An Undergraduate Internship Project on BD Online Job Protocol

By

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Attestation

I, Abul Hasnat Sobuj, ID: 1922062, affirm that the report named "BD Online Job Protocol" for IT WAY BD, presented as part of the criteria for the Degree of Computer Science and Engineering at Independent University, Bangladesh (IUB), is the outcome of my personal research efforts.

I additionally declare that the project was completed while I was a student at the university. I want to express my gratitude to my supervisor, Azwad Abid, Lecturer B in the Department of Computer Science and Engineering, for his support during the completion of this project. I also affirm that the work showcased here represents my individual comprehension and insights acquired during my internship at IT WAY BD.

The report accurately references and acknowledges all utilized sources. For any additional questions related to this report, please reach out to my internship supervisor at IT WAY BD via the email address.

Sobuj — 11-10-2025

Signature — Date

Abul Hasnat Sobuj

Name

Acknowledgement

First and foremost, I am profoundly grateful to Almighty Allah for granting me the strength, determination, and perseverance to successfully complete my internship and this final report. I express my deepest appreciation to the Faculty of Computer Science and Engineering at Independent University, Bangladesh, whose commitment to academic excellence has played a pivotal role in shaping my technical, analytical and problem solving skills. Their dedication to imparting both theoretical knowledge and practical applications has been instrumental in my professional growth. My sincere gratitude goes to my organizational supervisor Rabbi Hossain, Senior Web Developer of IT Way BD, for providing me with this invaluable internship opportunity. His mentorship and insightful feedback have significantly refined my technical competencies. I also thank the entire IT Way BD team for fostering a collaborative and supportive learning environment. I am deeply grateful to my family, friends, and mentors for their continuous encouragement and belief in my abilities. Their support has motivated me to overcome challenges and grow professionally. A special acknowledgment is given to my academic supervisor, lecturer Azwad Abid of the Department of Computer Science and Engineering, Independent University, Bangladesh, for his invaluable guidance, which has enriched my problem solving and technical skills. I also appreciate the computer science and software development community for their contributions, which have broadened my understanding of this ever evolving field. Lastly, I express my heartfelt gratitude to all those who have contributed to my learning. This internship has been a transformative experience that has equipped me with essential skills and practical knowledge for my future career.

Letter of Transmittal

Azwad Abid
Lecturer B
Department of Computer Science Engineering
School Of Engineering and Computer science
Independent University, Bangladesh.

Subject: Submission of Internship Report for Graduation Completion

Dear Sir,
It gave me immense pleasure to present the internship report which was given to me to fulfill the requirements of my engineering degree. In this paper, I have tried my best to carry all the requirements of an internship project. I feel very lucky to have been able to prepare this internship project under your guidance. It has been a great opportunity to learn how to manage an internship program. It provided me a great opportunity to apply the classroom knowledge gathered in the practical field. I must mention here that I am extremely grateful to you for your valuable guidance, tireless efforts and constant attention whenever required.
I will happily answer any questions you may have now and when needed. I would especially like to draw attention to the fact that there is always a place for interpretation of any relevant matter.

Sincerely,
Abul Hasnat Sobuj
ID: 1922062
Department of Computer Science and Engineering,
Independent University, Bangladesh.

Evaluation Committee

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Academic Supervisor	Industry Supervisor

Panel Members

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Internship Coordinator	Head of the Department

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Abstract

The BD Online Job Protocol is a comprehensive recruitment platform developed during my internship at IT WAY BD to address the evolving challenges in Bangladesh's digital job market. The system provides a secure, user friendly, and scalable environment where employers and job seekers can connect seamlessly. It integrates essential features such as job postings, candidate applications, resume uploads, employer dashboards and an admin review panel to ensure authenticity and transparency. The platform is built with Html, CSS, Bootstrap, PHP, JavaScript and MySQL, ensuring responsive design, efficient data handling and strong security measures against vulnerabilities. To enhance intelligence and future scalability, the system now incorporates Gemini API for smart recommendations and predictive analytics, along with multi language support to improve accessibility for both English and Bangla users. With scalability as a core consideration, the platform supports real time updates and future AI integrations. By emphasizing trust, accessibility, and administrative oversight, the BD Online Job Protocol reduces the risk of fake job postings, enhances mobile usability and streamlines recruitment processes. Ultimately, it contributes to a more reliable, efficient and future ready digital employment ecosystem in Bangladesh, empowering job seekers and employers while setting a standard for secure and sustainable online recruitment solutions.

Keywords— Job Portal, Recruitment System,Web Development, User Experience, Admin Review Panel, Resume Upload, Career Advancement, AI-powered Recruitment, Gemini API, Multi-language Support

Contents

List of Figures

Chapter 1

Introduction

The BD Online Job Protocol is a web-based recruitment platform developed at IT Way BD under the supervision of Industry Supervisor Mr. Rabbi Hossain. This project aims to bridge the gap between job seekers and employers by providing a secure, efficient, and user-friendly online environment. It is designed to digitalize traditional hiring methods, enabling users to post jobs, apply for positions, and manage recruitment activities seamlessly. By utilizing modern web technologies such as HTML, CSS, Bootstrap, PHP, and MySQL, the system ensures responsiveness, scalability, and reliable data management, thereby enhancing the overall recruitment experience.

1.1 Overview/Background of the Work

The students are in a position to apply their academic knowledge in real life projects through internships. I underwent my internship in IT WAY BD, a renowned IT solution provider, as a CSE undergraduate student of Independent University, Bangladesh (IUB). Through my internship, I participated in a project called "BD Online Job Protocol" in designing a secure and efficient job portal for Bangladesh's market. The system was designed to connect employers and job seekers through a user-friendly interface allowing job postings, applications, and communications.

My work included front-end and back-end activities. I was involved in designing dashboards, landing pages, and modules for employment posts along with authentication modules and database integration. My work boosted my expertise in web technology, problem solving, and collaborative development.

This is a description of work completed, difficulties faced and knowledge gained during my internship. The report is also a reflection of how my internship supported me in terms of professional development and prepared me for possible future involvements in the software industry.

1.2 Objectives

I was able to contribute in a significant project in my internship in IT WAY BD, initiated August 22, 2025, titled BD Online Job Protocol. The core purpose of this project was to create a safe, easy, and effective online job platform that would facilitate recruitment in Bangladesh. The fundamental objective of this system was to develop a single, unified, and user-friendly online interface where companies and job seekers could communicate freely. Besides helping companies quickly identify the most qualified applicants, this would simplify and expedite the job search process.

For user data's protection, like robust log-in and security mechanisms was another vital objective. Employer dashboards and candidate dashboards, job postings and apply functionality, together with an admin interface to keep tabs on the system, were also contemplated facets of the system. Time savings, greater output, and greater clarity in the process were to be attained through these.

Making sure that the system would manage scalability and real-time updating, such that it could take an expanding user base without a dip in performance, was another fundamental goal. For this purpose, web programming, database administration, and system optimizing best practices were applied throughout the whole project. Sustainability and ethical approaches were key areas of emphasis in this initiative as well. The BD Online Job Protocol was created to provide equitable employment procedures, equal opportunity, and ethical digital employment opportunities throughout all of Bangladesh.

With these accomplishments, the project hopes to establish a standard of safe, efficient, and lasting employment platforms, adding to Bangladesh's digital employment ecosystem's expansion. In general, I supported front-end as well as back-end operations in this project, in such a way that there was appropriate integration, efficient handling of content, as well as effective user experience.

1.3 Scopes

Features for Job Seekers: The system lets job seekers submit resumes, make and edit profiles, and apply for jobs that fit their qualifications and skill set. Its main goal is to streamline the job application process by offering a user-friendly and accessible platform.

Employer Dashboard: Employers can post job openings, review applications, and streamline recruitment through a dedicated dashboard. This helps organizations manage applicants efficiently and make data-driven hiring decisions.

Administrative Control: Administrators have complete authority over user conversations and the verification of job postings. This maintains system integrity, guards against abuse, and ensures that the hiring process is fair.

Interactive Communication: To strengthen engagement, the project includes features such as direct messaging between employers and applicants, as well as user review and rating systems to promote trust and accountability.

Scalability and Future Growth: With its adaptable architecture and responsive design, the project ensures scalability to accommodate growing user demands. It is built to evolve with the changing needs of the Bangladeshi job market and future technological advancements.

Knowledge Transfer and Collaboration: The project encourages collaboration among administrators, employers, and job seekers by promoting the exchange of information and feedback. It seeks to establish a culture of continuous learning and problem-solving that strengthens the overall recruitment ecosystem.

1.4 Problem Statement:

The recruitment industry in Bangladesh has seen significant growth with the expansion of digital technologies, yet both job seekers and employers continue to face considerable challenges. For jobseekers, one of the main issues is the lack of a centralized and reliable platform where verified job postings are consistently available. Vacancies are often scattered across multiple sources, which makes it time-consuming for applicants to find relevant opportunities. Another persistent problem is the prevalence of fake or misleading job postings, which undermines trust and leads to frustration among users. In addition, many existing platforms provide limited mobile responsiveness, even though a large portion of the Bangladeshi workforce depends primarily on smartphones for internet access. Employers face challenges as well, particularly in terms of visibility and candidate management. While they may post jobs across different platforms, the absence of centralized systems often reduces their reach and increases recruitment costs. Moreover, many platforms lack proper administrative oversight, which makes it difficult to filter out unqualified applicants or monitor deceitful activities. Data security is another concern, as some job portals do not adequately protect sensitive information such as resumes and personal details of users. The impact of these challenges is two fold. Jobseekers often miss opportunities, waste valuable time, and lose trust in online recruitment systems, while employers struggle to find the right candidates efficiently. This not only slows down the hiring process but also contributes to mismatches between skills and job requirements, ultimately affecting workforce productivity. Proposed Solution: The BD Online Job Protocol is designed as a comprehensive recruitment platform to address these issues. It introduces an administrative review system to verify job postings before they are published, thereby reducing fake listings and enhancing trust. The platform provides centralized access to job opportunities, enabling candidates to quickly search, filter, and apply for jobs that match their skills and preferences. It also offers responsive design using Bootstrap, ensuring accessibility across desktops, tablets, and smartphones. For employers, the system provides dashboards to manage vacancies and applications more effectively.

Additionally, the platform is built with scalability in mind, allowing the future integration of features such as AI-powered job recommendations, premium job listings, payment gateways and real-time communication tools.

Chapter 2

Literature Review

The review of literature underscores the significance of undergraduate courses in cultivating the foundational abilities needed for the development of the BD Online Job Protocol system. Courses in programming, database management, and system design have equipped me with the necessary knowledge to effectively plan and execute the project. Current platforms such as Bdjobs[1], LinkedIn, Glassdoor and Indeed have provided insightful perspectives on industry practices, highlighting challenges concerning scalability, data security and user experience. Scholarly research also emphasizes the necessity for efficient, secure, and user-focused online job portals. This project seeks to tackle these challenges by creating a [2]PHP-based job listing and recruitment system that prioritizes secure authentication, dynamic data management and scalability customized for the Bangladeshi job market.

2.1 Relationship with Undergraduate Studies

The skills and information I gained at IUB throughout my undergraduate studies came in handy when building the User, employee and admin dashboard.This assignment would have been much more difficult without the basis from these classes.Important classes that have included:

CSE 203 Data Structures: This course covered organizing and handling complex data structures, including arrays, objects and classes.These concepts were essential in implementing efficient property search and filtering features.Proper use of data structures made the system faster and more reliable in handling large volumes of property listings.

CSE 211 Algorithms: These classes helped me get more familiar with the minor architectural changes of a new programming language and enhanced my understanding of algorithms.

CSE 303 Database Management: This course covers the fundamental concepts of entity-relationship (ERD) diagrams and database architecture. Applying this information I was able to design Data models for the dashboard for connect the tables with each other.

CSE 309 Web Application: This course started my web development adventure by introducing me to a variety of coding languages and me a useful hands-on learning experience in web development that I could apply to my internship project.This enables me to apply in my data scraping and Api design tasks.

CSE 307 System Analysis and Design: This course focused mostly on requirements analysis and diagram drawing techniques. These skills were necessary to understand the needs of the clients and design the program accordingly.

CSE 317 Numerical Methods : This course helped me to understand the basic methods of data visualization and machine learning model training and implementations.

2.2 Related works

By making the hiring process more accessible and effective, BD Online job protocol in Bangladesh has significantly contributed to its transformation. With features including resume uploads, job applications, career counseling, and employer branding, BDJobs.com is the most well-known and popular of these platforms. Although BDJobs has established a standard, it still has problems, including fierce applicant rivalry, few free services, and insufficient safeguards against fake or false job posts. In the Bangladeshi job market,[1]BDJobs.com has emerged as the leading recruitment platform, offering services such as resume uploads, job applications, and career advice. While widely used,BDJobs faces challenges related to high competition, limited free features, and insufficient measures to prevent misleading or fake job postings. Other smaller platforms, such as[3] Chakri.com and [4]Kormo Jobs, provide alternative solutions, but many of them lack strong administrative monitoring or effective filtering options for users.
The importance of user interface design, data security, and trust in hiring systems is also emphasized by academic studies. Research shows that job seekers are more inclined to choose platforms that protect personal information and verify employers. Additionally, increasing adoption rates in emerging nations requires localization, which includes language support, mobile optimization, and culturally appropriate design.
By resolving the drawbacks of local solutions and applying the benefits of global platforms, the BD Online Job Protocol project expands on these before. It has a responsive design for multi-device compatibility, is designed for future scalability, and includes an admin review process to minimize fake submissions, in contrast to many other portals now in use. As a result, it is a more open, secure, and user-friendly hiring solution developed specially for the Bangladeshi job market.

Chapter 3

Project Management & Financing

The BD Online Job Protocol initiative was overseen by applying fundamental project management principles to guarantee it was completed on time and resources were used efficiently.The work was segmented into stages planning, design, development, testing and deployment with established milestones and deadlines.Ongoing progress monitoring and documentation helped sustain focus and address potential risks throughout the development process.

Regarding financing, the project was mainly self-sustained, covering expenses associated with domain hosting, database management and web development tools. Open source technologies like PHP, MySQL and Bootstrap[5] were employed to reduce costs while preserving quality and performance. Ultimately, effective management and economical resource utilization led to the successful completion of the project within a constrained budget.

3.1 Work Breakdown Structure

The Work Breakdown Structure (WBS) is an essential tool used to streamline the development of the BD Online Job Protocol project. It divides the entire project into manageable subtasks, ensuring that the workflow remains structured and efficient. By employing WBS, each task is clearly defined, allowing for better resource allocation, improved coordination among team members, and effective tracking of project progress.
In this project, the WBS served as the foundation for creating the Gantt chart and detailed task timelines. It ensured alignment among the project team, reduced overlap of responsibilities, and enhanced accountability. Incorporating WBS into the BD Online Job Protocol simplified organizational processes, ensured smooth execution of all phases and significantly contributed to the successful completion of the project.

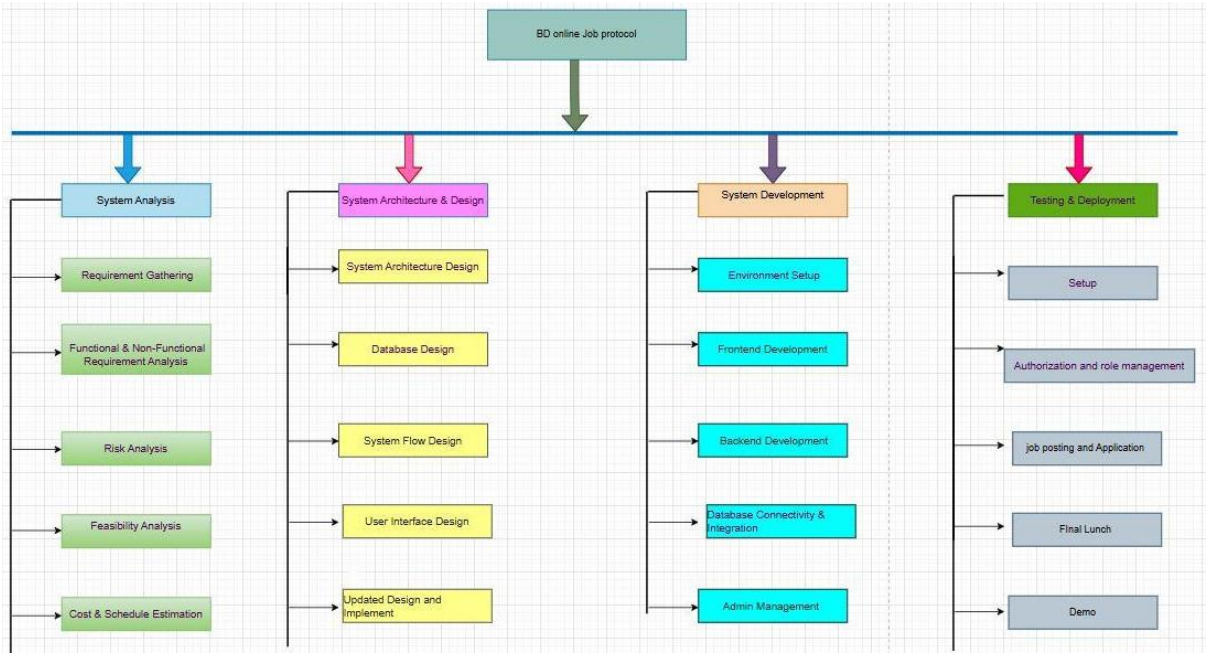

Figure 3.1: WBS

3.2 Process/Activity wise Time Distribution

Time distribution involves allocating a specific timeframe for each project phase to enhance resource management and overall efficiency. In the BD Online Job Protocol, this method was applied to ensure that every activity was completed with in schedule and that potential overruns were carefully monitored. For example, the Requirement Analysis phase, which included stakeholder consultations and system requirement gathering, was allocated 5 days. The Design Phase was allotted 5 days to prepare wireframes and prototypes. The Development Phase, divided into frontend and backend development, was scheduled for a total of 15 days (8 days for frontend and 7 days for backend) to ensure synchronized progress. Following development, the Testing Phase was assigned 10 days to identify and fix errors. The Deployment Phase was allotted 10 days to ensure smooth system integration. Finally, Final Review Optimization and Launch Maintenance were allocated 9 days each to guarantee stable performance and long-term support.

3.3 Gantt Chart

During the planning stage of the BD Online Job Protocol project, a Gantt chart was used as a project management tool. Gantt charts are widely utilized in project management to track timelines, visualize task dependencies, monitor progress, and prioritize resources. By using a Gantt chart structure, the Gantt chart clearly presents each task with its corresponding start and end dates. According to the chart, the project follows a structured workflow starting from Requirement Analysis and progressing through Design, Frontend Development, Backend

Development, Testing, Deployment, Final Review Optimization and finally reaching the Launch and Maintenance stage. The overall project timeline spans from July 22, 2025, to September 29, 2025. For the successful execution of the project, office PCs and servers were required. However, the most valuable resource was the team of developers. Each member was assigned specific responsibilities with deadlines and through collaboration, they ensured the completion of the project within the defined schedule.

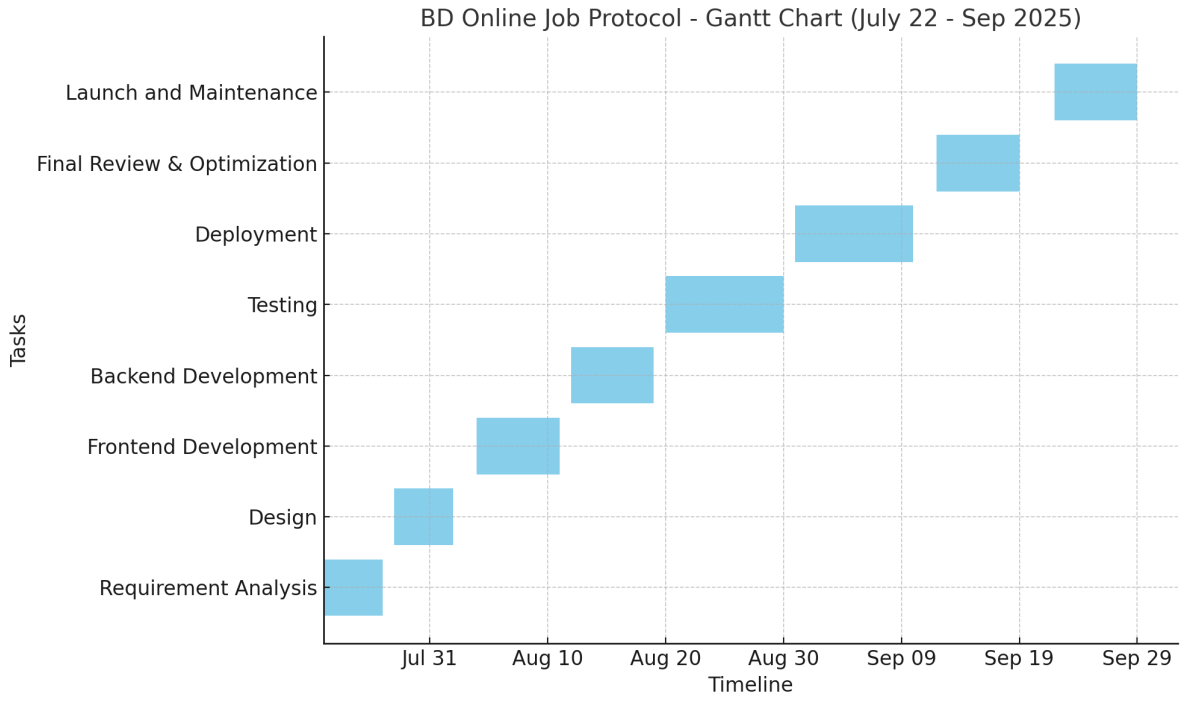

Figure 3.2: Gantt chart

3.4 Process/Activity wise Resource Allocation

Time distribution refers to allocating a specific time frame for each project phase to enhance resource management and efficiency. For the BD Online Job Protocol, this approach ensures that every activity is completed on schedule and time over runs are monitored effectively. For example, Requirement Analysis included stakeholder consultations and system requirement gathering with an allocated timeline of 5 days. The Development Phase, divided into frontend and backend development, was allocated 14 days to ensure synchronized progress. Testing and Deployment were scheduled with clear deadlines to ensure smooth integration and roll out.

3.5 Resource Allocation

Under the project BD Online Job Protocol, resources were planned in a systematic approach during different phases to ensure efficiency, accountability, and completion in a scheduled time.

Requirement Analysis phase was performed by business analyst and project manager, who together developed stakeholder requirements along with system scope in five days. Design Phase was then carried out by UI/UX designers and prototyping groups, who prepared interface layouts along with system work flows in five days. The building phase was split into two concurrent sections. The Backend Development segment was dedicated to constructing the user interface in a span of eight days, whereas Backend Development worked solely on server-side logic along with database integration, and its completion was achieved in a total of seven days. The Testing Phase was then carried out by QA engineers and the testing department, who performed functional, performance, and integration tests in a ten-day span in order to ensure the reliability of a system. DevOps and IT deployed it after ensuring smooth release of system within ten days. The Final Review and Optimization phase then ensued, in which there was close collaboration between project manager, developers, and QA engineers to tune the application and rectify remaining issues in nine days. The Launch and Maintenance phase was undertaken by IT maintenance and support engineers, who took nine days to stabilize system and provide continuous post-release support.

3.6 Estimated Costing

The BD Online Job Protocol project incurred costs across four major categories: labor, software, hardware, and operational expenses. Among these, labor costs represented the largest share, as the project relied on a skilled workforce that included developers, designers, QA engineers, and IT specialists. Considering salaries, benefits, and training, the estimated labor expenditure amounted to approximately BDT 4,00,000, reflecting nearly 40 of the total project budget. Software costs accounted for around BDT 2,00,000, which included licensing fees for development tools, frameworks, and security solutions. Although open-source technologies were utilized where feasible to reduce expenses, certain proprietary plugins and utilities were necessary to achieve advanced functionality and ensure reliability. Hardware expenses were another significant component, estimated at BDT 2,50,000, covering servers, storage systems, and networking infrastructure. This investment ensured that the platform could operate efficiently while maintaining scalability to handle future user traffic and data growth. Finally, operational expenses were estimated at BDT 1,50,000, which included hosting charges, system maintenance, regular updates, and technical support. These recurring costs are essential to maintain platform stability, security, and performance after deployment. Overall, the total estimated cost of the BD Online Job Protocol project was approximately BDT 10,00,000. This financial strategy was designed to ensure that the project remained within budget while still delivering the expected features and functionalities. The cost estimation also included a margin for unforeseen risks and potential scope changes, reinforcing financial sustainability and long-term system viability.

Chapter 4

Methodology

The development of the BD Online Job Protocol system followed a systematic and structured methodology to ensure efficiency, reliability and user satisfaction. The project adopted the agile model, which involved distinct phases requirement analysis, system design, implementation, testing, and deployment.

During the requirement analysis phase, user needs and system objectives were identified through observation of existing job portals and user feedback. In the system design phase, the database structure, user interface, and system flow were planned using tools such as flowcharts and ERD diagrams. The implementation stage involved coding the system using PHP, MySQL, HTML, CSS,bootstrap and JavaScript.

After development, testing was conducted to identify and fix bugs, ensuring functionality, security and performance. Finally, the system was deployed and evaluated for user acceptance, demonstrating its potential as a reliable online job portal for the Bangladeshi job market.

4.1 Development Process

The development of the BD Online Job Protocol followed a systematic process that ensured that every phase of the system's lifecycle was well planned, executed and verified. The process included demand analysis, design and planning, software development, database creation, testing, release, and validation.

4.2 Demand Analysis

The first phase focused on mapping the requirements of key stakeholders, such as business owners, administrators and job seekers. Interviews and informal surveys were conducted among fresh graduates and HR practitioners to understand their expectations from an online recruitment platform. In addition, an analysis of existing Bangladeshi job portals (BD Jobs, Chakri.com) revealed major gaps, including limited administrative oversight, poor mobile responsiveness, and lack of integration of intelligent features. These findings formed the basis for defining the system requirements, which emphasized security, reliability, trust and scalability.

4.3 Design and Planning

The design and planning stage was structured around these requirements. A three-tier architecture was envisioned:

Front-End: Built with Bootstrap and CSS for responsiveness across devices, while JavaScript handled interactivity and dynamic features.

Back-End: Developed in PHP to implement business logic such as authentication, job postings, and application processing.

Database: Designed in MySQL to store structured data such as user profiles, job postings, and applications.

To enhance functionality, the [6]Gemini API was proposed for advanced features such as resume parsing and intelligent job-matching. Wireframes were prepared for the core sections of the platform, including the homepage, job seeker dashboard, employer dashboard and administrator interface. This ensured a user-centric design approach.

4.4 Development

During the development phase, the front-end was built to provide a responsive and user-friendly interface.

Job Seekers: Could sign up, upload resumes, search for opportunities, and apply directly through the portal.

Employers: Were provided with dashboards to post vacancies, track applications, and review candidate details.

On the back-end, PHP scripts managed CRUD operations, authentication, and session handling. The Gemini API supported advanced search features and intelligent vacancy matching. Collectively, these implementations ensured smooth interaction between users and the system, while maintaining data integrity and security.

4.5 Database Setup

We created a well-structured schema in [7]MySQL, consisting of tables for users, employers, administrators, job postings, and applications. The relationships among tables were established through primary and foreign keys, ensuring the integrity of the reference. Data validation mechanisms were applied to minimize duplication and maintain consistency. This design facilitated efficient storage, retrieval, and management of recruitment-related data.

4.6 Testing and Debugging

The testing was carried out in multiple stages. First, unit testing verified individual components such as the registration form, job posting module, and search filters. Integration testing ensured effective communication between the front-end, back-end, and database. Security

testing was performed to detect vulnerabilities such as SQL injection, malicious attacks, and unauthorized access attempts. Cross-device testing was also conducted to ensure the platform worked properly on desktops, tablets, and smartphones across multiple browsers.

4.7 Implementation

The implementation phase of the BD Online Job Protocol focused on converting the system design into a fully operational and reliable platform. Initially, the system was deployed using the XAMPP[8] stack on a local Apache server, providing a controlled environment for testing, debugging, and performance optimization. This setup ensured stability during early development and allowed for careful monitoring of system behavior under various conditions. To enhance scalability and availability deployment scripts were prepared to facilitate migration to a more robust hosting environment, enabling broader access for users across Bangladesh. Data integrity and security were prioritized throughout the implementation process. Regular automated backups were configured to protect against potential system failures, while server configurations were optimized to handle multiple concurrent users efficiently. Performance tuning, including database optimization and caching strategies, ensured smooth and responsive operation, even under high-load conditions. Extensive technical documentation was maintained to support both development and future maintenance. This included detailed system architecture diagrams, database schema representations, and explanations of module interactions, providing a clear and structured overview of the platform's design. These documents serve as essential references for developers and system administrators, facilitating efficient troubleshooting, updates and scalability improvements. A comprehensive user manual was also developed to guide administrators, employers, and job seekers in utilizing the platform effectively. The manual includes step-by-step instructions and practical walk throughs of key features such as job posting, application tracking, and user management. Supplementary tutorials and walk throughs were created to improve accessibility and user experience, particularly for first-time users, ensuring that all stakeholders can navigate the system confidently. By following a structured and methodical implementation strategy, the BD Online Job Protocol was successfully established as a secure, scalable, and user-friendly recruitment system. The integration of intelligent API-driven features, adherence to best practices in software engineering and emphasis on data security collectively address the specific challenges of the Bangladeshi job market. This approach ensures the system delivers reliable performance, facilitates efficient recruitment processes and provides an accessible platform for all users.

Chapter 5

Body of the Project

The project's body details the entire development procedure, from planning through to execution.It begins with the Work Description, which details the project objectives and tasks accomplished.The Requirement Analysis specifies the system's needs, encompassing a Rich Picture for clarity and both Functional and Non-Functional Requirements for performance criteria. In System Analysis,various elements such as feasibility,issues and design framework are thoroughly examined. The Feasibility Analysis evaluates whether the project is feasible and attainable, whereas Problem Solution Analysis and Effect and Constraints Analysis pinpoint obstacles and system restrictions.Ultimately,Implementation and Testing verify that the project is accurately developed and operates correctly through input/output assessments and testing outcomes.

5.1 Work Description

The BD Online Job Protocol platform is an integrated web-based solution developed to enhance efficiency in online job searching and recruitment. It provides a centralized environment where job seekers, recruiters, and administrators can interact seamlessly. The system incorporates essential modules, including job listings, recruiter dashboards, user profiles, and administrative management tools, all within a responsive and user-friendly interface.

For job seekers, the platform facilitates vacancy browsing, online applications, personalized notifications, and the option to save or track opportunities. Recruiters are supported with secure dashboards that enable job posting, applicant review, and candidate shortlisting. Administrative functions are managed through a dedicated panel, allowing efficient oversight of users, job postings, and system content.

In addition, the platform integrates interactive features such as feedback mechanisms, recruiter candidate communication and automated alerts. Built-in analytics provide insights into user behavior and system performance.Finally, the BD Online Job Protocol ensures scalability, sustainability, and accessibility while maintaining strong security and usability standards.

5.2 Requirement Analysis

Rich Picture

The picture shows the whole process of how the BD Online Job Protocol system works, including how the different users work together to make sure that hiring goes smoothly. Employers post job vacancies and evaluate applications, while job seekers can look for employment, apply, and upload their resumes. The administrator serves as the main controller, controlling user roles, approving or rejecting job postings, checking resumes, and keeping an eye on system activities. When a technical problem arises, the administrator notifies the technical staff, who investigate it and resolve it. The system also has an Artificial Intelligence (AI) module that evaluates resumes, assigns scores to applicants, and helps administrators and companies make better decisions and match people with jobs. Within the hiring portal, this linked process ensures effective administration, accuracy, and dependability.

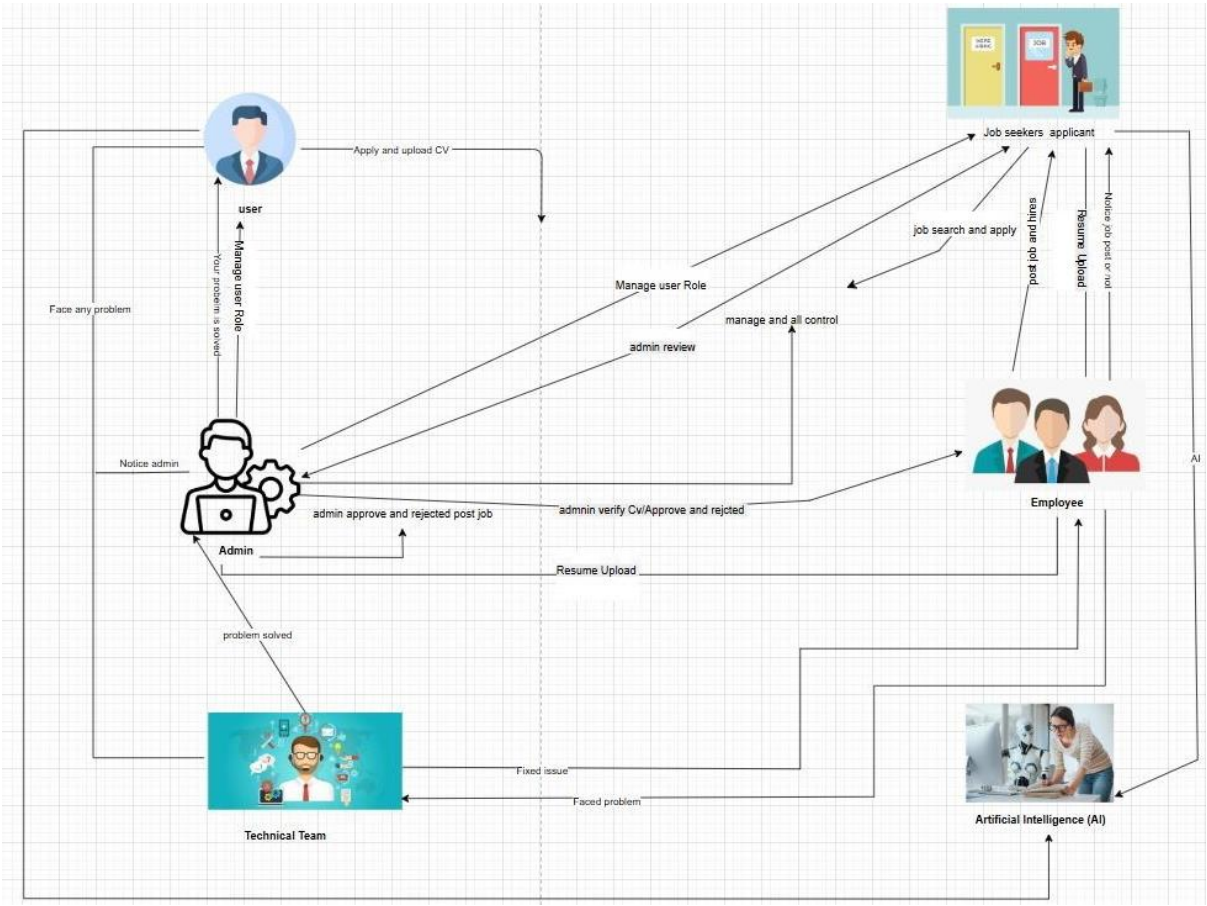

Figure 5.1: Rich Picture

5.2.1 Functional Requirements

The functional requirements of the BD Online Job Protocol system are designed to ensure smooth and secure interaction between job seekers, employers, and administrators. At the core,

the system supports user management, where individuals can register, log in, and maintain a personal profile including their skills, experiences, and CV. For job seekers, the system enables advanced job search and filtering features, allowing them to explore opportunities based on keywords, job type, location, or salary range. Once suitable positions are identified, candidates can submit applications directly through the platform, attaching their resume and cover letter, and later track the real-time status of their submissions. Employers, on the other hand, are empowered with functionalities to post job openings by specifying detailed descriptions, requirements, and deadlines. They can also manage applications, filter candidates, and update applicant statuses to streamline recruitment. From the administrative side, the platform integrates verification and content moderation mechanisms, ensuring that both job seekers and employers are authentic, while inappropriate or fraudulent postings are removed. To further enhance user experience, the system incorporates notifications and alerts for job updates and interview schedules, alongside additional tools such as a resume builder, resource blogs, and a direct messaging system to facilitate communication. Collectively, these functional requirements guarantee a reliable, scalable, and user-friendly.. The BD Online Job Protocol platform has been successfully developed as a secure, scalable, and user-friendly system for connecting job seekers and recruiters. With features such as AI-driven job recommendations, multi-language support, responsive design, and real-time notifications, the platform provides an inclusive and efficient solution to modern recruitment challenges. It ensures smooth user interaction through role-based access, recruiter dashboards, and analytics-driven insights, while maintaining strong security and ethical data practices. Looking forward, future enhancements could include the development of a dedicated mobile application, integration of virtual interview tools, and advanced analytics for job market predictions. Incorporating blockchain-based credential verification and expanding cybersecurity protocols will further strengthen trust and reliability. Overall, the project demonstrates how thoughtful engineering and innovation can address employment challenges while creating a sustainable and future-ready digital recruitment platform.

5.2.2 Non-Functional Requirements

Performance: The platform must be able to support at least 1,500 concurrent users without significant performance degradation. Under standard load, all web pages should render within 2 seconds, while intensive operations such as job searches and application submissions should not exceed 3 seconds. The server must efficiently process a minimum of 15,000 database queries per hour to accommodate high traffic and maintain responsiveness.

Scalability: The system should support vertical scaling through resource upgrades and horizontal scaling using load balancers to manage multiple servers. During peak recruitment periods, such as university graduation seasons or large-scale hiring campaigns, the platform should be capable of scaling to handle at least three times its average user load.

Security: Sensitive information, including user credentials, CVs, and employer data, must be encrypted using AES-256 for data storage and bcrypt for password hashing. Input validation

must be enforced at both the client and server sides to prevent SQL injection, cross-site scripting (XSS), and similar vulnerabilities. All communications must be secured with HTTPS/TLS protocols to ensure end-to-end data protection.

Usability: The user interface should follow responsive design principles to guarantee smooth accessibility on desktops, tablets, and smartphones. Navigation must be intuitive, featuring clear menus, advanced filtering, and breadcrumb trails. Key functionalities such as job search, CV uploads, and application tracking must be accessible in no more than three clicks from the homepage.

Availability: The platform must maintain a minimum uptime of 99.9%. Load balancing and failover mechanisms should ensure continuity of service even if one or more servers experience downtime. In the event of a system crash, recovery must be completed within 15 minutes to minimize user disruption.

Maintainability: The codebase must adhere to clean coding standards and industry best practices, ensuring readability and ease of modification. The architecture should be modular to facilitate the addition of new features without affecting core functionalities. Automated error logging and real-time monitoring should detect issues promptly, while regression testing should be conducted after every update.

Portability: The system should be deployable across Windows, Linux, and cloud-based environments with minimal configuration changes. The platform must be optimized for mobile and tablet users, either through responsive web design or a dedicated mobile app in future phases. It should also support integration with third-party services such as Google Analytics and digital advertising platforms.

Compatibility: The system must remain fully operational on the latest versions of major browsers, including Chrome, Firefox, Safari, and Microsoft Edge, with backward compatibility for at least one previous version. Seamless integration with external APIs should enable features such as online payments, real-time notifications, and social media sharing. Additionally, the platform must ensure full compatibility with MySQL databases for consistent and efficient data management.

5.3 System Analysis

The analysis of the BD Online Job Protocol system concentrated on understanding the needs of users, establishing the objectives of the system, and pinpointing both the functional and non-functional requirements of the platform. The system is intended to connect job seekers with employers by offering features such as job postings, job searches, user authentication, and profile management. During the analysis phase, existing systems along with user feedback

were examined to discover shortcomings, including limited accessibility, absence of real time updates and inadequate data security in current platforms. The proposed system was crafted to address these challenges through an effective database design, a secure login mechanism, and an intuitive user interface. The analysis also included evaluating hardware and software requirements, system constraints and Entity Relationship Diagrams (ERD).

5.3.1 Feasibility Analysis

When evaluating the feasibility of the BD Online Job Protocol project, seven aspects are taken into account are technical, economic, operational, legal, schedule, social and environmental.

Technical Feasibility: The project is developed using PHP for backend operations, MySQL for database management, and Bootstrap, CSS, and JavaScript[9] for a responsive frontend. This technology stack is mature, reliable, and well-suited for building scalable recruitment platforms. The development team possesses the required expertise in web development, database design, and system integration, which ensures smooth implementation of all modules for job seekers, employers and administrators. Moreover, the system can efficiently run on cloud infrastructures such as AWS or Azure, providing the necessary computational power and storage capacity to handle growth in user demand.

Economic Feasibility: The project offers significant cost benefits. By digitizing job postings, applications, and recruiter candidate communication, the platform reduces recruitment overhead for employers. Operational costs are also minimized through cloud hosting models that follow subscription or pay-as-you-go pricing, avoiding the need for heavy upfront investments in physical infrastructure. In the long run, both employers and job seekers benefit financially, as employers gain quicker access to verified candidates while job seekers can use the system at little or no cost, generating a favorable return on investment.

Operational Feasibility: Operational feasibility is achieved through the platform's user-friendly and responsive design, which provides seamless navigation across desktops, tablets and smartphones. The system is structured to meet the needs of different user roles: job seekers can upload CVs and apply directly, employers can post openings and track applications, while administrators can verify and moderate postings. Since the interface is intuitive, minimal training is required, which ensures high adoption and smooth day-to-day operation.

Legal Feasibility: Legal feasibility is ensured by the system's compliance with international data protection principles similar to GDPR as well as local data privacy regulations. User information, including CVs and personal data is stored securely and handled ethically. Furthermore, all tools, frameworks and resources employed in the development of the platform are either open-source or legally licensed, eliminating any risk of copyright infringement.

Schedule Feasibility: The development schedule is realistic and structured into distinct phases requirement analysis, system design, implementation, testing and deployment. An agile methodology, particularly Scrum, has been adopted to allow iterative development, quick feedback cycles and flexible adjustments. Risk management provisions, such as continuous debugging, performance monitoring and user acceptance testing, are incorporated into the timeline to reduce the likelihood of delays and ensure timely delivery.

Social Feasibility: The platform has strong social feasibility as it promotes employment opportunities and career development. Through verified job postings, CV-building tools, resource blogs, and direct messaging, the system engages users in ways that contribute to their professional growth. In addition, the platform has been designed to be inclusive, offering multilanguage support and responsive design, making it accessible to a diverse range of users regardless of background or technical expertise.

Environmental Feasibility: Finally, environmental feasibility is achieved by the platform's digital-first approach. Since it operates on cloud-based infrastructure, the system reduces the reliance on physical servers, thereby lowering energy consumption. Furthermore, the paperless recruitment process eliminates the need for printed CVs and job postings, contributing to sustainability by reducing paper waste.

5.3.2 Operational Feasibility

Operational viability, which emphasizes data analysis and the integration of intelligent matching algorithms for job–seeker and employer connectivity, is a crucial element of our BD Online Job Protocol project. To ensure that the project aligns with current operational practices and can be seamlessly integrated into daily activities, it is essential to evaluate its operational feasibility.

This assessment involves a broad evaluation of user adoption and readiness. We must determine whether the portal's functionalities and interface are user-friendly and adaptable for all stakeholders, including job seekers, recruiters, and system administrators. This requires providing users with comprehensive documentation and structured training so that they acquire the skills necessary to navigate the platform effectively.

Additionally, the impact of the system on operational efficiency forms a core aspect of operational feasibility. We must evaluate whether the platform enhances our decision-making capacity, streamlines recruitment procedures, and contributes to higher productivity across the ecosystem. Beyond technical capability, it is important to assess the system's ability to generate actionable insights such as job market trends and job candidate analytics—that can be incorporated into strategic planning.

Ultimately, operational feasibility ensures that the BD Online Job Protocol integrates smoothly with existing workflows, strengthens our capacity to utilize data effectively, and promotes a culture of digital transformation within the employment sector.

5.3.3 Financial Feasibility

Financial sustainability is another requirement for the BD Online Job Protocol project, which combines sophisticated data analysis and clever job-matching algorithms. To guarantee long-term viability and economic responsibility, a thorough financial review is required. A cost analysis needs to be done first. This involves figuring out one-time and ongoing costs including platform development, server infrastructure, software licensing , hiring staff for training, support, and development, and unanticipated maintenance expenditures. The total amount of investment needed is clearly depicted by this financial mapping.
Return on investment (ROI) needs to be thoroughly examined concurrently. Increased operational efficacy across the job market services, better employment matching, increased recruiter efficiency, and more exposure for job seekers are among the anticipated advantages. The platform's long-term worth can be assessed and the financial investment validated by comparing these advantages to actual expenses. Therefore, financial viability guarantees that the BD online job protocol maintains cost effectiveness and sustainability while providing quantifiable economic benefit.

5.3.4 Schedule Feasibility

BD Online Job Protocol project, schedule feasibility is an important consideration. It demands a scrutiny of schedules to ensure that project milestones remain realistic as well as achievable.
Major milestones including systems design, algorithm integration, thorough testing, user training, and finally deployment will constitute the timeline. Defining definite goals and deadlines creates a structured framework which encapsulates the development cycle of a project.
No less important is ensuring availability of resources throughout the schedule. As part of this, we ensure availability of qualified developers, trainers, IT infrastructure, and accurate job market data sets. Identification ahead of time of potential bottlenecks, limited availability of resources or technical interdependencies allows early resolution of schedule risks and avoidable delay. Essentially, scheduling feasibility ensures that BD Online Job Protocol executes with a specific timeline so that resource allocation, performing tasks, is aligned with project goals.

5.3.5 Problem Solution Analysis

Problem: During the development of the BD Online Job Protocol system, several challenges were encountered due to evolving feature requirements and integration complexities. These issues occasionally led to navigation bugs, slow query execution, and inconsistent user experiences across different devices. In particular, features such as advanced job search, CV uploads, and employer dashboards experienced delays in rollout due to recurring bugs and performance bottlenecks.

Solution: To address these issues, the development team implemented a structured debugging process by analyzing server error logs, user feedback, and reported incidents to identify

root causes. Code optimization was introduced by improving SQL query efficiency, reducing redundant API calls, and streamlining backend logic. Stronger error handling mechanisms were deployed, including real-time monitoring tools to detect failures quickly. Automated testing frameworks were integrated to ensure feature reliability and prevent future issues.

Testing Validation: After the fixes were applied, the system underwent multiple testing cycles, including beta testing with real users. Both functional and non-functional aspects were validated to ensure smooth navigation, responsive design, and stable interaction between job seekers, employers, and administrators.

5.3.6 Effect and Constraints Analysis

Effects: The implementation of the BD Online Job Protocol project has several positive outcomes. Improved accessibility allows job seekers to search and apply for jobs anytime, anywhere, while employers can easily manage postings and candidate applications. The responsive user interface ensures a seamless experience across desktops, tablets, and smartphones. Enhanced content management capabilities within the admin panel provide efficient oversight of job postings, CV submissions and system verification. Furthermore, real time alerts, job notifications and direct messaging features significantly increase user engagement and interaction within the platform.

Constraints Analysis: Despite its strengths, the project faces certain constraints. From a technical perspective, scalability issues may arise if proper database indexing and caching are not implemented, potentially affecting system performance during peak loads. Ensuring cross-platform compatibility requires extensive testing across different browsers and devices, while heavy file uploads such as CVs or multimedia resources may introduce performance bottlenecks. Economically, hosting fees, database management costs, and third-party API integrations must be carefully managed to maintain affordability. Continuous maintenance, including regular updates, security patches, and feature enhancements, also requires ongoing investment. From a legal and regulatory standpoint, the system must comply with data protection laws and privacy regulations, ensuring the safe handling of sensitive user data. Compliance with third-party services such as payment gateways and analytics platforms must also be maintained. Operationally, advanced automation features such as AI-driven resume screening may require specialized technical expertise, while system downtime during updates and maintenance must be planned carefully to minimize service disruptions.

5.4 System Design

Entity Relationship Diagram (ERD)

This ERD (Entity-Relationship Diagram) represents a job portal system where users, companies, and administrators interact. The user entity stores user details and connects to resumes, job applications, and subscriptions. Employees or recruiters post jobs through the job post table, while job details are stored in find job, linked to job location and browse company. Applicants can submit applications via the application table and may later attend interviews recorded in the interview table. Admins manage and verify job postings through admin and admin review, ensuring accuracy and quality. The technical team supports the process with specialized evaluations. Finally, the system organizes the entire hiring workflow from job posting to application, review and interview within a structured and interconnected database.

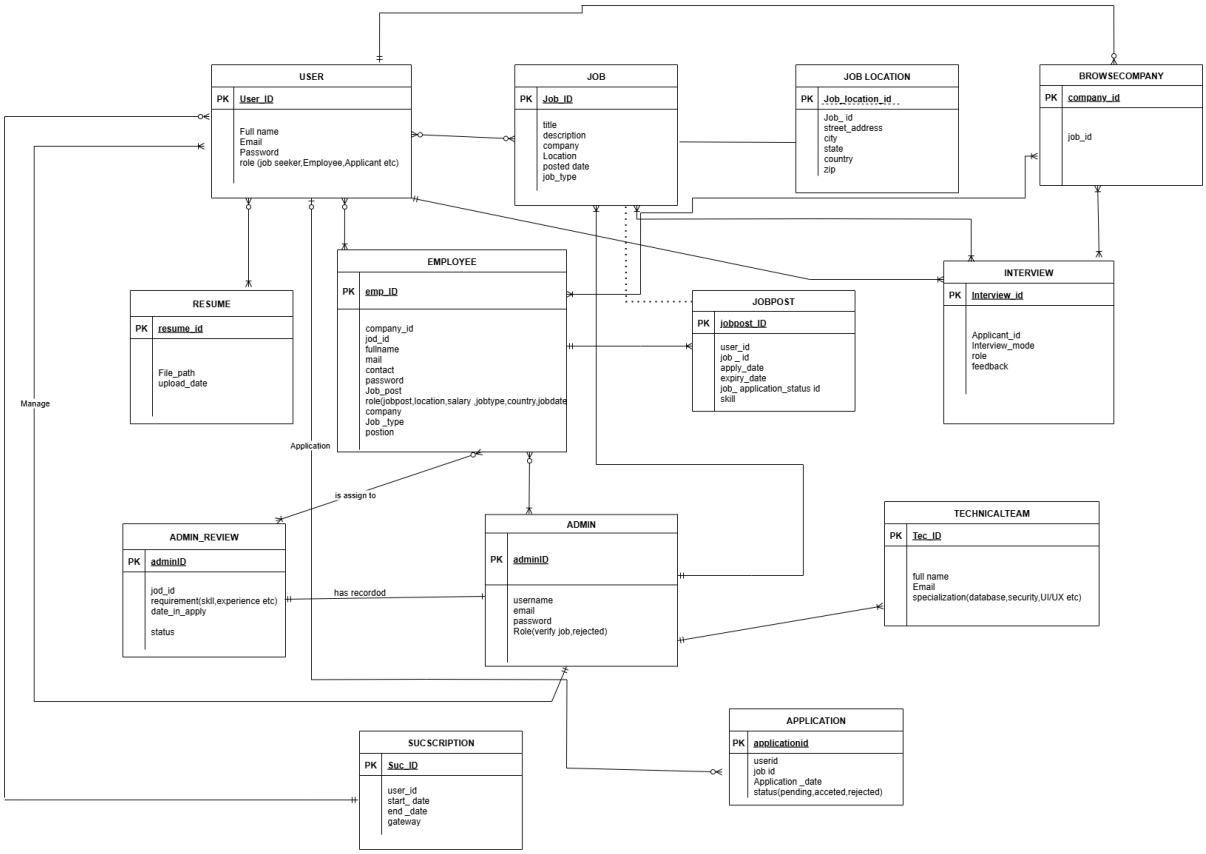

Figure 5.2: ERD

5.5 Implementation

The BD Online Job Protocol was implemented by converting the system design into a fully operational web application utilizing PHP, MySQL, HTML, CSS, JavaScript and Bootstrap. The project commenced with the establishment of the database, creating tables for users, job

listings, subscriptions and other essential entities to facilitate efficient data storage and retrieval.

Backend functionality was crafted using PHP, encompassing features such as user registration and authentication, job posting, job searching, subscription management, and safe file uploads. The frontend interface was developed with HTML, CSS, JavaScript and Bootstrap[10], which delivered a responsive and visually attractive design, ensuring accessibility across various devices and screen sizes. During the implementation process, a payment gateway was incorporated to facilitate subscription services, giving employers the ability to post premium job listings and utilize extra features. Ongoing testing for bugs, security flaws and performance challenges guaranteed a dependable and scalable system. Finally, the implementation phase effectively converted the design into a working, user-friendly and visually responsive online job portal.

5.5.1 Devlopment

During my internship, I implemented the BD Online Job Protocol using CSS, Bootstrap, PHP, and JavaScript to deliver a responsive, secure, and maintainable web application. On the frontend, Bootstrap 5's grid(new update version), utilities, and components accelerated layout and guaranteed consistent behavior across devices. Custom CSS layered brand styling, while accessible typography, contrast, and focus states improved usability. JavaScript added interactivity through client side validation, AJAX based search and filtering, debounced queries, modal workflows, and dynamic pagination to reduce reloads and improve perceived speed. On the backend, PHP powered a lightweight MVC structure separating routing, controllers, and views. Business logic handled job postings, applications, and profile management with strict server side validation. PDO with prepared statements protected database operations, and session based authentication enforced role aware access for seekers, recruiters, and administrators. Security included CSRF tokens, password hashing, input sanitization, file upload constraints, and mandatory HTTPS. Performance was addressed through asset minification, CDN delivery for Bootstrap and icons, HTTP caching headers, and optimized queries on large result sets. Email alerts and notifications were queued to avoid blocking requests. The system was deployed on a LAMP stack with environment specific configuration, centralized logging, and regular backups. Version control with Git and peer reviews maintained quality, while developer documentation, basic unit tests, and repeatable release steps supported stable, iterative delivery.

```php
<?php include "./includes/conn.php"; ?>
<?php include "./includes/indexHeader.php"; ?>

<body>
  <?php include "./includes/indexNavbar.php"; ?>
  <?php include "./includes/indexChat.php"; ?>

  <!-- Hero Section -->
  <section class="hero-section">
    <div class="hero-overlay"></div>
    <div class="hero-content">
      <div class="container hero-container">
        <h3 class="hero-title">BD Online Job Protocol</h3>
        <div class="line line-dark"></div>
        <p class="hero-slogan">Find your dream job.</p>
      </div>
    </div>
  </section>

  <!-- Search Filter Section -->
  <section class="search-section">
    <div class="container">
      <form action="job-listings.php" method="GET" class="search-form">
        <div class="filter-group">
          <input type="text" name="keyword" placeholder="Job title or keyword" class="filter-input">
        </div>
        <div class="filter-group">
          <select name="job_type" class="filter-input">
            <option value="">Job Type</option>
```

Figure 5.3: Coding Implementation

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1" />
  <title>BD Jobs Pro – Pricing</title>

  <!-- Bootstrap 5 CSS -->
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/css/bootstrap.min.css" rel="stylesheet">

  <style>
    :root{
      --accent: #0d6efd;
      --bg-card: #ffffff;
      --muted: #6c757d;
      --footer-bg: #0b5ed7;
      --footer-text: #ffffff;
    }

    body{font-family: Inter, system-ui, -apple-system, 'Segoe UI', Roboto, 'Helvetica Neue', Arial;}

    .navbar { box-shadow: 0 6px 18px rgba(13,110,253,0.08); font-weight: 600; }

    .plan-card{
      background-color: var(--bg-card);
      border-radius: 14px;
      transition: transform .25s ease, box-shadow .25s ease, background .25s ease, border-color .25s ease;
      padding: 28px;
      cursor: pointer;
```

Figure 5.4: Coding Implementation

```
<?php include "./includes/conn.php" ?>
<?php include "./includes/indexHeader.php"; ?>

<body>
  <?php include "./includes/indexNavbar.php" ?>

  <div id="find-jobs-page">
    <div class="intro-banner">
      <div class="intro-banner-overlay">
        <div class="intro-banner-content">
          <div class="container glassmorphism">
            <div class="banner-headline-text-part">
              <h3>Find Nearby Jobs</h3>
              <div class="keywords">
                <p>Trending Jobs Keywords:</p>
                <span> Nurse, Architect, Graphic Designer, Teller, Electrical Engineer, Android Developer</span>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
    <section class="page-content">
      <div class="page-content-left-side">
        <?php include "./includes/searchSidebarFindJobs.php"; ?>
      </div>
      <div class="page-content-right-side">
        <div class="headline">
          <span class="icon-container">
```

Figure 5.5: Coding Implementation

```
<?php include "./includes/conn.php" ?>
<?php include "./includes/indexHeader.php"; ?>

<body>
  <?php include "./includes/indexNavbar.php" ?>

  <div id="find-jobs-page">
    <div class="intro-banner">
      <div id="intro-banner-overlay">
        <div class="intro-banner-content">
          <div class="container glassmorphism">
            <div class="banner-headline-text-part">
            </div>
          </div>
        </div>
      </div>
    </div>

    <section class="page-content">
      <div class="page-content-left-side">
        <?php include "./includes/searchSidebarFindJobs.php" ?>
      </div>
      <div class="page-content-right-side">
        <div class="headline">
          <span class="icon-container">
            <i class="fa-solid fa-magnifying-glass"></i>
          </span>
          <h3>Jobs Listing Results</h3>
        </div>
```

Figure 5.6: Coding Implementation

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Post Your CV - BD Online Job Protocol</title>

  <!-- Bootstrap CSS -->
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet">
  <!-- FontAwesome -->
  <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.5.0/css/all.min.css">

  <style>
    body {
      background-color: #f5f7fa;
    }

    /* Navbar */
    .navbar {
      box-shadow: 0 4px 8px rgba(0,0,0,0.1);
      padding: 0.75rem 1rem;
    }
    .navbar-brand span {
      color: #0d6efd;
      font-weight: 600;
      font-size: 20px;
    }
    .nav-link.active {
      font-weight: 600;
```

Figure 5.7: Coding Implementation

5.6 Deployment

The BD Online Job Protocol system was installed on a local server with XAMPP enabling it to operate on localhost for development and testing. The setup process involved configuring the database, arranging the project files and ensuring that PHP was properly connected to MySQL. Once deployed, the system underwent local testing to confirm its functionality, performance and security prior to any future live deployment.

5.6.1 Front-end

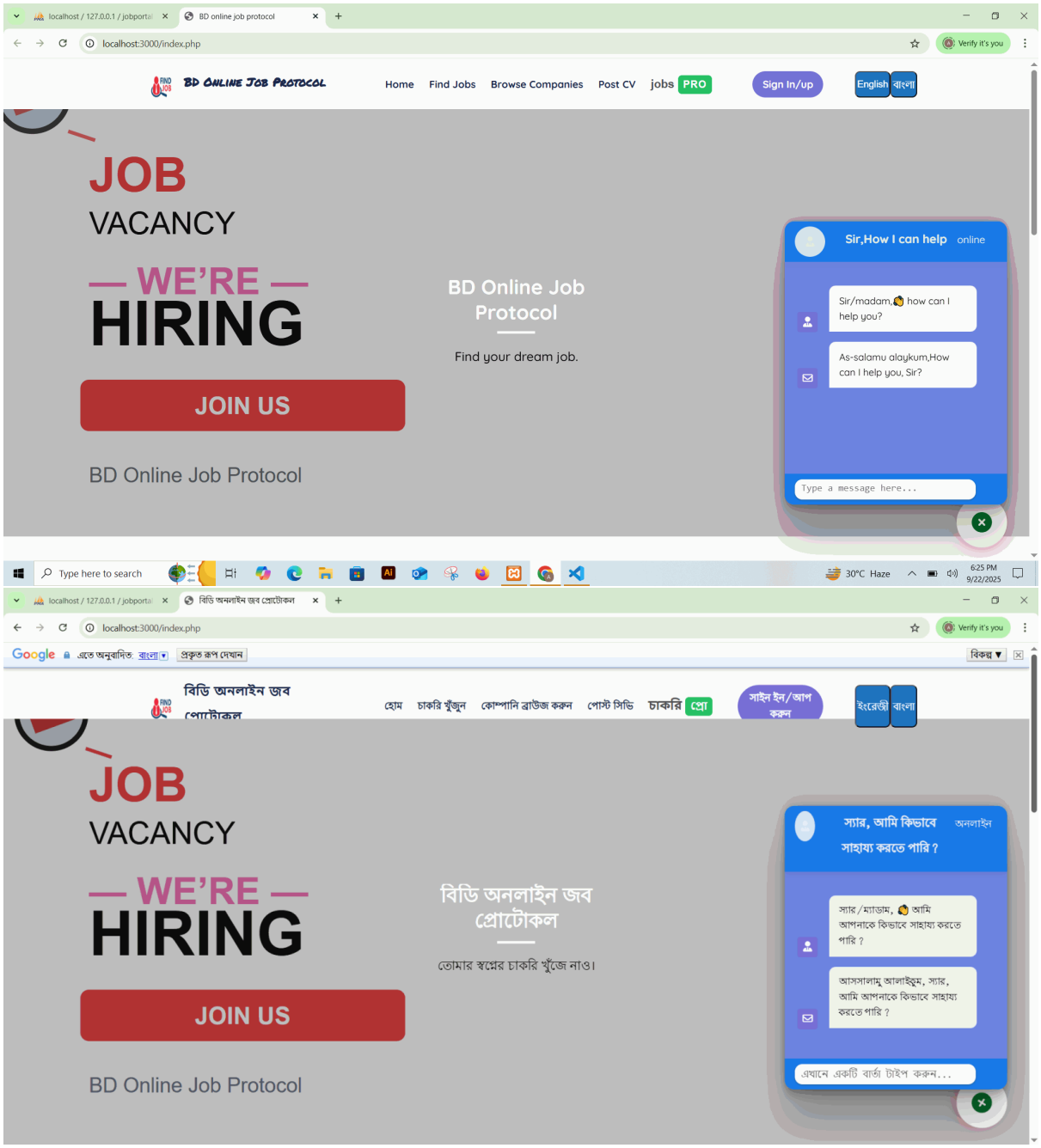

Figure 5.8: Home Page Implementation

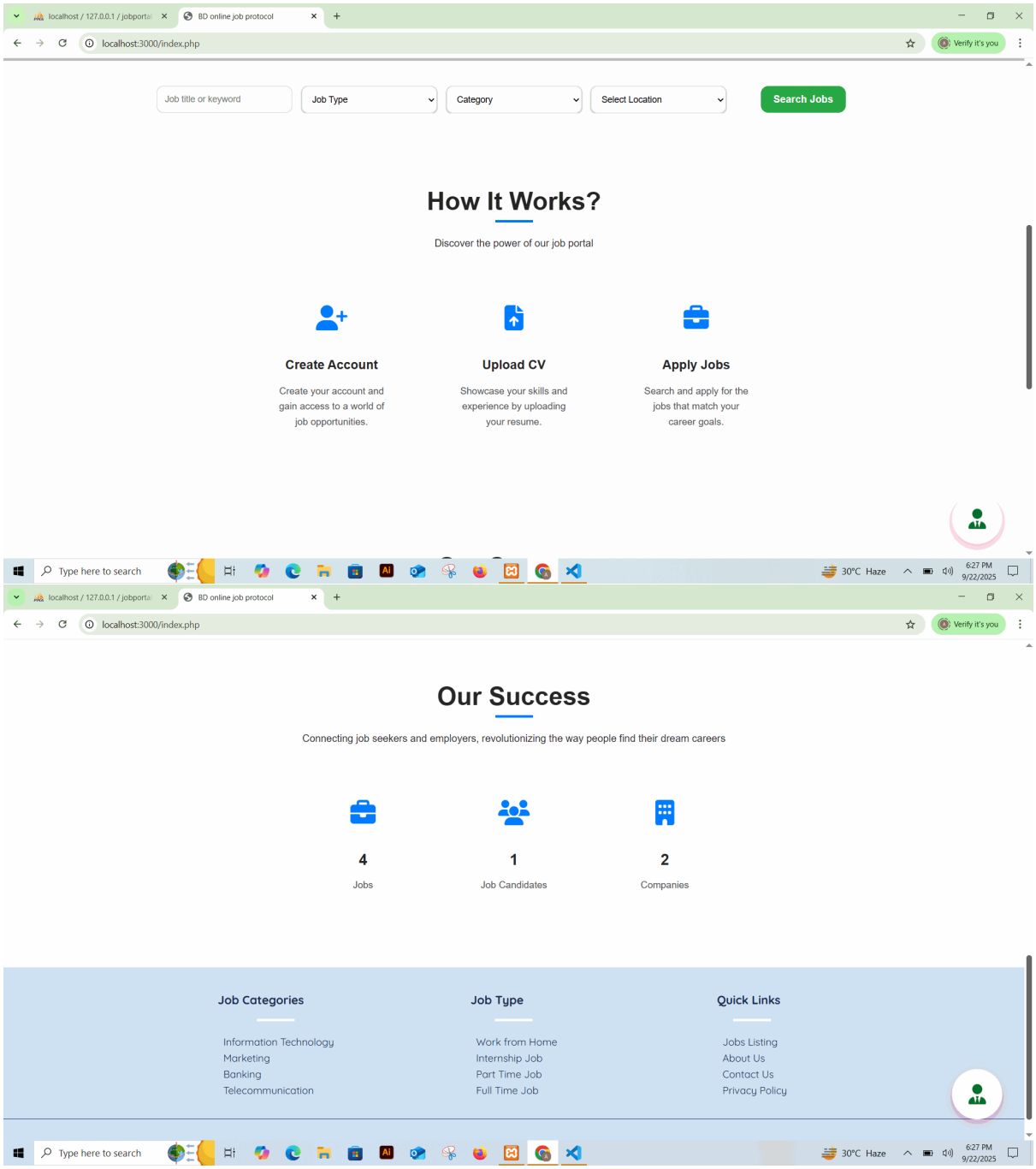

Figure 5.9: Process Implementation

5.6.2 Back-End

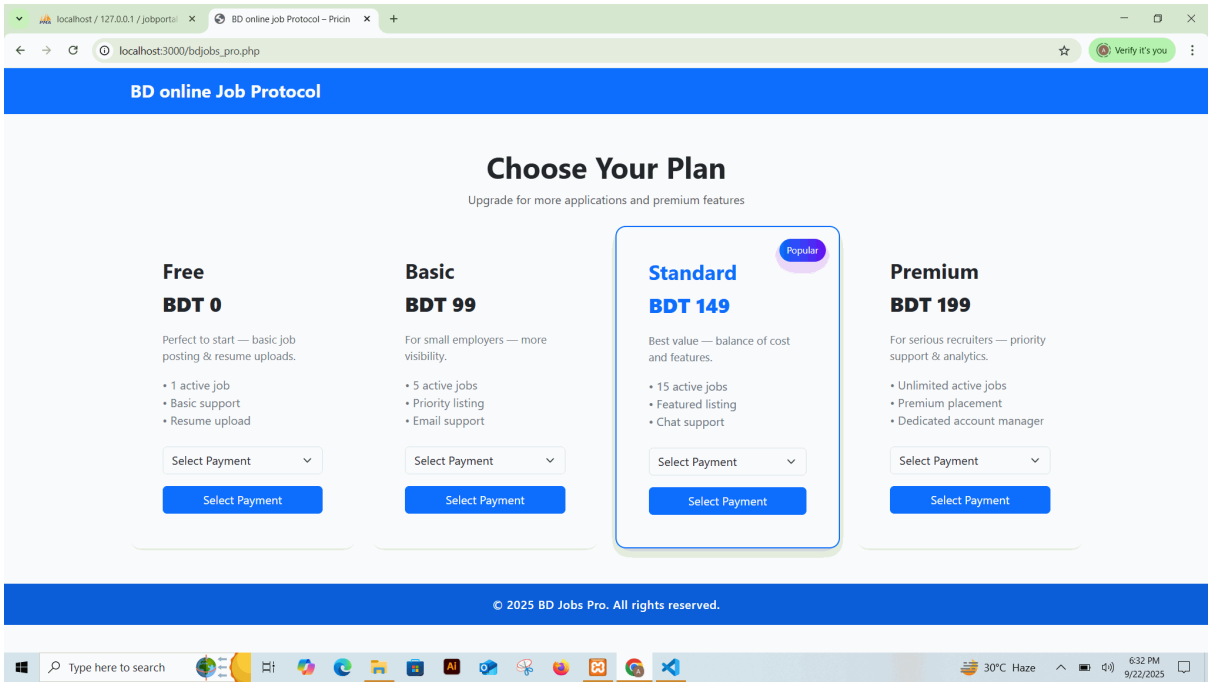

Figure 5.10: Subscription Package Implementation

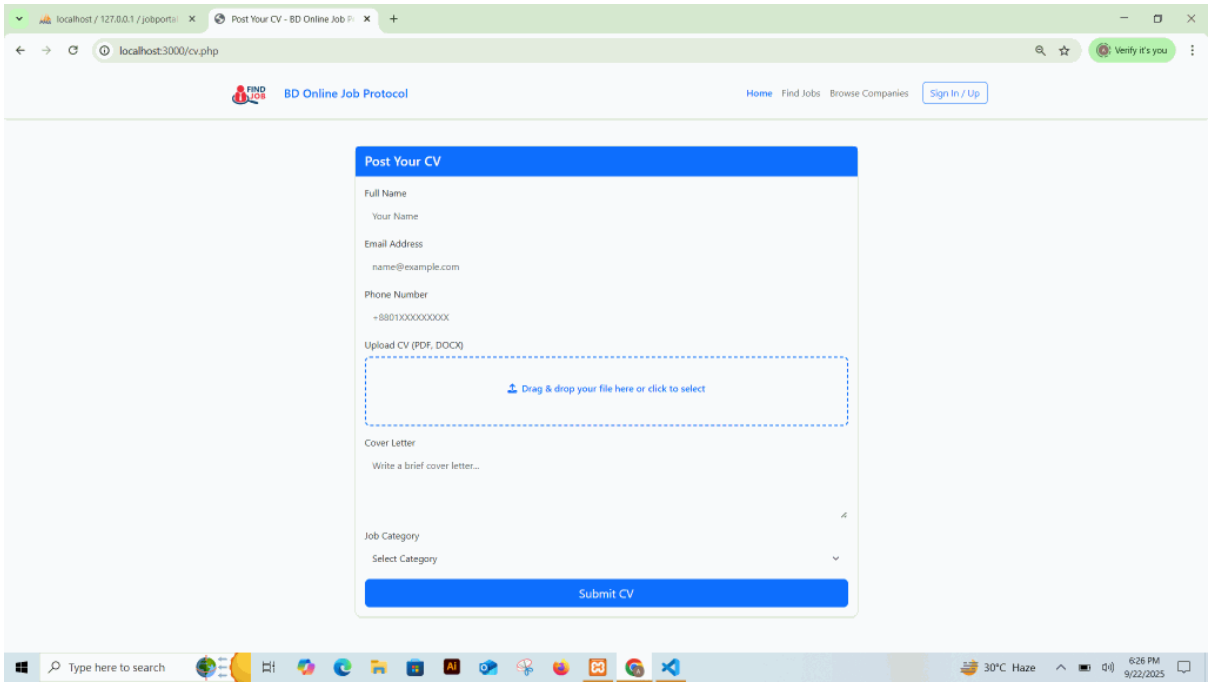

Figure 5.11: Post Cv Implementation

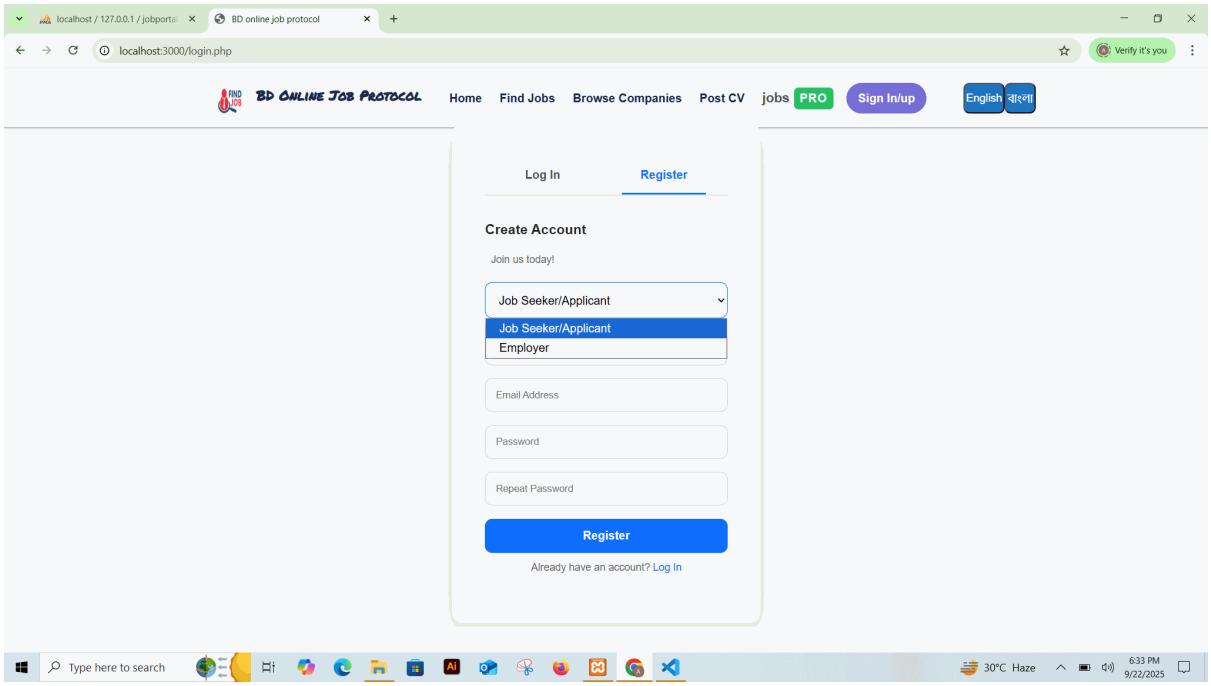

Figure 5.12: Registration Page Implementation

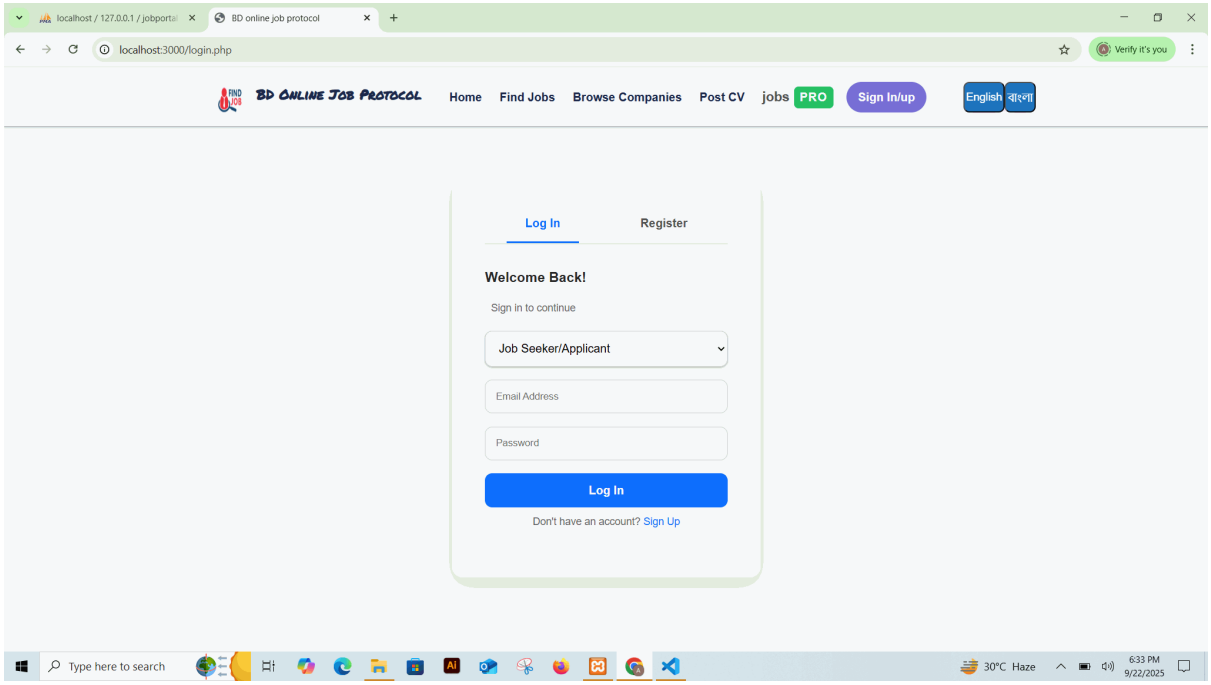

Figure 5.13: Login Page Implementation

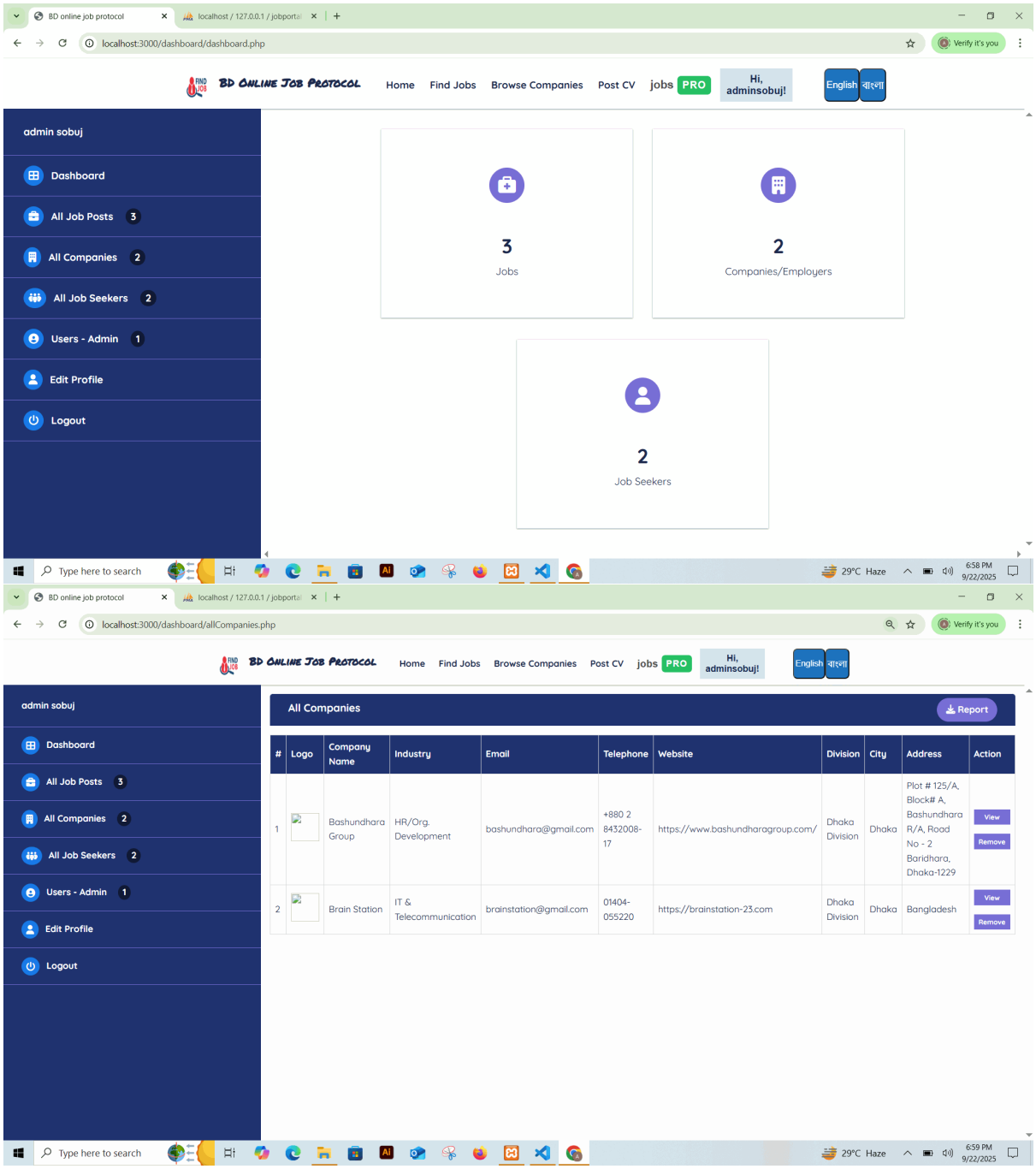

Figure 5.14: Admin Dashboard Implementation

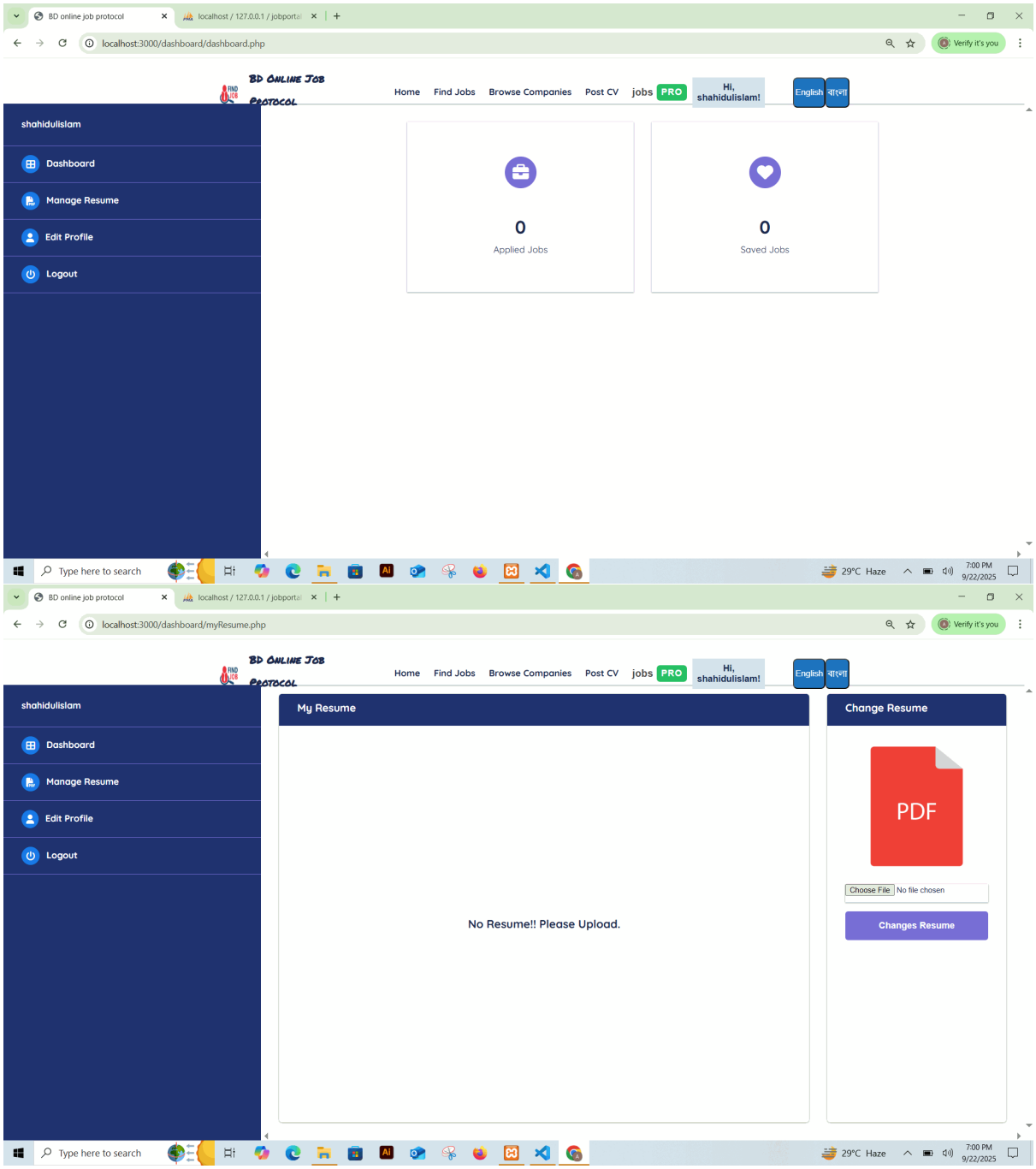

Figure 5.15: User Dashboard Implementation

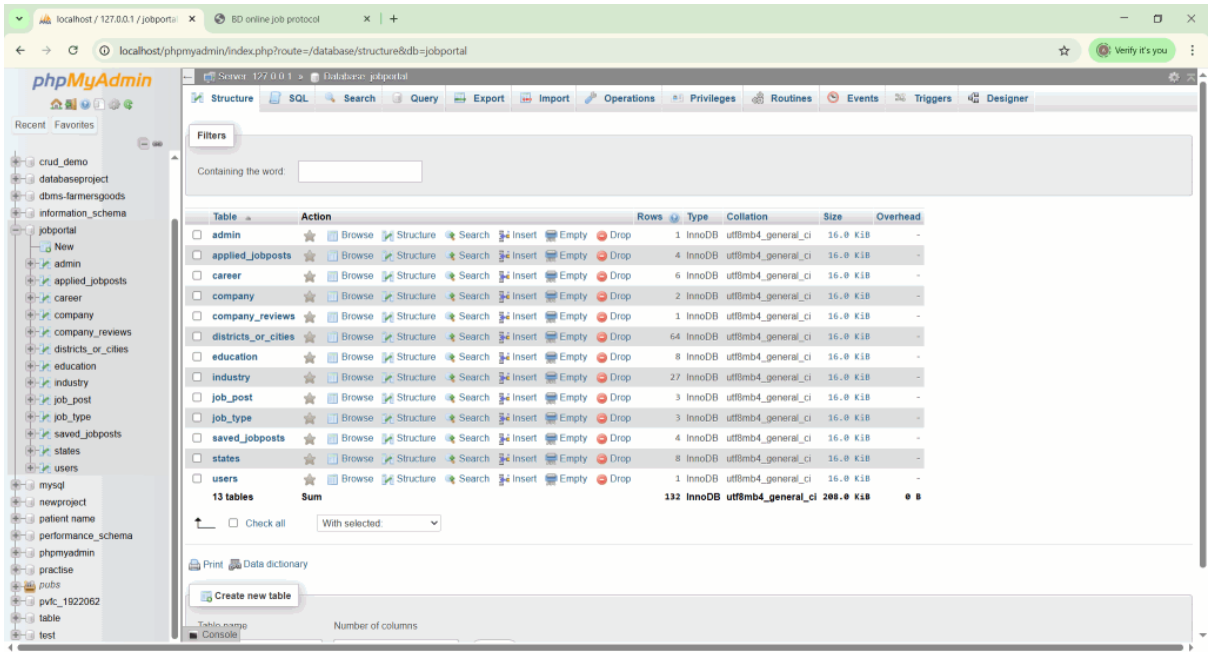

Figure 5.16: Database Implementation

5.6.3 Test Results

TC-01 User Registration: The application registers new users with valid credentials and persists records in the `users` table, enforcing server-side validation to prevent duplicate emails and malformed inputs.

TC-02 User Login: Registered users authenticate successfully; hashed passwords are verified and role-based access is enforced for job seekers, employers, and administrators.

TC-03 Post Job: Verified employers/administrators create postings in job post required fields (title, description, salary, deadline, job type, industry, state, district/city) are validated and foreign keys align with job type,industry, states and districts or cities.

TC-04 Search & Filter Jobs: Keyword and faceted filters return accurate, paginated results stress tests confirm stable response under higher result counts.

TC-05 View Job Details: The system displays complete job information and related company data without exposing restricted fields links to apply and save are consistently available.

TC-06 Apply to Job: Authenticated applicants submit CV and cover letter entries are stored in applied job posts and status updates (pending, shortlisted, selected) reflect in real time on dashboards.

TC-07 Save Job: Bookmarking creates or maintains a single saved record per user-post pair in saved job posts duplicates are prevented across sessions.

TC-08 Profile & Resume Management: Users update personal details and experience/education (mapped to users, career, education updates propagate to applications and employer views.

TC-09 Company & Reviews: Employers manage profiles in company moderated feedback in company reviews is accepted, with inappropriate content blocked and queued for admin action.

TC-10 Admin Moderation & Verification: Administrators verify employers, approve/reject job posts, and remove fraudulent content changes take effect immediately and are traceable via audit logs.

Chapter 6

Results & Analysis

The BD Online Job Protocol system was successfully designed, developed and tested according to the planned methodology. The platform fulfilled all its functional objectives secure user registration, login, and profile management for both job seekers and employers. Features such as advanced job search, filtering, vacancy posting, application workflows, recruiter dashboards, and applicant tracking operated smoothly. Administrative tools performed effectively, allowing verification of job postings and moderation of fraudulent activities.

From the performance perspective, the system handled concurrent users with minimal delay. Usability testing showed that the interface was responsive across desktops, tablets and mobile devices, ensuring accessibility for a diverse user base. Test cases including registration, login, job posting, job search, application submission, saving jobs, and profile management were executed successfully, confirming that the system was both reliable and robust.

The graphical user interface (GUI) of the BD Online Job Protocol is designed to ensure usability and accessibility across desktops, tablets and mobile devices. Its responsive and modern design allows seamless access regardless of screen size, creating a consistent user experience. The system provides role-specific dashboards for Administrators, Employers, and Job Seekers, each tailored to their responsibilities. Administrators manage verification, moderation, and overall system integrity, while Employers can post vacancies, review applications and handle shortlisting. Job Seekers benefit from an intuitive interface for profile creation, resume uploads, job searches, and real-time application tracking. Clear navigation menus, advanced filters, and integrated notifications enhance efficiency and strengthen engagement across all user roles. So Below are sample interfaces from the system:

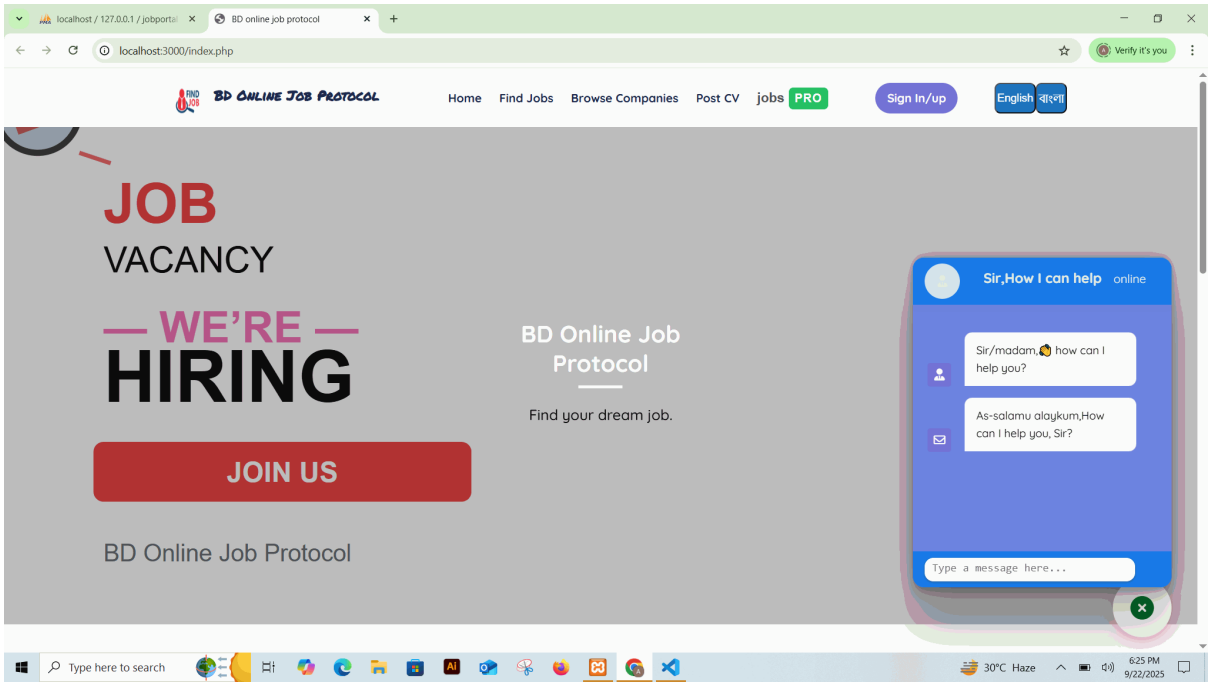

Figure 6.1: Home page

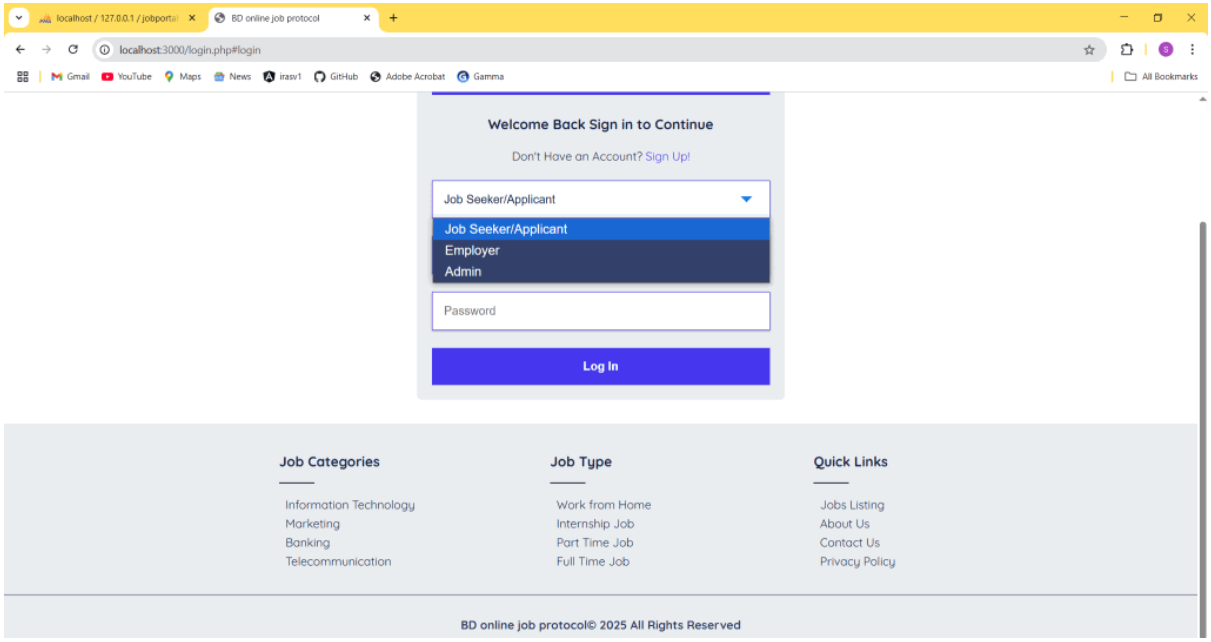

Figure 6.2: Login

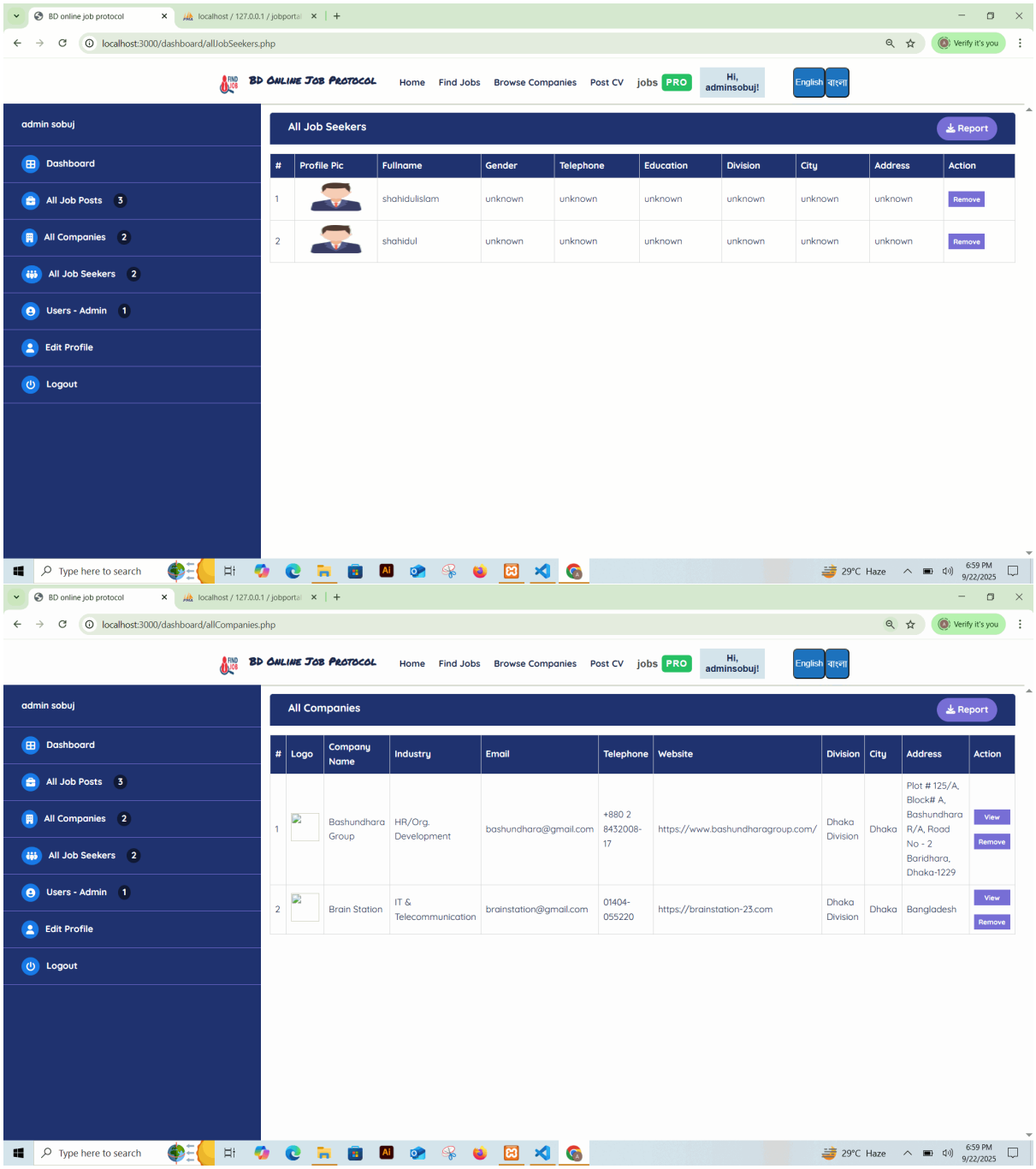

Figure 6.3: Admin Monitoring

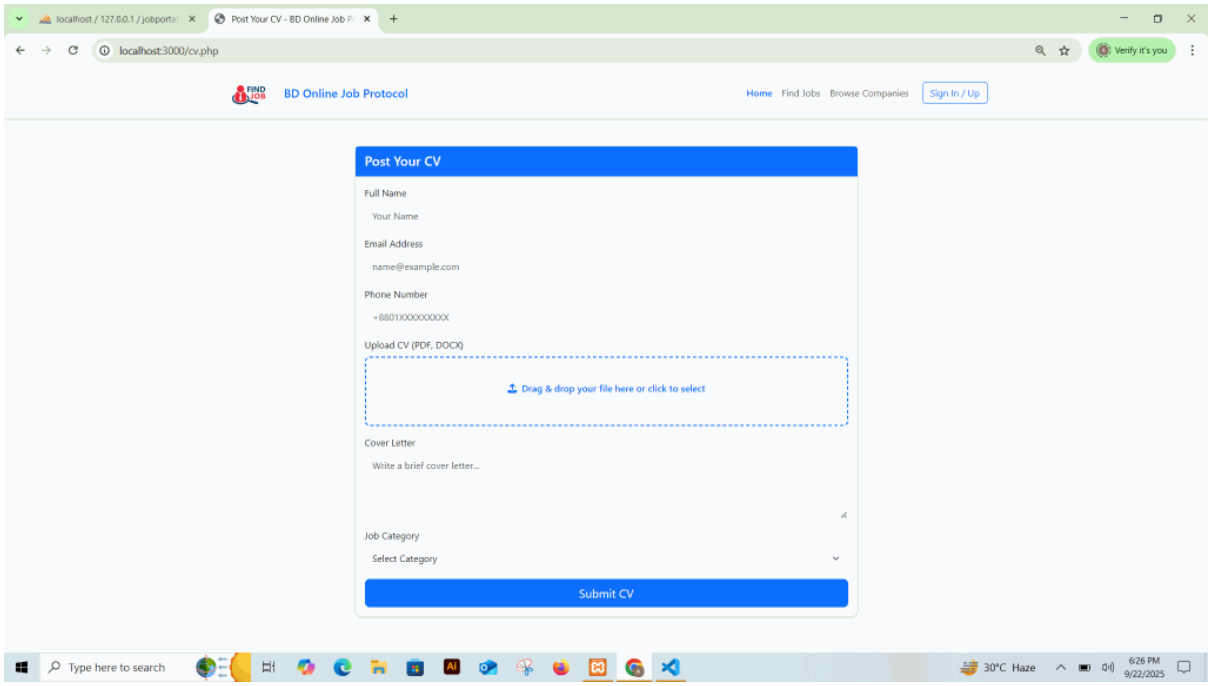

Figure 6.4: Job seekers post his/her job Cv

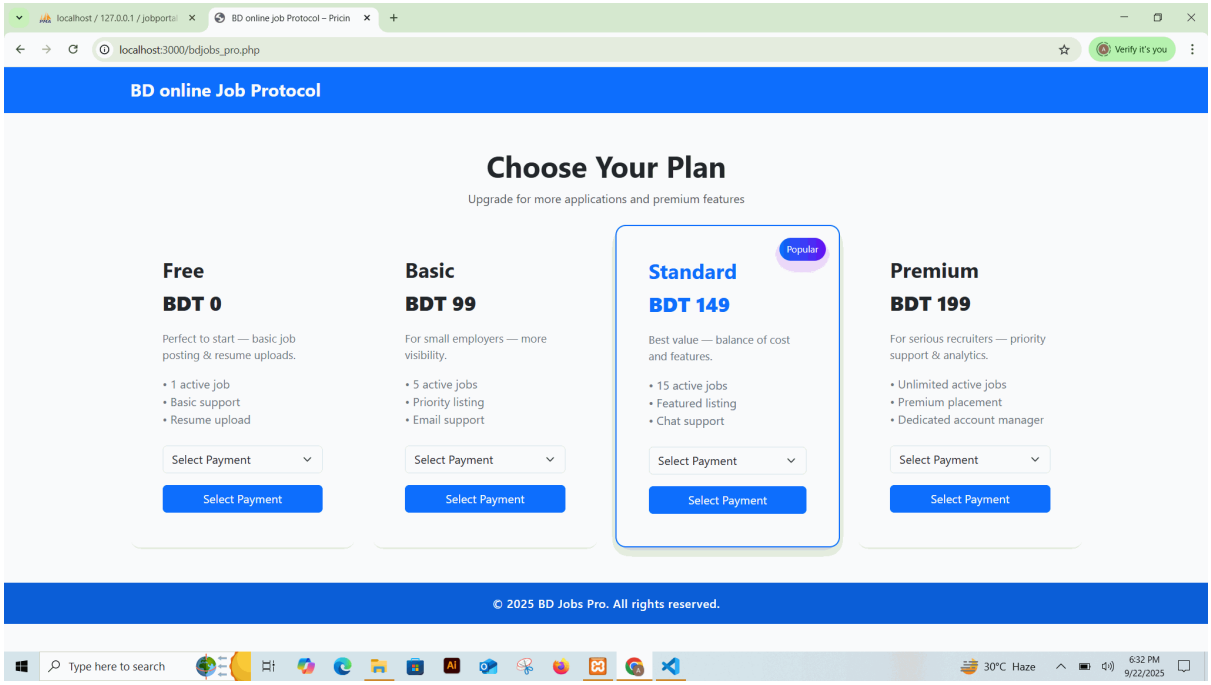

Figure 6.5: Subscription packages

6.0.1 Analysis

The analysis of the BD Online Job Protocol shows that the platform effectively addresses major recruitment challenges in Bangladesh, such as fake job postings, scattered vacancies, and lack of oversight. By integrating administrative verification and role-specific dashboards, the system enhances transparency and trust between job seekers and employers. Its responsive design ensures accessibility across devices, while performance testing confirmed stable operation under concurrent usage. Minor issues identified during development, including navigation errors and slow queries, were resolved through debugging and optimization. However, live deployment and large-scale user testing are still required to fully validate performance and gather real-world feedback. Finally, the system demonstrates technical feasibility, social impact and strong potential as a secure and sustainable digital recruitment solution.

Chapter 7

Project as Engineering Problem Analysis

The BD Online Job Protocol project tackles a significant engineering issue: the absence of a streamlined secure and accessible online platform for linking job seekers with employers in Bangladesh. From an engineering standpoint, the initiative required the use of systematic problem-solving techniques evaluating user needs, crafting a robust system architecture, and implementing dependable data management practices. The main challenge was to ensure seamless operation, scalability and security while providing a user-friendly experience. Utilizing PHP and MySQL, the system was designed to effectively handle large quantities of job postings, user information, and file uploads. So, the project illustrates how engineering concepts can be utilized to create and develop a functional technological solution for managing employment and digital recruitment.

7.1 Sustainability of the Project/Work

The BD Online Job Protocol platform has been engineered with long-term sustainability as a first-class requirement, balancing scalability, maintainability, operability and cost efficiency. From a technical sustainability perspective, the system adopts a modular API-driven architecture that separates concerns across presentation, application, and data layers. This decoupling enables independent evolution of features, rapid defect isolation, and safer deployments. The front-end employs a modern component model which promotes reuse and predictable rendering performance. On the server side, a layered service design supports horizontal scaling through container orchestration and load balancing. Core quality attributes, performance, reliability, and security, are addressed through disciplined engineering: pagination and lazy loading for data-heavy views query optimization and indexing at the database tier; an application cache for hot reads and asynchronous queues for bursty workloads such as notification fan out.
Maintainability is reinforced by coding standards, static analysis, unit and integration testing, and a continuous integration/continuous delivery pipeline that automates the build, test, and release gates. Observability centralized log, metrics and tracing - allows for early anomaly

detection and capacity planning, improving mean time to detect and mean time to recover. To ensure flexible integrations, the platform exposes stable interfaces for third party services (payment gateways for employer subscriptions, OAuth/OpenID providers for login, email/SMS gateways, and analytics) via well-developed REST endpoints and webhooks. This contract first approach permits substituting vendors without destabilizing core functionality.
Resource and operations sustainability complements the technical stance. Cloud native deployment leverages managed services object storage , serverless functions, and managed databases to reduce undifferentiated ops burden while retaining the ability to scale elastically with demand. A content delivery network (CDN) improves global latency and reduces origin load, while infrastructure as code ensures reproducible environments and controlled drift. Cost stewardship is built into the design through right sizing instances, autoscaling policies, lifecycle rules for cold data, and aggressive caching. Vendor lock in is mitigated by using open standards and abstraction layers where proprietary services are adopted, clear migration paths are documented. Operational runbooks, onboarding guides, and architectural decision records preserve institutional knowledge and shorten ramp up time for future maintainers. Collectively, these practices make the platform adaptable to evolving requirements while keeping total cost of ownership predictable and sustainable.

7.2 Social and Environmental Effects and Analysis

From a social impact point of view, the BD Online Job Protocol advances employability and transparency in the labor market. By aggregating verified job listings, providing standardized employer profiles, and enabling structured application workflows, the platform reduces information asymmetry between job seekers and recruiters. Career resources, such as interview guidance, resume tips, and market updates, support ongoing up-skilling and help bridge the knowledge gap for new entrants to the workforce. Inclusive design principles extend access to users with differing abilities and varying device constraints, aligning with accessibility best practices. In addition, role-appropriate dashboards and message channels foster professional networking and timely feedback between candidates and employers, improving placement outcomes and user satisfaction.
The platform also yields meaningful environmental benefits by promoting digital first interactions. Electronic applications, digital document exchange, and online interviews reduce reliance on paper, physical commuting, and in person processing. Cloud based hosting consolidates compute resources into highly utilized data centers that typically operate with better power usage effectiveness than on premises deployments. Performance engineering choices caching, CDN distribution, compressed assets, and efficient database queries lower server cycles per user action, indirectly reducing energy consumption per transaction. Data lifecycle policies further limit storage and processing overhead by pruning redundant artifacts and archiving cold data. While the environmental footprint of any online service is non zero, these measures drive a lower carbon intensity relative to fragmented, paper heavy, and travel dependent hiring processes.

7.3 Addressing Ethics and Ethical Issues

Ethical stewardship is foundational to the platform's legitimacy and long term adoption. Data privacy and security are treated as non negotiable all traffic is protected with TLS secrets are managed securely and sensitive data at rest is encrypted. User credentials are stored using strong, salted password hashing and session integrity is enforced with short lived tokens and refresh mechanisms. Role based access control implements the principle of least privilege across job seekers, recruiters, and administrators, while audit logs provide a tamper evident trail of key actions. The platform publishes clear notices of data collection and processing, honors user consent, and provides mechanisms for account deletion and data export. Although Bangladesh's regulatory landscape for data protection is evolving, the system aligns with international best practices , thereby future proofing compliance and building user trust. Content integrity and platform fairness are addressed through a combination of policy, verification, and moderation. Employer accounts undergo tiered verification to deter fraudulent postings, and automated heuristics plus manual review help detect misleading claims, discriminatory language or exploitative offers. Intellectual property is respected by attributing authorship for original materials and by enforcing anti plagiarism rules. Recommendation and ranking logic for job search is documented at a policy level to avoid opaque black box biases signals that influence ordering (recency, relevance, employer verification, and match quality) are disclosed in user facing help. The platform's acceptable use policy prohibits discrimination on the basis of protected characteristics and provides straightforward reporting tools. Reports are triaged within published service targets and outcomes are communicated to reporters and affected parties to sustain procedural fairness.

Finally, economic and community ethics are considered in how value is exchanged on the platform. Pricing for employer plans is transparent there are no dark patterns in subscription or cancellation flows and any premium features for candidates (if introduced) are optional and clearly delineated from the core, free job search experience. Where external partners (payment gateways, identity providers or analytics services) are involved, data sharing is minimized to only what is required for the stated purpose, and third party compliance is part of vendor due diligence. These governance measures coupled with regular security reviews, penetration testing, and incident response drills create a robust ethical baseline that can evolve with policy and societal expectations.

Chapter 8

Lesson Learned

The BD Online Job Protocol initiative provided important insights into using programming, database and web development principles in practical scenarios. We discovered that careful planning and system architecture are crucial for optimal efficiency and performance. Focusing on security, user experience and testing enhanced the system's dependability. So, the project bolstered our technical abilities, problem-solving skills and project management experience.

8.1 Problems Faced During this Period

The development of the BD Online Job Protocol platform was a challenging yet rewarding journey, during which several technical and operational problems were encountered. One of the primary issues was related to system performance while handling large volumes of data. Since the platform was designed to store and process extensive records, including job postings, user registrations and employer information, maintaining fast response times during high-traffic periods became a significant challenge. In particular, peak activity during new job updates occasionally caused delays in server responses, which required additional optimization.
Another major difficulty arose in implementing real-time updates and ensuring smooth synchronization across different modules of the platform. Because job postings, user applications, and notifications needed to reflect instantly across multiple user roles, maintaining data consistency without creating duplication or conflicts demanded considerable effort. Closely related to this was the complexity of designing a secure and efficient authentication system. The platform supported multiple user roles job seekers, recruiters, and administrators and implementing role-based access control without compromising security required a carefully structured approach.
User experience and interface design also posed challenges. Developing a responsive and intuitive interface that could provide a seamless experience across devices required multiple refinements. Extensive testing and feedback analysis were necessary to improve navigation, job search functionality, and application submission processes. In addition, security and data privacy concerns were a constant priority, given that the system stored sensitive information such as login credentials, resumes and application details. Preventing unauthorized access and ensuring user data protection required the implementation of robust encryption and security measures.

Finally, integrating external services created further difficulties. The system relied on third-party solutions such as payment gateways, authentication tools and email notification services. Ensuring that these integrations functioned smoothly without causing conflicts or degrading platform performance required meticulous planning and careful testing. Overall, these challenges significantly shaped the development process of the BD Online Job Protocol project.

8.2 Solution of those Problems

To address the challenges encountered during the development of the BD Online Job Protocol project, several strategic solutions and improvements were implemented. Performance issues caused by heavy data handling and peak traffic loads were mitigated by optimizing database queries, implementing efficient indexing techniques, and introducing server-side caching. These measures significantly improved system responsiveness and allowed the platform to handle larger volumes of data without noticeable delays. Real-time updates and data synchronization were enhanced through the use of asynchronous processing and carefully designed database transactions. By structuring update operations to avoid conflicts between different user roles, the platform maintained consistency across job postings, applications and notifications. In terms of authentication and access management, a robust role based access control mechanism was introduced. This ensured that job seekers, recruiters, and administrators could access only the features relevant to their roles while safeguarding the security of sensitive data. User experience challenges were addressed by adopting a responsive design framework and conducting iterative usability testing. Continuous feedback from test users guided improvements in navigation flow, interface layout, and mobile compatibility. These refinements created a more intuitive and user-friendly environment, ensuring accessibility across different devices and screen sizes. Security concerns were tackled by incorporating strong encryption protocols, implementing secure password storage and applying regular vulnerability assessments. These steps not only protected sensitive user data but also built trust in the reliability of the system.

For third-party service integration, such as payment gateways, authentication systems, and email notifications, modular APIs were adopted. This approach ensured smooth communication between the core platform and external services, while minimizing the risk of conflicts or performance degradation. Careful documentation and version control further strengthened system stability, allowing future updates and integrations to be performed more efficiently. Through these solutions, the BD Online Job Protocol platform achieved a higher level of stability, security, and usability. The improvements not only resolved the immediate technical issues but also established best practices for future development initiatives, making the system more scalable and adaptable to evolving requirements.

Chapter 9

Future Work & Conclusion

In the future, the BD Online Job Protocol system could be enhanced by incorporating a payment gateway to allow for premium job listings and subscription services for both employers and job seekers. Additional functionalities such as AI-driven job suggestions, real-time alerts, and mobile app integration could further improve user interaction and convenience. The platform might also be broadened to offer multi-language support, making it more available to a larger audience throughout Bangladesh. Future efforts should concentrate on bolstering data security and optimizing system scalability to efficiently manage a growing number of users. Finally, the project has successfully laid a solid foundation for a secure, user-friendly and scalable online job portal developed with PHP.

9.1 Future Works

The BD Online Job Protocol has been designed to be scalable and adaptable, yet there are still several areas where the platform can be further improved in the future. Developing dedicated mobile applications for Android and iOS would make the system more accessible to a wider audience, while incorporating AI-driven features could provide personalized job recommendations, resume optimization, and intelligent candidate matching. To strengthen trust and transparency, blockchain-based credential verification may be introduced to prevent fraudulent job postings and virtual interview tools such as built-in video conferencing and automated evaluation systems could streamline the hiring process.Moreover advanced analytics dashboards would enable both employers and job seekers to gain valuable insights into labor market trends and career pathways. Enhancing cybersecurity with multi-factor authentication, intrusion detection systems and continuous vulnerability testing will further safeguard sensitive data. Finally, expanding multi-language support beyond English and Bangla to include more regional languages would ensure inclusivity and make the platform accessible to a broader user base across Bangladesh.

9.2 Conclusion

The successful development of the BD Online Job Protocol demonstrates how thoughtful design, modern web technologies, and structured methodologies can address key challenges in Bangladesh's digital recruitment landscape. By integrating secure user registration, job postings, applicant tracking, and administrative oversight into one unified system, the platform creates a trustworthy and efficient environment for both employers and job seekers. This project not only enhanced my technical skills in web development, database design, and system integration, but also allowed me to bridge academic knowledge with real-world application. Ultimately, the system provides a strong foundation for a sustainable and future-ready digital employment ecosystem, promoting transparency, efficiency, and equal opportunity in the job market. With continuous improvement and innovation, the BD Online Job Protocol has the potential to grow into a leading solution that connects talent with opportunity while contributing to the broader vision of a digitally empowered Bangladesh.

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INTERNSHIP CERTIFICATE

Date: October 7, 2025

This is to certify that Abul hasnat sobuj has successfully completed his internship at IT WAY BD as a Software Developer from 27 May 2025 to 21 September 2025. During this period, he was actively involved in the development and maintenance of websites. His responsibilities included coding, debugging, testing and optimizing various website development.

Abul hasnat sobuj consistently demonstrated a strong work ethic, excellent problem solving skills and a keen ability to quickly adapt to new technologies and challenges. He worked diligently with the development team and contributed significantly to various development projects.

We are confident that his technical skills and proactive approach will make him an asset in his future career endeavors and we wish him continued success in his professional journey.

Regrads,

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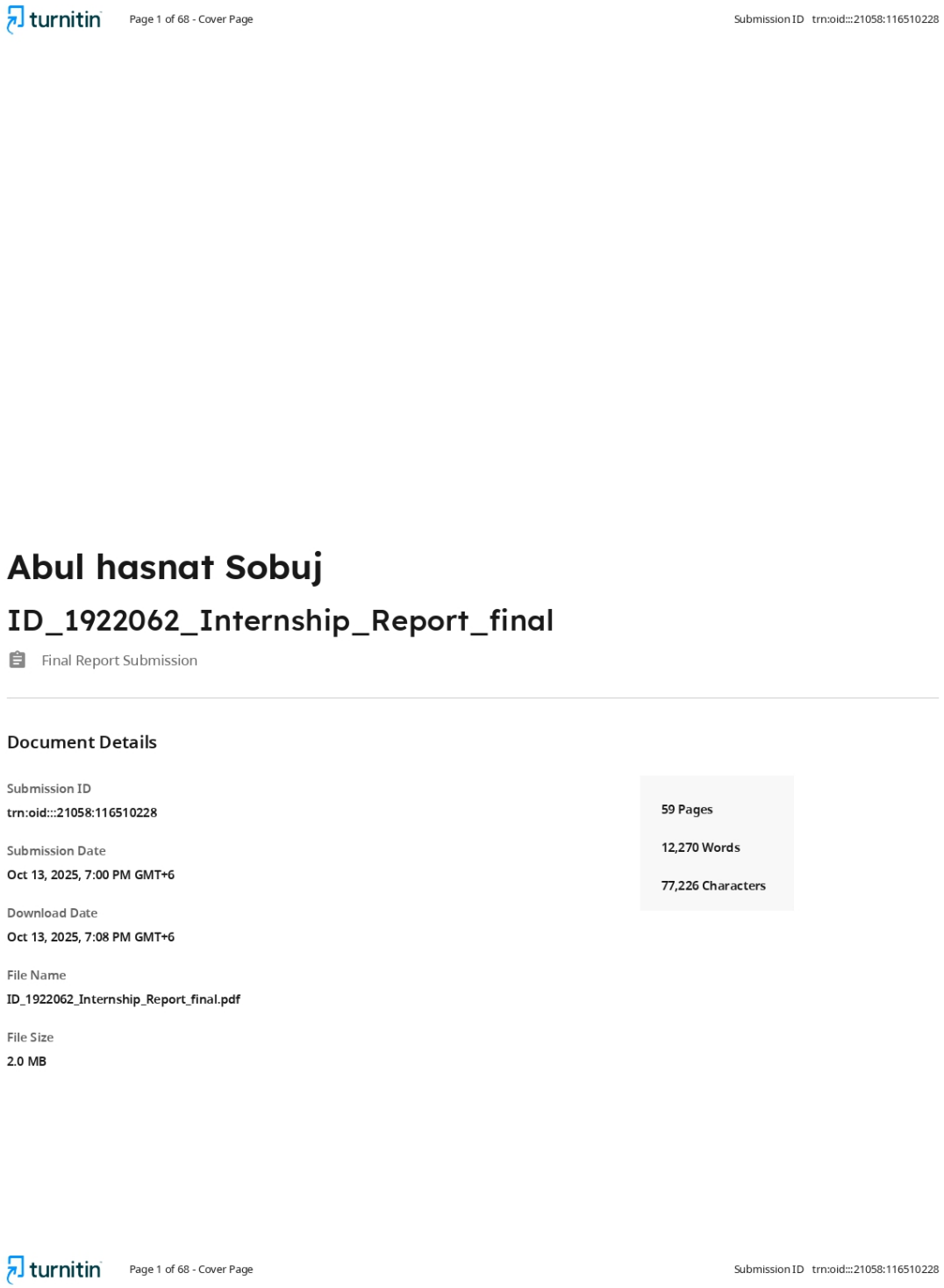

Figure 9.1: Plagiarism Report Page 1

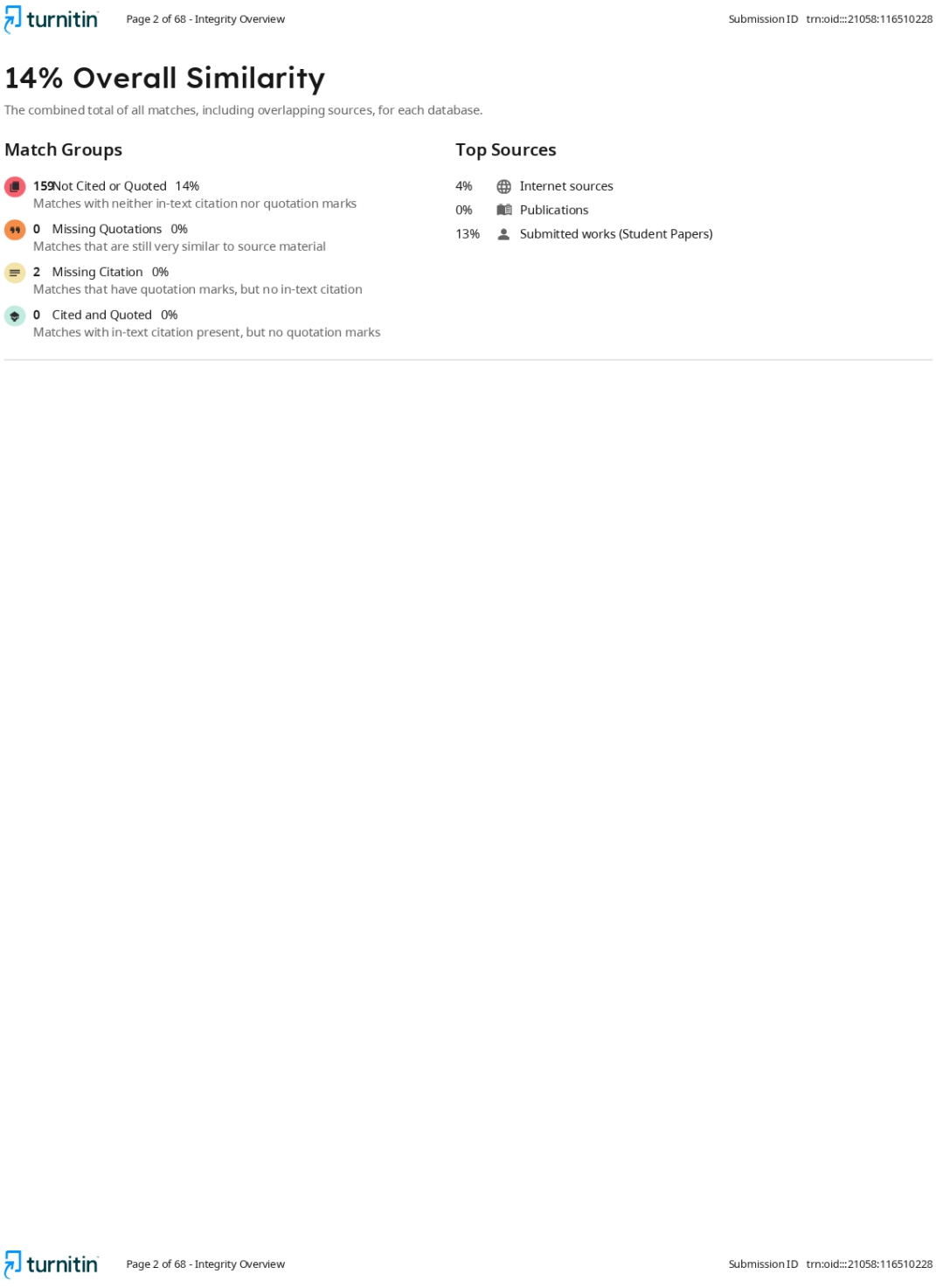

Figure 9.2: Plagiarism Report Page 2

An Undergraduate Internship Project on BD online Job Protocol

By

Abul Hasnat Sobuj

Student ID: **1922062**

Summer, 2025

The student modified the internship final report as per the recommendation made by his or her academic supervisor and/or panel members during final viva, and the department can use this version for achieving.

Signature of the Supervisor

Azwad Abid

Lecturer B

Department of Computer Science & Engineering

School of Engineering, Technology & Sciences

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