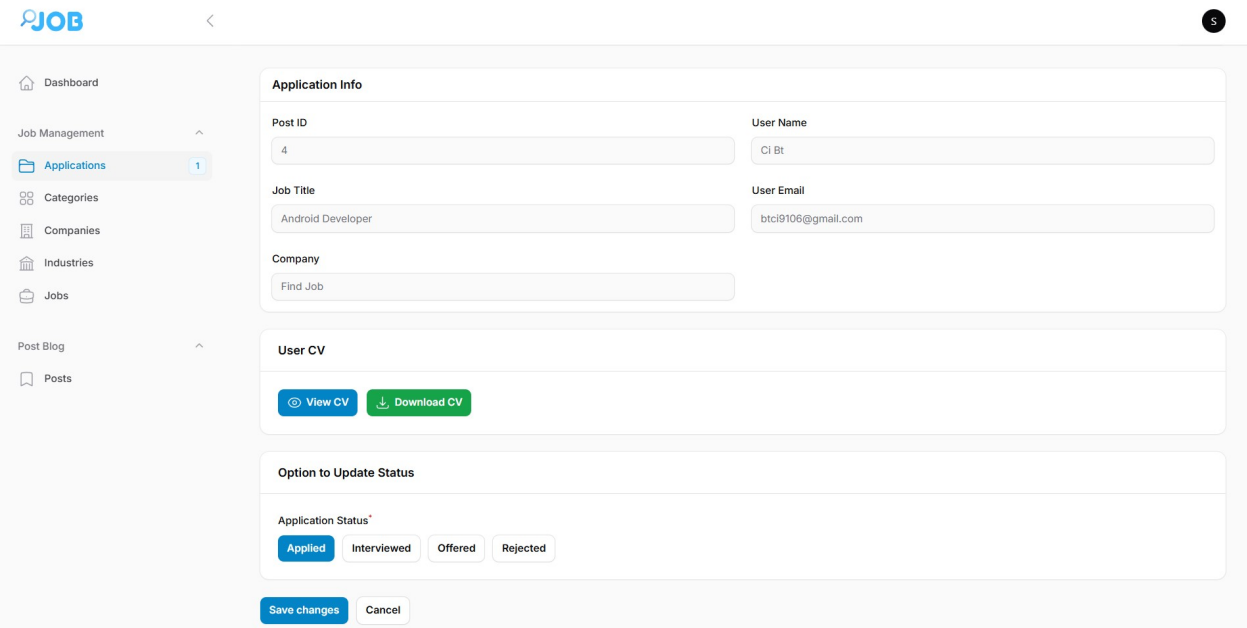



*Figure 24: Application Review*

## 4.3 Admin Features

The administrative interface provides system-wide management capabilities, ensuring the platform operates smoothly and all content meets quality standards.

### 4.3.1 Admin Dashboard

The admin dashboard provides a high-level view of platform activity including total users, employers, job postings, and applications. Key metrics are displayed to enable data-driven management decisions.

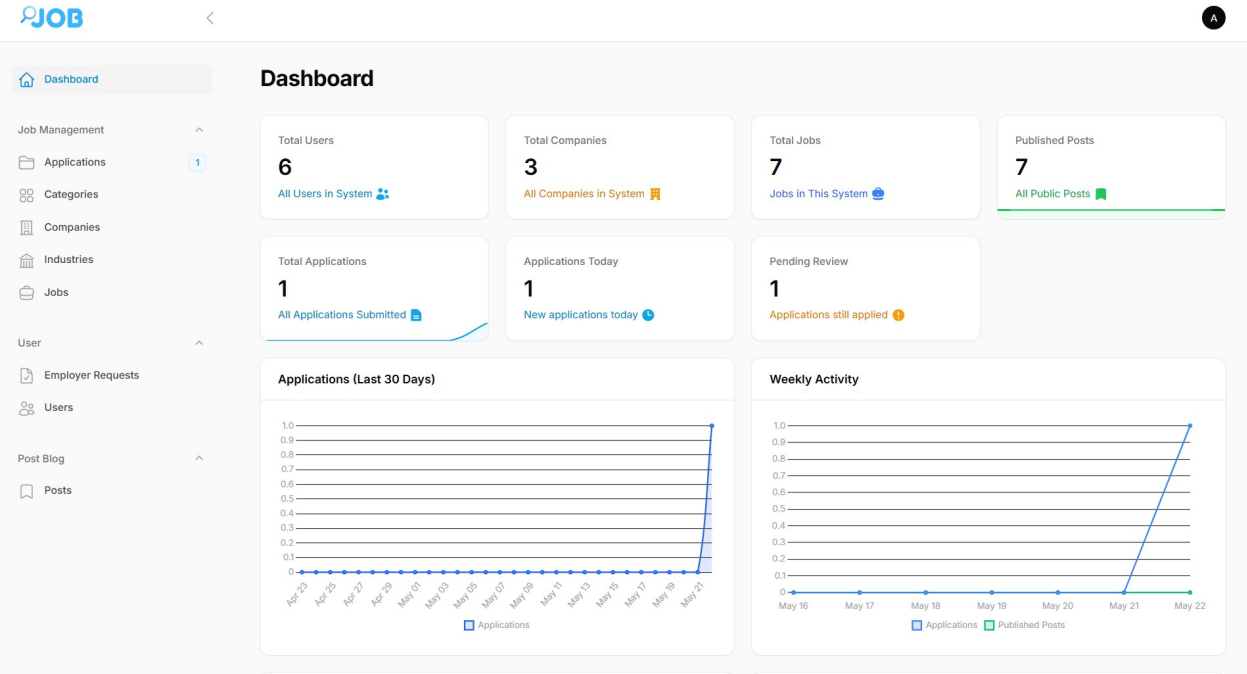



*Figure 25: Admin Dashboard*

### 4.3.2 User and Employer Management

Administrators can view, edit, and manage all user and employer accounts on the platform. Employer registration requests undergo a review process before being approved, ensuring only legitimate businesses can post jobs.

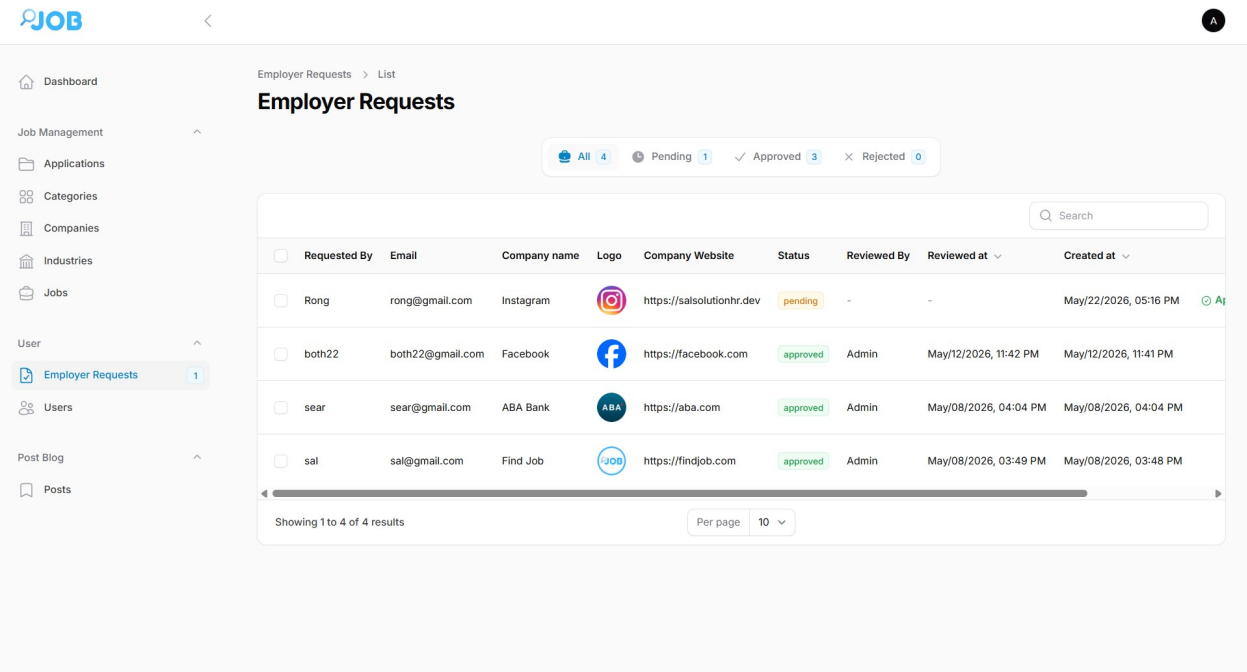



*Figure 26: Employer Requests*

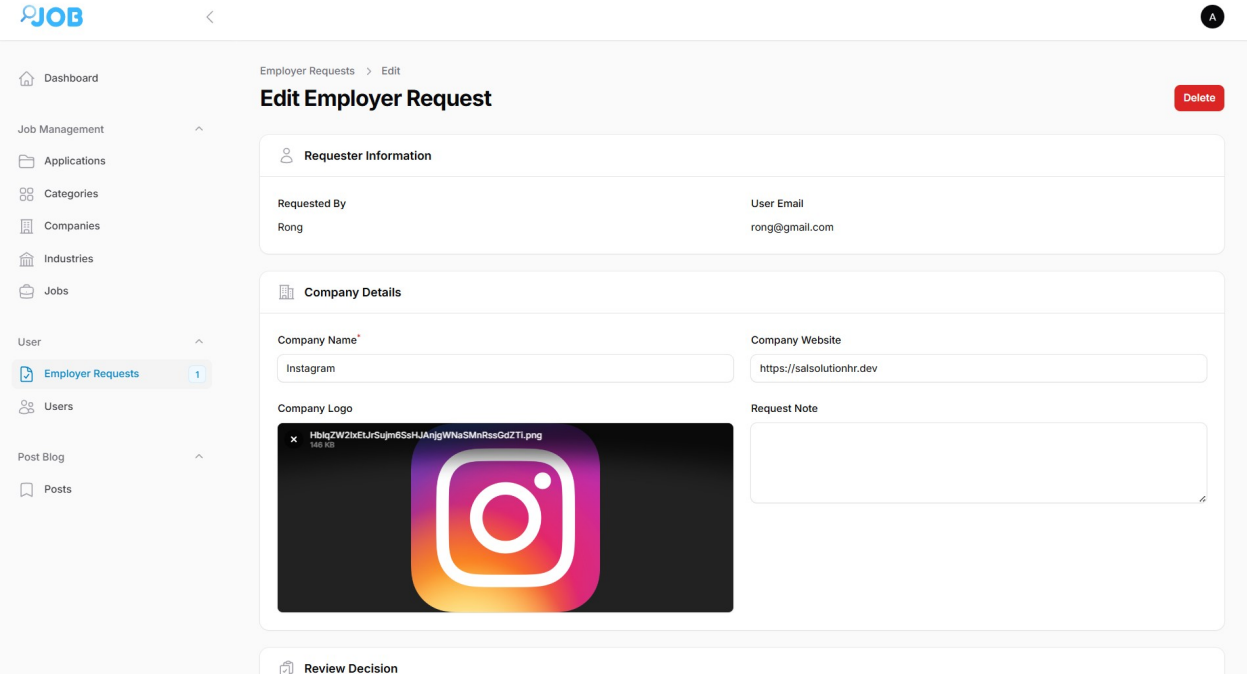



*Figure 27: Review Employer*

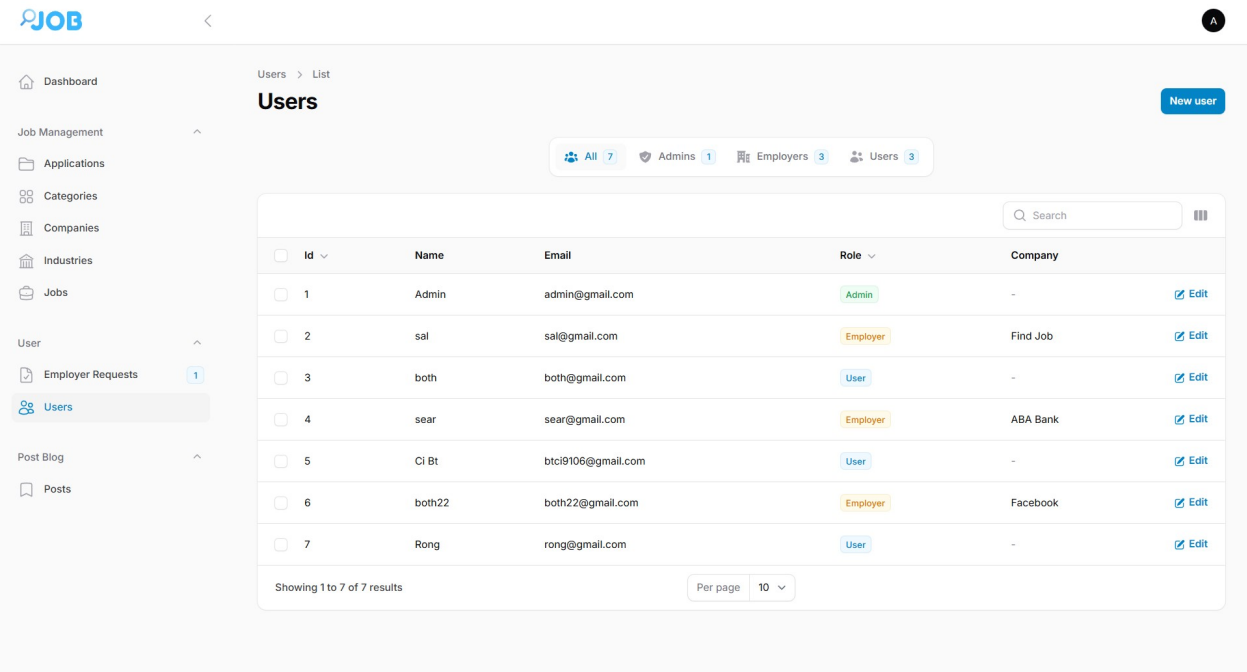



*Figure 28: User List*

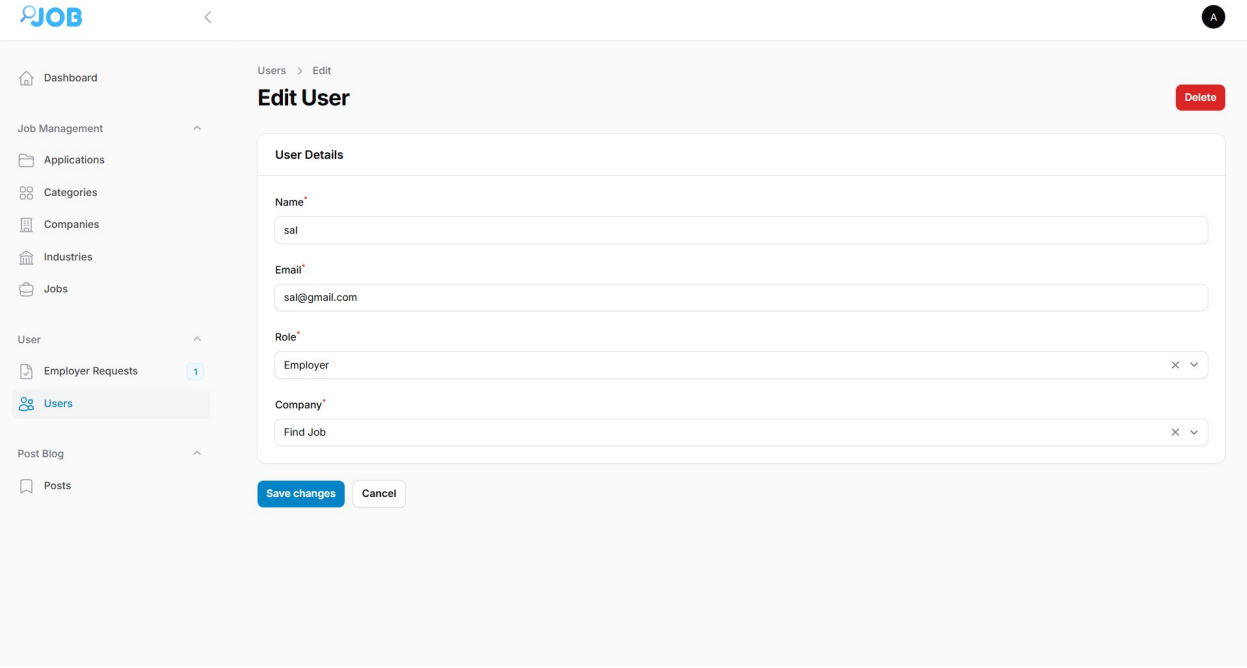



*Figure 29: Edit User*

# CHAPTER 5

# DISCUSSION

## 5.1 Key Findings

The developed Job Portal Web Application successfully addresses all four problem statements identified in Chapter 1. The following key findings emerged from the development and testing process:

- All identified problems successfully addressed the system effectively solves all the core problems identified for both job seekers and employers, delivering a complete and functional solution that meets the original aims and objectives of the project.
- Job Seekers can easily find relevant opportunities through the AI-powered matching engine combining TF-IDF similarity, skill extraction, and experience scoring, job seekers are able to discover job postings that genuinely match their profile without having to manually browse through large volumes of irrelevant listings.
- Employers save significant time in recruitment. They no longer need to spend excessive time advertising vacancies and screening candidates manually. The platform automates the posting and application collection process, allowing employers to focus their attention on the most relevant candidates.
- Friendly and easy to use interface ensures that users of all experience levels can navigate the platform with ease. This addresses one of the most common weaknesses found across existing platforms such as LinkedIn and JobNet.com.kh.
- The job matching engine help job seekers to find their most compatible job opportunities faster, reducing the time and effort typically spent searching and filtering through unmatched listings.
- This platform brings centralized connection between job seekers and employers successfully together through a single centralized application, streamlining the entire recruitment process from job posting to application submission and review.

# CHAPTER 6

# CONCLUSION AND FUTURE WORK

## 6.1 Conclusion

### 6.1.1 Main Strengths

The Job Portal Web Application successfully achieves its primary aim of providing a centralized and user-friendly platform for job seekers and employers to manage their recruitment and job-seeking activities. The system's main strengths include:

- A comprehensive multi-role platform that serves job seekers, employers, and administrators from a single integrated system.
- An AI-powered matching system that provides relevant job recommendations based on profile, skill matching, and experience compatibility.
- A clean, accessible user interface that prioritizes ease of use and has been validated through user testing.
- End-to-end recruitment process support from job posting to application review and status tracking.
- The three-tier architecture and role-based access control provide a solid, scalable, and secure foundation for future development

### 6.1.2 Limitations

The current version of the system has several limitations that should be acknowledged. As the result this web application can only:

- The platform is accessible only through a web browser and requires an active internet connection, limiting usability in areas with poor connectivity.
- The system is optimized for small to medium-scale operations and may experience performance constraints under very high concurrent user loads.
- Advanced security features such as fake job post detection are not implemented in this version, potentially exposing users to fraudulent listings.

- Mobile-native applications for iOS and Android platforms are not available, which may limit accessibility for users who primarily use mobile devices.

### 6.1.3 Unexpected Findings

During the development and testing phases, one notable unexpected finding emerged many users expressed a strong preference for a simple and clean interface rather than complex or feature-rich designs. This finding has significant implications for the design of job portal systems.

Contrary to the assumption that more features would lead to greater user satisfaction, participants consistently rated the simplified, clean interface more favorably than feature-dense alternatives. This suggests that for the target user demographic, cognitive simplicity and ease of navigation are more important than comprehensive functionality accessible from a single screen.

This finding aligns with established principles of user experience design that prioritize progressive disclosure of information and features. The implication for future development is to continue prioritizing interface simplicity while making advanced features accessible through deliberate navigation rather than immediate presentation.

### 6.1.4 Significance of the Study

This study makes a meaningful contribution to the development of digital recruitment solutions in Cambodia. By combining AI-powered matching with a locally adapted and user-friendly platform, the project demonstrates that intelligent recruitment technology does not need to be complex to be effective. The system provides a practical and accessible tool that lowers barriers for both job seekers and employers, particularly at the small to medium scale where existing platforms fall short. The findings also contribute to the broader understanding of how TF-IDF-based matching and NLP-based CV parsing can be applied effectively in a real-world recruitment context.

## 6.2 Future Work

Based on the findings and limitations of this research, several directions for future work are identified

- **Mobile Application Support:** Developing native mobile applications for iOS and Android platforms would significantly expand the reach of the system and improve accessibility for

mobile-first users, which represents a growing segment of the Cambodian internet user base.

- **Improved Matching Accuracy:** Further research into advanced natural language processing techniques and machine learning models could improve the accuracy of the AI matching system. Incorporating user feedback data into the matching algorithm would enable continuous improvement over time.
- **Fake Job Detection:** Implementing automated detection of fraudulent or misleading job postings would improve platform trustworthiness and protect users. This could involve both rule-based systems and machine learning models trained on patterns associated with fake listings.

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