

Working Under Datasys Limited as an Web Developer Intern

by

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An internship report submitted to the Department of Computer Science and
Engineering
in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science and Engineering

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Declaration

It is hereby declared that

1. The internship report submitted is my own original work while completing degree at Brac University.
2. The internship report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The internship report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Ethics Statement

Throughout this internship report, I have maintained complete honesty about my experiences and contributions at Datasys Limited. All the work described here represents my actual involvement in projects while being employed as an intern at Datasys Limited. I hereby confirm that I have not exaggerated my role or claimed credit for any work done by others. To adhere to the rules set by my employer, all client and project information has been presented respectfully while maintaining appropriate confidentiality.

Abstract

This is the final internship report which gives a snapshot of my experience as a Web Development Intern at Datasys Limited that lasted for six months from 1st December 2024 to 31st May 2025. My primary responsibility in this internship was to assist in the project named “Permanent Residency Certificate web application” which was a government project built for the tribal communities living in Rangamati district. The main purpose was to help them get Permanent Residency Certificates more easily. Previously, people had to wait for months and deal with lots of paperwork. However, this new digital system will allow them to apply online and get their certificates within just a few days. Through this project, I learned modern web technologies such as Laravel framework, MongoDB, Vue.js, Node.js, PHP, MySQL, and JavaScript for full-stack web development. Simultaneously, thanks to this internship experience, I developed several important soft skills including professional communication, time management, teamwork, problem-solving, and adaptability in a real work environment.

Acknowledgment

First of all, I am grateful to Mr. Mizaur Rahman for his exceptional mentorship, patience, and continuous guidance throughout my internship period. He provided me with both technical expertise and professional development support that was essential for making this experience successful. My seniors and colleagues at Data-sys Limited were very welcoming towards me. All my peers were very helpful as every time I was confused regarding something or felt stuck they provided guidance and support. Not only my peers at workplace, even BRAC University's faculties especially Mr. Rafeed Rahman Sir, helped to make this internship experience easier for me; for instance, they solved my confusions regarding the report format, guidelines, deadlines etc. I could not have completed this internship without any of their support.

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Nomenclature

The next list describes several symbols & abbreviation that will be later used within the body of the document

I/O operations Input/Output operations

CSRF Cross-Site Request Forgery

JSON JavaScript Object Notation

MVC Model-View-Controller

NoSQL Not only SQL

ORM Object-Relational Mapping

Chapter 1

Introduction

1.1 Internship Overview

I completed a six-month web development internship at Datasys Limited from December 2024 to May 2025. During my internship, I worked as a Web Development Intern under the supervision of Mr. Mizaur Rahman, Senior Software Engineer at Datasys Limited, and Mr. Rafeed Rahman, Senior lecturer from Brac University as my internship supervisor. My primary responsibilities included contributing to full-stack web development projects, with a major focus on the Permanent Residency Certificate web application for Rangamati district - a government digitization project serving tribal communities in Bangladesh's Chittagong Hill Tracts. My key tasks involved database design and implementation, backend development support, and documentation work. I gained hands-on experience with modern web technologies including Laravel framework, MongoDB, Vue.js, Node.js, PHP, MySQL, and JavaScript.

1.2 Objectives

The primary objective of this internship was to gain practical experience in web development while contributing meaningfully to real-world projects that address societal challenges. This main goal included several smaller goals that helped guide my learning during the six months. I aimed to master modern web development frameworks and technologies, which would provide me with the technical foundation necessary for a successful career in software development. A significant aspect of my objectives involved contributing to the digitization of government services for underserved communities, particularly in Bangladesh's Chittagong Hill Tracts region. This objective aligned with my personal values of using technology to create positive social impact while gaining experience in developing solutions for complex real-world problems. Additionally, I sought to develop professional communication and collaboration skills that are essential for working effectively in team-based development environments. These objectives collectively aimed to transform my academic understanding into practical competencies that would serve as a foundation for my professional career.

1.3 Methodology

This report brings together my experiences from working on actual projects, observing professional work methods, and ongoing learning with expert guidance. The methodology combined hands-on technical work with theoretical understanding, supported by regular mentorship sessions and collaborative project participation. Throughout the internship, I maintained detailed documentation of learning experiences, technical challenges encountered, and solutions implemented. Regular discussion sessions with my supervisors helped me understand my daily experiences better. These meetings showed me how my work related to my broader professional development. I also actively joined team meetings and client conversations. This participation gave me insights into professional communication and project management methods

Chapter 2

Company Overview

2.1 About Datasys Limited

Datasys Limited, that was founded in 2015, located in Mirpur DOHS, Dhaka, combines 'data' and 'system' to reflect its mission of turning complex data challenges into practical technology solutions. The company has built a strong reputation for delivering innovative IT solutions that exceed client expectations. Datasys aims to become the preferred technology partner for organizations seeking digital transformation by using creativity and advanced technologies to solve business problems. The company builds strong software and web platforms that help automate business operations and support growth. Datasys Limited has built websites and software for many well-known local companies including Lankabangla Securities, Shajalal Islami Bank, Eastern Bank, United Commercial Bank, Robi Axiata, and Bkash. They have also worked on important government projects like the Rangamati Permanent Residence Certificate website and Bangladesh Investment Development Authority website, while providing branding services to various clients.

2.2 Organizational Culture and Structure

During my internship at Datasys, I observed that the company uses a team-based structure with different specialized groups. For example, there are separate teams for frontend development, backend work, UI/UX design, business development, and administration. Each team focuses on their expertise but, at the same time, works closely with others.

What I noticed most about the work culture was how much they value sharing knowledge and helping each other grow professionally. People there, based on my experience, genuinely seemed to care about maintaining a good work-life balance. I think nowadays, workplace rivalry and office politics has become a norm everywhere, but here things were really different. Throughout six months of my internship I never even saw anyone gossip behind someone's back let alone any jealousy or politics. One thing that stood out to me was how they included everyone in discussions and decisions, regardless of job level. Even though I was just an intern there, everyone made me feel included and valued my opinions regarding any project. From what I saw, this collaborative approach was not just internal as even when working with clients, they maintained straightforward communication to make sure projects actually met what the clients needed and expected.

2.3 Development Methodology

In general, Datasys builds software using an Agile methodology with the Scrum framework. They test the software continuously during development, which helps them find and solve problems early in the process [3]. Moreover, the team works in short development cycles and prioritizes the most critical features. This allows them to quickly deliver functional software components. In all these, communication plays a key role such as regular sprint meetings keep the development moving forward. In fact, this approach proves particularly effective for government projects like the one I was assigned in. Since these types of projects often see requirements shift as stakeholders learn about new technological capabilities.

Chapter 3

Learning Journey and Skill Development

3.1 Initial Adaptation Phase

In the first month of my internship focused on adapting to the environment and tried to improve my foundational learning. This was a crucial transition period from academic study to professional practice. Though there were some uncertainties about what to expect on a professional level and concerns about being up to the mark, the supportiveness of Mr. Mizaur Rahman as a mentor and the collaborative team environment initiated a smooth transition into the professional setting. During this time, I learned the company's work ethics and communication methods and I found them to be much more formal and structured than what I was used to in my university. I had to learn new software tools and understand how different parts of the development system worked together. I built relationships with my teammates and colleagues by joining team meetings, having casual conversations, and working together on projects, which helped me understand the company culture and how people work together professionally. I also started learning the required technologies in an organized way, making sure I could still complete my assigned work while gaining new technical skills.

3.2 Technical Skill Acquisition

3.2.1 LARAVEL Framework

Laravel's Model-View-Controller (MVC) architecture became central to my development work, providing a structured approach to building robust web applications. Through comprehensive study and practical application, I learned to use Eloquent ORM for better database operations, which made working with databases easier and helped keep the code well-organized. Understanding dependency injection and service container utilization enabled me to write more modular and testable code,[5] while Laravel's built-in security features including CSRF protection and secure authentication provided confidence in developing secure applications [4]. Initially Laravel turned out to be a challenging learning curve due to its comprehensive feature set and complex architectural patterns. But, the clean syntax format and thorough documentation enabled me to acquire this skill as fast as possible. The built-in

conventions in Laravel let me focus on the main requirements instead of spending time on setup and configuration. Its extensive library of packages also provided ready-made solutions for common development needs.

3.2.2 Database Management: MongoDB

MongoDB introduced me to NoSQL database concepts and document-oriented data storage, which were fairly new to me. Working with JSON-based document structures taught me how to handle unstructured data effectively. The flexible schema design helped me understand how to adapt databases when application requirements change over time. I also learned about horizontal scaling capabilities, which showed me how NoSQL databases can solve performance problems. These databases work much better than traditional databases when dealing with large amounts of data [2]. Connecting NoSQL databases to Laravel required learning how to set up and optimize database connections using the right drivers and packages. I also had to master indexing strategies, query optimization, and data modeling techniques to make sure data could be retrieved and updated efficiently.

3.2.3 Vue.js Frontend Development

The transition from React.js to Vue.js showed me how Vue.js focuses on simplicity and easy adoption. This makes Vue.js perfect for projects where you need to gradually upgrade existing applications rather than rebuilding everything from scratch. Vue.js proved to be excellent for upgrading older systems because it can be added gradually without rewriting everything. Its two-way data binding and reactive components made it much easier to manage data changes and handle user interactions without complex code [6]. The directive system for dynamic DOM manipulation provided powerful tools for creating interactive user interfaces, and component-based development patterns encouraged code reusability and maintainability. Vue.js has a gentle learning curve and comprehensive documentation which made it accessible for developers with varying levels of frontend experience, while its robust performance characteristics ensured that applications remained responsive even with complex user interfaces, as mentioned by [6].

3.2.4 Backend Integration with Node.js

Node.js experience reinforced understanding of JavaScript runtime environments and event-driven architecture, providing valuable insights into leveraging JavaScript effectively for server-side development. The single-threaded event loop for concurrent connection handling demonstrated how Node.js could efficiently manage multiple client requests without the overhead associated with traditional multi-threaded approaches, while non-blocking I/O operations illustrated how asynchronous programming patterns could significantly enhance application responsiveness [1]. Real-time application development capabilities opened possibilities for creating dynamic, interactive applications that could respond instantaneously to user actions and data changes, and integration with frontend frameworks for full-stack solutions provided a unified development experience where the same programming language could be utilized across the entire application stack, reducing context switching and improving overall development efficiency.

3.3 Professional Skill Development

Beyond technical competencies, the internship emphasized professional skills essential for career success in the software development industry. Communication skills developed through regular client interactions, meeting facilitation, and documentation practices, enhancing both written and verbal communication abilities, while learning to articulate technical concepts to non-technical stakeholders became a valuable skill for ensuring project success and client satisfaction. Project management exposure through Agile methodology, sprint planning, and collaborative development workflows enhanced understanding of professional project execution, while problem-solving skills developed through debugging complex issues, analyzing client requirements, and implementing efficient solutions, alongside improved time management through balancing multiple project responsibilities and meeting deadlines consistently. These professional skills proved to be as important as technical abilities in contributing effectively to project success and building positive working relationships with colleagues and clients, and the combination of technical and professional skill development created a comprehensive foundation for career advancement in the software development field.

Chapter 4

Project Contributions

4.1 Database Design and Implementation

My primary technical contribution involved designing and implementing database systems for client projects, requiring thorough analysis of client requirements to create data structures that supported both current needs and future growth. This work demanded deep understanding of business processes to develop efficient database schemas that could handle complex relationships and data integrity requirements while anticipating application evolution. I worked on keeping data safe and correct, which was crucial for this project as it is a government project where privacy is very important. This meant following both technical rules and business needs. I worked closely with backend developers to make sure everything worked smoothly and quickly. I also handled two databases—one for the website and one for tracking users. This taught me a lot about how systems are built and how to keep data in sync.

4.2 Backend Development Support

I worked on the backend for several projects, which helped me learn good coding practices through code reviews and quality checks. I found and fixed bugs by carefully checking how different parts of the system worked together. I also helped build and test APIs to send data safely and quickly to the frontend. To make the system faster, I looked for slow parts and made changes to improve speed and efficiency. These activities enhanced understanding of software development best practices and quality assurance methodologies while providing practical experience in maintaining and improving existing codebases. Working on multiple projects simultaneously developed skills in context switching and maintaining code quality across different technical environments.

4.3 Documentation and Administrative Tasks

Professional development extended beyond coding to include meeting minutes documentation and client requirement analysis, which required developing skills in capturing and organizing complex information from diverse stakeholders, while formal

correspondence preparation using Microsoft Office suite involved learning professional communication standards and creating documents that could effectively convey technical information to business stakeholders. Project timeline tracking and progress reporting required understanding project management principles and developing skills in monitoring and communicating project status to different audiences, and client communication facilitation and scheduling coordination involved developing interpersonal skills and understanding how to manage expectations and maintain positive relationships throughout project lifecycles. These administrative responsibilities provided insights into the business aspects of software development and the importance of effective communication in project success.

Chapter 5

Major Project: Permanent Residency Certificate System

5.1 Project Background and Problem Statement

The Chittagong Hill Tracts region, particularly Rangamati district, faces unique challenges in government service delivery due to geographical remoteness and traditional bureaucratic processes that have not adapted to modern technological possibilities. The existing system for obtaining Permanent Residency Certificates created significant barriers for tribal communities seeking to access essential government services and employment opportunities. The traditional process required multiple months of processing time, during which applicants had no visibility into the status of their applications or clear understanding of what steps remained to be completed. In the old system, people had to deal with a lot of paperwork and visit government offices many times. This was especially hard for those in remote areas, who spent a lot of time and money on travel. Many had to go back again due to missing documents or unclear instructions, which caused stress and hardship. There was no way to track their application status, so people did not know when they would get their certificates. Documents could also get lost or damaged, forcing them to start over. These problems affected tribal communities the most, making it even harder for them to get important services.

5.2 Solution Architecture and Implementation

The web-based application system solved the problems faced by residents of Rangamati district regarding government service delivery by fully moving to a digital setup using modern web tools. It created a service that is fast, clear to understand and easy to use. The technologies used were carefully selected to ensure the system works well and is secured. In addition, the interface has been designed in a way that is so simple that anyone even with little education is able to use it.

Laravel, that has been used in this project, gave the system a strong and secure backend. This is important because it will help to protect private government data. It also helped follow data safety rules. PHP handled the work on the server, running complicated rules and making things faster by reducing manual work. MySQL was used to store data in a clear and organized way. It kept information about users,

forms, and certificates safe and easy to access. This made the system reliable and fast for government use.

JavaScript enhanced user experience through interactive interfaces and real-time updates, making the application more responsive and user-friendly than traditional government websites. NBR Integration enabled automatic document verification through government database connectivity, significantly reducing processing time and improving accuracy by eliminating manual verification steps that were prone to errors and delays.

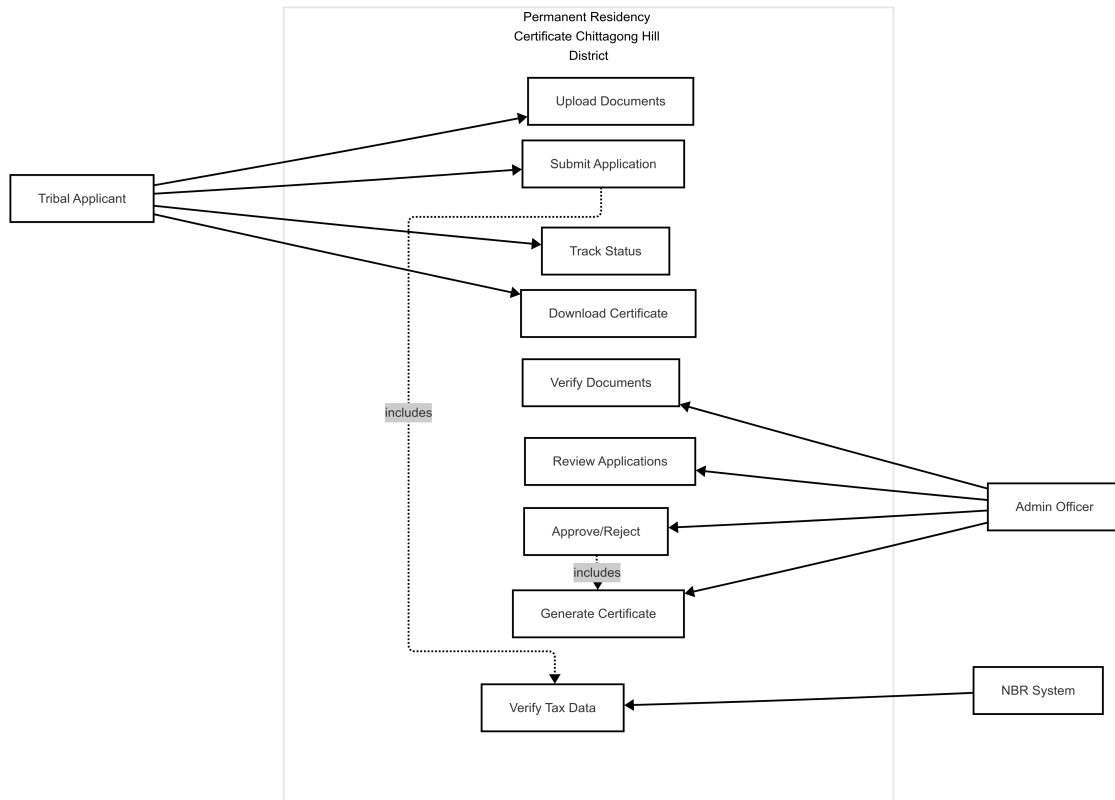


Figure 5.1: Usecase Diagram illustrates the process

The system used both Bengali and English so people could choose the language they are comfortable with. This helped users with different education levels to access it. It also made it easy to upload documents using a simple drag-and-drop feature, so even people who are not good with computers could apply easily. Applicants could see their application status in real time, which gave them clear updates that the old system did not offer. They could track their progress and know what steps were left. The system also checked if someone was eligible by comparing their information with government records, which saved time and reduced mistakes. Digital certificate generation with secure authentication guaranteed that certificates could be validated and were safeguarded against counterfeiting, while an administrative dashboard for government officials offered comprehensive tools for efficient application management and complete process oversight.

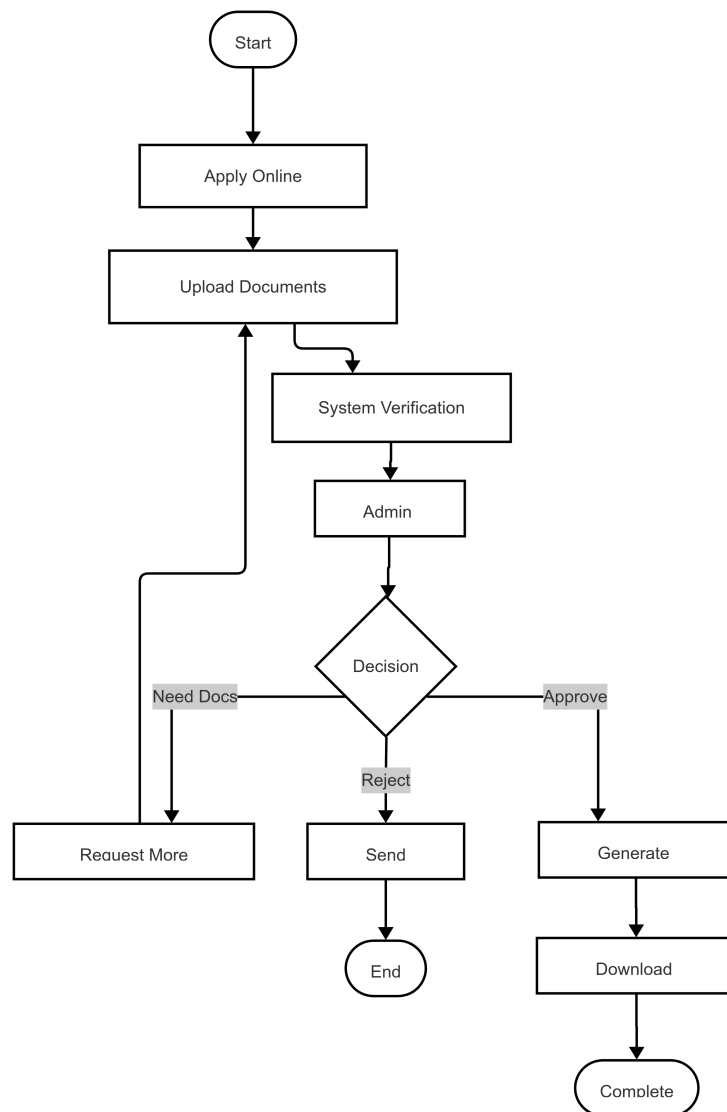


Figure 5.2: Activity Diagram of the website

5.3 Development Process and Agile Implementation

The project exemplified successful Agile methodology implementation through systematic sprint planning where user stories were organized to prioritize core functionality. For example, simple stories like "I want to apply for residency online as a tribal applicant" and "I want to check applicant data using NBR systems as a government worker" helped our team focus on what was most important and build those parts first.

Our team used an Agile method to build the system step by step. This made it possible to test often and get feedback during the whole process. It was helpful for a government project, where ideas and needs can change as people learn more about digital tools. The Datasys team worked closely with government staff and users to make sure the system matched both community needs and official rules. They kept the system safe and reliable by testing and checking it all the time. This was very important because the system handled private personal information. The team could quickly make changes based on real feedback and how people actually used it.

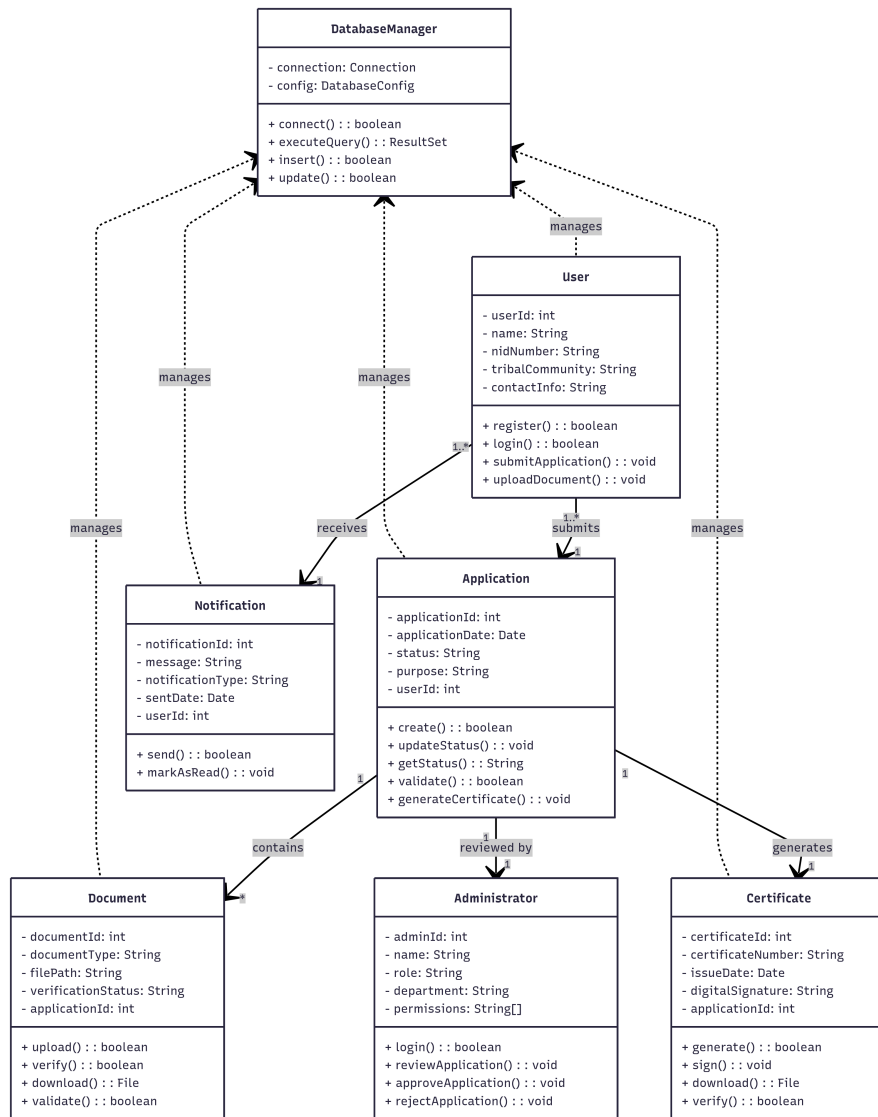


Figure 5.3: Class Diagram of the website

Chapter 6

Challenges and Solutions

6.1 Technical Challenges

Since, this is my first time working in a real-life project that too a government level project, I faced several technical challenges throughout this internship period. For instance, learning modern web development frameworks was quite challenging for me since these are very complex and have a lot of information, which I could not grasp in the beginning. I needed a step-by-step approach that would not overwhelm me with too much at once. As such, I created a structured learning plan that used online resources, and practiced hands-on coding with help from mentors at Datasys. This method helped me learn gradually and apply new ideas right away to strengthen my understanding.

I also faced difficulties when trying to make the system work well under different usage levels. This is because I needed to understand how different design choices affected how fast the system responded and how much computer resources it used. I used techniques like database indexing, improving database queries etc. that I learned from mentors and online research from sites like Coursera, YouTube.

6.2 Professional Challenges

Since Agile methodology ensures frequent changes in the project's requirement, it proved to be quite challenging for me. To be precise, this requires teams to have adaptive planning and proper communication about the changes that would be brought in and how it will affect the timeline of the project. I had the opportunity to gain skills for requirement documentation, impact analysis of changes and having clear communication with the stakeholders. These skills ensure how the project momentum is maintain despite having rapid changes to requirements.

Moreover, I also faced several time management issues as I had to balance multiple responsibilities in this project. And since this was a government level project I had to be meticulous to maintain quality and this took quite a lot of time. To solve these issues and manage my time better, I started to implement priority-based task management, for instance, I started to note every morning what things are urgent and most important and completed those tasks first. I also started to break down long tasks into multiple short task to avoid procrastination. These things helped me tremendously to manage my time efficiently.

Additionally, I also face challenges while communicating initially. For instance, previously in university I only had to write email to communicate with professors and, to be honest, I did not follow any specific format or anything to maintain formal tone in that. But in professional world its very different as a simple mistake can make or break everything so I had to be very careful and, honestly, I had to learn from scratch how to write professional emails, and how to format each email for different personnel. I also had to learn how to communicate properly in meetings, how to take meeting minutes etc. So, although, initially I did not know how to communicate professionally in correct manner, eventually, through research and regular practice I learned it thoroughly.

Chapter 7

Conclusion and Future Prospects

7.1 Internship Outcomes

This internship, which lasted for six months in total, has provided me with valuable lessons and helped me to develop professionally, in the area of software development, in multiple ways. Firstly, through this internship I got to apply the skills I learned in class professionally like in class we were taught about Agile Methodology and how it is applied during software development and in this internship, the project I was assigned utilized this very thing I learned. This helped me to see first-hand how this methodology is applied in real life. Alongside, I had the experience of using different technologies and understand the working principles of these technologies in real life situations.

Second, understanding workflows, client communication and project management methodologies were an integral part of professional skill development, an area which I believe is crucial for career success. These experiences showed me that knowing the technical aspects of the project is not all that establishes a good project. Rather skills like effective communication, collaboration and the ability to manage the project are necessary in achieving a project's objectives.

Third, through this internship I also got to learn the proper networking techniques, and how to carry out professional communication effectively through my seniors and peers. I believe these things are a gateway for resources and career development for the future. I hope to maintain these connections, which might provide fruitful support and guidance which I intend to use towards my professional growth in software development sector.

7.2 Final Reflection

This internship has transformed my understanding of professional software development from theoretical concepts to practical application, providing insights into how technology solutions are developed, deployed, and maintained in real-world environments. The experience of contributing to projects that create tangible social impact, particularly for tribal communities in Bangladesh, has reinforced my commitment to using technology as a force for positive change and demonstrated that meaningful work is possible in the technology sector. The skills acquired, relationships built, and experiences gained during these six months have established a strong foundation for my career in software development while providing the confidence and competence

needed to tackle complex technical challenges. More importantly, the internship has demonstrated that meaningful technology solutions emerge from understanding user needs, collaborative development processes, and commitment to continuous learning and improvement. I hope to contribute more to creating a social impact through these skills that I have learned, and I look forward to utilizing my skills as much as possible for the betterment of the people of my country.

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