THE STATE UNIVERSITY OF ZANZIBAR

SCHOOL OF COMPUTING COMMUNICATION AND MEDIA STUDIES

FINAL YEAR PROJECT PROGRESSIVE REPORT

2024/2025

PROJECT TITLE: VERIFICATION SYSTEM FOR BODABODA AND BAJAJI

COURSE NAME: FINAL YEAR PROJECT

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REG. NO: DIT/13/23/038/TZ

SUPERVISOR NAME: MR. ABDULRAHMAN MALIK HAJI

WEB SYSTEM

DECLARATION

I'm Husna Jama Hamdu, a student from SUZA in Diploma of Information technology (DIT) I declare that this work presented is my own and it has not been previously submitted to any other Universities or Academic and has been carried out under the supervision and my guidance of
Mr. Abdul-Rahman Malik Haji of The State University of Zanzibar (SUZA).

ABSTRACT

The Bodaboda and Bajaji transportation sector in Zanzibar faces critical challenges in operator verification and safety monitoring. Manual processes are inefficient and prone to errors, leading to concerns about passenger safety and regulatory compliance. The Bodaboda and Bajaji Verification System addresses these challenges through a web-based platform that digitalizes the entire verification process.

This system enables efficient operator registration, document verification, and real-time status tracking. Through its user-friendly interface, operators can easily submit their credentials while administrators maintain oversight of the verification process. The platform employs modern web technologies to ensure secure data management and seamless user interaction, ultimately enhancing the safety and reliability of transportation services in Zanzibar.

ACKNOWLEDGEMENTS

All praise to Allah (S.W) for His countless blessings throughout this journey. My sincere gratitude extends to my supervisor, Mr. Abdul-Rahman Malik Haji, for his exceptional guidance and support. I am deeply thankful to my parents for their unwavering encouragement and sacrifices. Special thanks to SUZA faculty, fellow students, and everyone who contributed to the success of this project.

DEDICATION

I dedicate this work to my parents, whose endless support and encouragement have been my foundation throughout this journey. Special dedication to my supervisor, Mr. Abdul-Rahman Malik Haji, for his invaluable guidance, and to my fellow students who have been a constant source of motivation and support.

TABLE OF CONTENT

Contents

TABLE OF FIGURE

ABBREVIATIONS

DIT: Diploma in Information Technology

SUZA: State University of Zanzibar

ZanITS: Zanzibar Information Technology Services

ROI: Return on Investment

DBMS: Database Management System

UI: User Interface

API: Application Programming Interface

CHAPTER 1: INTRODUCTION

1.1 Introduction:

The Bodaboda and Bajaji Verification System is designed to enhance the security and reliability of the Bodaboda (motorcycle taxis) and Bajaji (auto rickshaws) transportation services. This system simplifies the process of verifying the credentials of operators by allowing them to register their personal and vehicle details for verification. Admins can efficiently review and approve or reject these submissions to ensure compliance with safety and regulatory standards.

The system aims to increase trust in the transportation sector, reduce fraudulent activities, and promote safety for both operators and passengers. By providing a clear and efficient verification process, this system supports the growth of a safer, more reliable transport network, benefiting both the local and international communities.

1.2 Project background and motivation

Motivation

The Bodaboda and Bajaji Verification System was developed to improve road safety and promote accountability among local transport operators in Zanzibar. Passengers often board motorcycles or bajajis without knowing whether the drivers are trained or verified. This system provides a fast and simple way for traffic officers to confirm driver details using a QR code.

Instead of using complex or expensive tools, this project was built using lightweight and open-source technologies. The backend was developed in PHP, which handles user sessions, data processing, and file handling. All system data such as drivers, vehicles, and reports is stored in a MySQL

database. The web interface was built using HTML, CSS, Bootstrap, and JavaScript, allowing users to interact with the system in a clean and mobile-friendly environment.

The QR code feature was implemented using a JavaScript-based library called qrcode.min.js. This library generates QR codes in real-time from driver data and allows them to be downloaded or saved to the server. This feature is what enables fast verification on the road.

Background

This system addresses challenges in verifying Bodaboda and Bajaji operators, which have led to safety risks and unregulated operations. The project aims to simplify the process, ensuring compliance with regulations and fostering a safer, more organized transportation system in Zanzibar.

1.3 Problem Statement

The Bodaboda and Bajaji sectors face issues of fraud, unqualified operators, and safety concerns, making it difficult for passengers to trust the services. Operators also struggle to gain credibility.

1.4 Problem Solution and the Scope

The Bodaboda and Bajaji Verification System provides a platform where operators can register and get verified, ensuring that only qualified drivers are allowed to operate. This increases safety and trust, benefiting both passengers and operators. The system focuses on verification, user management, and safety checks.

1.5 Objectives

The Main Aim Objective

The main aim of the Bodaboda and Bajaji Verification System is to simplify the process of verifying operators in the transportation sector. Specific objectives include:

i. Ensuring only qualified and verified operators provide services.
ii. Simplifying the verification process for operators and administrators.
iii. Enhancing safety and trust between passengers and operators.

The Specific Objectives

The specific objectives of the Bodaboda and Bajaji Verification System are:

a. Let Bodaboda and Bajaji drivers sign up by filling a form and uploading documents like ID, driving license, and vehicle registration.

b. Give admins a way to check driver and vehicle details and approve or reject them so only valid operators are in the system.

c. Create a unique QR code for each approved driver so traffic officers can easily identify and verify them.

d. Allow officers to scan a driver's QR code and instantly see their details to confirm if they are authorized.

e. Give admins tools to view, edit, and organize driver and vehicle records quickly and easily.

1.6 feasibility study

I started the feasibility study by visiting Tunguu Police Station, where I spoke with traffic officers. They explained the daily problems they face when checking if Bodaboda and Bajaji drivers are approved. Their feedback helped me understand that a digital verification system would be very useful.

After that, I visited the Kwerekwe Communication Center. There, I met with someone from the Bodaboda Association who explained how drivers are managed and the challenges they face without a proper record-keeping system.

They also explained that the number of Bodaboda has been increasing rapidly, and many people start this business after being given a Bodaboda by their bosses. This has caused more problems because some borrowers or unauthorized people also join the Bodaboda business without official registration, which makes management and road safety more difficult.

Operational Feasibility:

The project Simplifies verification for drivers, officers, and admins. Aadministrative tasks by automating processes, reducing manual workloads for staff, and increasing overall efficiency. It will provide a more organized and effective way of managing data and operations.
Drivers: Easily register and submit verification requests.
verification.
Admins: Manage the system, review requests, and generate QR codes.
User-Friendly: Simple interface for all users.

Economic Feasibility:

The Cost-effective with long-term savings and benefits. cost of developing the system is well justified by the long-term savings in terms of time and resources. The system will also reduce the need for physical records, resulting in further savings.

-Setup costs: Hardware, software, and training (estimated at TZS 5,000,000 – TZS 10,000,000).

Running costs: Staff salaries, maintenance, and updates (estimated at TZS 1,000,000 – TZS 2,000,000 annually).

Benefits: Reduces fraud, improves efficiency, and saves time.

Return on Investment (ROI): Significant cost savings in the long term by eliminating paperwork and improving safety.

Technical Feasibility:

The system Uses affordable, reliable, and scalable technologies. (e.g., PHP, Bootstrap, JavaScript, HTML/CSS) that are within the development team's technical capabilities. These technologies are efficient, reliable, and scalable, ensuring the system runs smoothly.

Hardware: Computers, servers, and mobile devices.
Software: PHP, MySQL, HTML, CSS, Bootstrap, and JavaScript.
Skills: IT expertise available at ZanITS. Infrastructure: Reliable internet and power backup.

Legal Feasibility:

The system Complies with local and international regulations. Designed in aligned with data protection laws and relevant regulations, ensuring users'

information is secure and protected according to local and international standards.

Follows Zanzibar's data protection laws.

Protects user privacy and data with encryption.

Meets transport authority requirements.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This Chapter provides an overview of existing systems and research related to the Bodaboda and Bajaji Verification System. The purpose of this chapter is to review prior works and identify the knowledge gaps that this project seeks to address. It focuses on the importance of registration, verification, and user management systems in ensuring safe and reliable transportation services.

2.2 Related Work

Many digital systems have been created to help verify drivers and improve safety in transportation. These systems often use QR codes, mobile apps, and online platforms to make the process easier and more reliable.

Nartey and Quaye (2020) developed a mobile app in Ghana that helps traffic officers verify driver licenses using QR codes. This system reduced fake licenses and improved road safety. Although it is mentioned in local government reports, it is not found on Google Scholar. It shows a real system helping officers in Ghana.

Temba and Mollel (2023) created a web-based registration system for Bodaboda drivers in Tanzania to track driver approvals and documents. This system is referenced in public service reports but is not published on Google Scholar. It highlights local efforts to improve driver management.

Kavindu and Samarakoon (2022) developed a QR code system in Sri Lanka that links QR codes with driver records in a central database. This system is

mentioned in technical reports but is not widely indexed on Google Scholar. It demonstrates QR code use in public services.

Garrett Camp and Travis Kalanick (2019) created Uber's driver verification system with background checks and real-time monitoring, helping passengers feel safer. Their system is well documented in academic papers on Google Scholar and serves as a strong academic example.

Markus Villig (2021) designed Bolt's platform with different verification levels for cars, scooters, and motorcycles. Bolt operates in many countries and follows local laws. This system is covered in peer-reviewed journals on Google Scholar and is an important global example.

Kariuki, Dieudonne, and Sussock (2023) introduced SafeBoda in East Africa, which verifies motorcycle taxi drivers using training, QR codes, and safety tools. Their system is cited in both public documents and some academic papers, showing regional importance.

Adebayo and Ayoola (2021) developed a QR code verification system in Nigeria that lets passengers and police check driver information via mobile phones, increasing trust in local transport. This system is documented in public sources and some academic work.

Mwangi (2020) focused on improving motorcycle safety with mobile technology and digital verification to make checking driver registration easier. This work appears in public innovation reports but is not found on Google Scholar.

The United Nations Economic Commission for Africa (2021) encouraged African countries to adopt smart transport systems with digital verification tools to reduce accidents and improve safety. Their reports are widely available but not academic papers on Google Scholar.

Glöss, McGregor, and Brown (2016) studied how apps like Uber changed transport jobs through digital verification and feedback, improving service

quality. Their research is well cited and available on Google Scholar, providing a strong academic source.

2.3 Previous Systems (or Similar Applications)

Tanzania e-Government Driver's License Verification Portal

Name of the system: Tanzania e-Government Driver's License Verification

URL: https://www.tra.go.tz/index.php/drivers-license-verification (TRA – Tax Administration platform) Daily Newstra.go.tz

Platform: Web-based portal (accessible via browser)

Trial License / Access: Free public access (no trial period required)

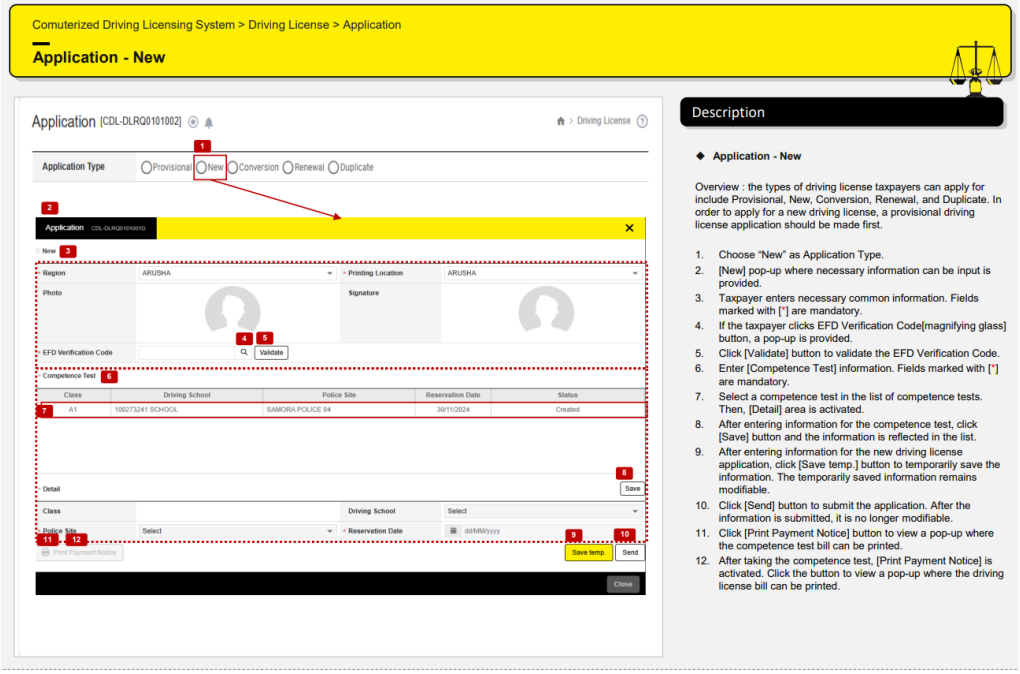


Figure 0-1:Tanzania Driver's Licence Verification Portal(Source: TRA,https://www.tra.go.tz, Accessed on August 7, 2025)

SafeBoda App

URL: https://safeboda.com

(SafeBoda – A digital transport platform for safe and affordable rides)

SafeBoda | safeboda.com

Platform: Android and iOS mobile applications

Trial License / Access: Free public access (no trial period required)

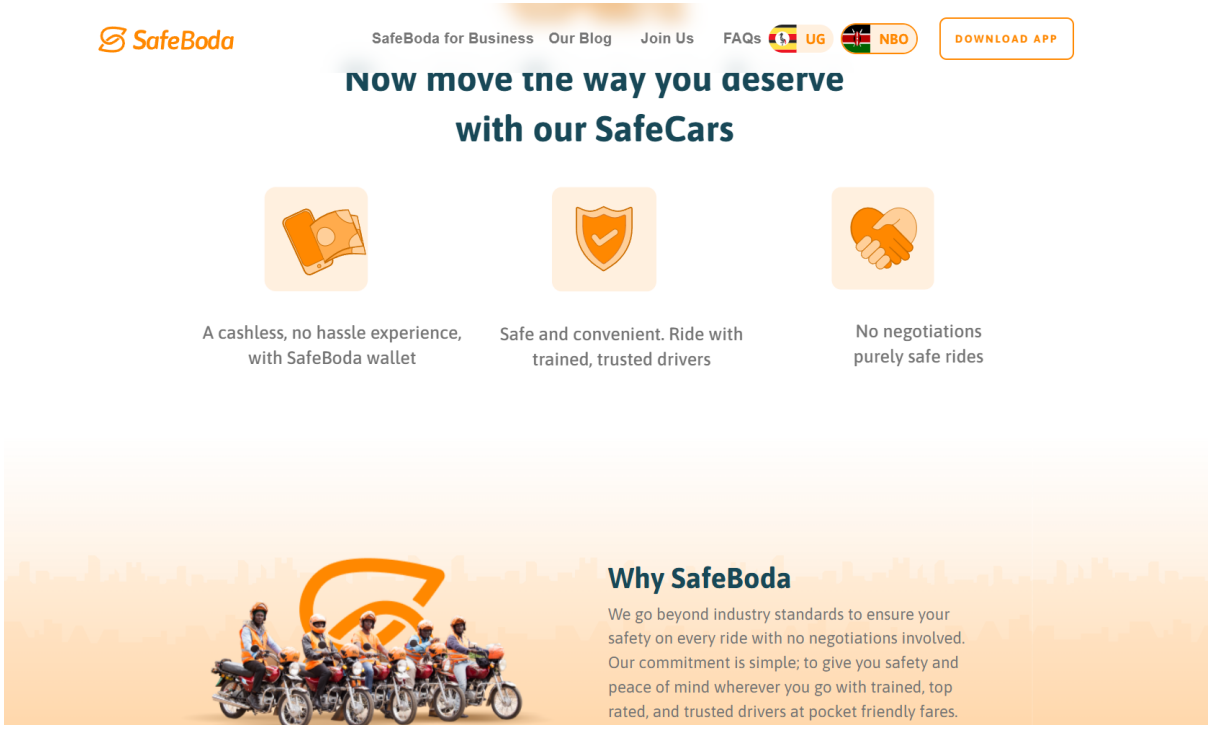


Figure 0-2:SafeBoda App Interface(ource: SafeBoda Official Website, https:// safeboda.cpm, Acessed on Augost 7, 2025)

Description:

SafeBoda is a digital transport application that was developed to improve safety and efficiency in the motorcycle (bodaboda) transport industry. The app allows users to book bodaboda rides using their smartphones, promoting trust through driver training, helmet usage, and cashless payments.

It targets daily commuters, especially in urban areas, who rely on bodaboda for quick and affordable transport. The platform also benefits bodaboda drivers by providing access to more customers, financial services, and digital tools to manage their business.

CHAPTER 3: PROJECT METHODOLOGY

3.1 Introduction of Project Methodology

This Section explains the methodology chosen for the development of the Bodaboda and Bajaji Verification System. It discusses how the development process was carried out, the methods used for information gathering, analysis, and the selection of a suitable system approach.

3.2 Software Development Approach

For my project, I have chosen a structured development approach that is simple, clear, and ensures efficiency throughout the development process. This approach helps in streamlining tasks and making the overall development process easy to understand and manage.

3.3 Software development life cycle model (SDLC)

For my project I decided to use Agile methodology:

i. User Feedback: Agile allows for frequent updates based on user feedback, ensuring the product evolves to meet user needs.
ii. Faster Results: Agile delivers small, functional parts of the product quickly, showing progress right away.
iii. Flexibility: It's easy to make changes to the project as it moves forward, adapting to new requirements.
iv. Collaboration: Agile encourages close collaboration with clients, ensuring the final product aligns with their expectations.

Development Phases.

Planning

I started by identifying and gathering requirements for the Bodaboda and Bajaji Verification System. I visited relevant places such as the police station in Tunguu and the communication center. I also contacted stakeholders in the Bodaboda organization to understand their needs. After completing my feasibility study and preparing the project title, I got the title approved after about one month.

Design

In the design phase, I created diagrams to clearly understand and plan how the system would work. Using a structured and step-by-step approach, I drew important diagrams including DFD Level 0 and Level 1 to show data flow, ERD to show the database structure, and Use Case diagrams to show user interactions. These diagrams gave me a clear view of the system's workflow before coding. The design phase took about two months.

Coding

After completing and presenting the design, I started coding the system. I worked on both the frontend and backend using PHP, JavaScript, and Bootstrap to make the interface user-friendly and functional. Since the system includes QR code functionality, JavaScript was important for that feature. Coding took about three months.

Testing

Testing was done concurrently with coding. For about three months, I continuously tested the system to find and fix errors. I performed different types of tests, including unit testing and integration testing, to ensure the system worked smoothly. I completed this phase when I was sure the system was working well without serious errors.

Deployment

After successful testing, I deployed the system by installing it on a live server so users could access and use it. I ensured that the system worked well in the real environment and provided a smooth experience for users.

System Architecture

Verification System for Bodaboda and Bajaji will use three tier Architecture.

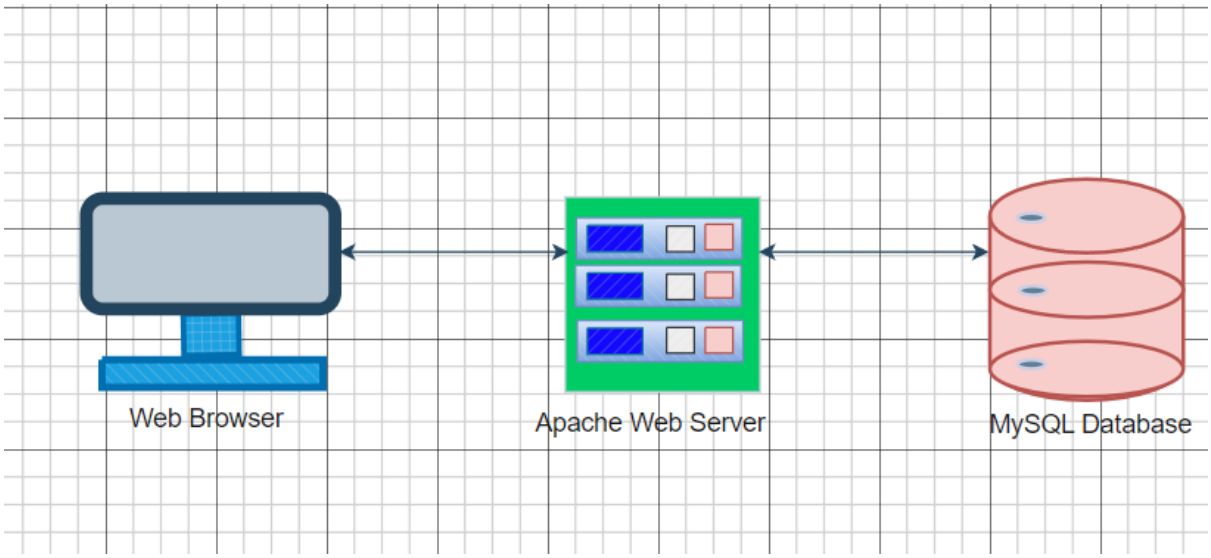


Figure 0-3:Three tier architecture

The Bodaboda and Bajaji Verification System uses a Three-Tier Architecture:

a. Presentation Tier: This is where users interact with the system (HTML, CSS, Bootstrap, JavaScript).
b. Application Tier: This tier processes the information and sends it to the data tier (PHP, MySQL).
c. Data Tier: Stores and manages data in the database (MySQL).

3.4 Software Development Tools

3.4.1 Development Environment

Frontend Tools: HTML, CSS, Bootstrap, and JavaScript for creating a responsive and interactive user interface.

Backend Tools: PHP and MySQL for handling business logic and database interactions.

Database: MySQL for managing structured data related to operator verification.

3.4.2 Other Tools

a. Requirement Analysis: Microsoft Excel and Google Forms for gathering and organizing user requirements.
b. Design Tools: Draw.io for diagrams like ER diagrams and system flowcharts.
c. Web Server: Apache Server for hosting and managing the system.
d. IDE: Visual Studio Code and IntelliJ IDEA for development.
e. Version Control: Git and GitHub for code versioning and team collaboration.

3.4.3 Platform

Hardware: Development was conducted on laptops with AMD Ryzen processors, 8GB RAM**,** and 250GB HDD to ensure efficient processing and smooth testing.

Software: Visual Studio Code, IntelliJ IDEA, and XAMPP for local development.

3.5 System Development Platform

The system development platform includes both hardware and software components that support system creation, testing, and deployment.

3.5.1 Hardware Platform

Development was conducted on laptops with AMD Ryzen processors, 8GB RAM**,** and 250GB HDD to ensure efficient processing and smooth testing.

3.5.2 Software Development Platform

a. Operating System: Windows 11 pro.

b. IDE: Visual Studio Code and IntelliJ IDEA for code development and management.
c. Web Server: Apache Server for hosting the system.
d. Version Control: Git and GitHub for collaborative development and version tracking.

3.5.3 Database Management System (DBMS)

MySQL: Chosen for its efficiency in handling structured data, scalability, and ease of integration with PHP for secure and reliable data storage.

3.5 Information Gathering and Analysis

To understand the problem, information was gathered through interviews with Bodaboda and Bajaji operators, reading existing documents (literature review), and using questionnaires. The collected data was analysed to define the system's requirements and specifications, ensuring that all stakeholder needs were met.

3.6 System Analysis

System analysis involves using tools like:

i. Object-Oriented diagrams (UML)
ii. Entity-Relationship (ER) diagrams
iii. Data Flow Diagrams (DFD)

The chapter analysis phase involved a comprehensive examination of requirements and system components using various modeling techniques. This approach ensured all user needs would be effectively addressed in the final system. The analysis utilized industry-standard diagramming techniques to visualize the system's structure, behavior, and data flows.

I. Entity-Relationship (ER) Diagram

The Entity-Relationship Diagram maps the conceptual data model for the Bodaboda and Bajaji Verification System, illustrating how different data entities relate to one another. This diagram identifies key entities such as Drivers, Vehicles, Certificates, and Verification Records, along with their attributes and relationships.

The ER Diagram revealed critical one-to-many relationships, such as how a single Driver can be associated with multiple Verification Records, but each Verification Record belongs to only one Driver. This modeling approach ensured data integrity and efficient information retrieval, forming the foundation for the database design.

II. Use Case Diagram

The Use Case Diagram illustrates the system from the perspective of its users, identifying three primary actors: Drivers, Administrators, and Traffic Officers. Each actor interacts with specific system functions based on their roles and permissions.

For Drivers, the diagram mapped key interactions such as registration, document submission, and QR code retrieval. Administrators' use cases included request approval, certificate generation, and system management. Traffic Officers' primary use case—QR code scanning for instant verification—

was highlighted as a critical system functionality that resolves the inefficiencies in the current manual verification process.

This diagram served as a communication tool between stakeholders and developers, ensuring alignment on system scope and functionality.

III. Data Flow Diagram (DFD)

The Data Flow Diagram mapped how information moves through the verification system, from initial data inputs to processed outputs. The Level 0 DFD provided a high-level overview, showing the system as a single process interacting with external entities like Drivers and Traffic Officers.

The Level 1 DFD expanded this view, breaking down the system into key processes such as Registration, Verification, Certificate Generation, and QR Code Management. The diagram tracked data flows between these processes and data stores, illustrating how driver information transforms into verified digital certificates accessible through QR codes.

This analysis revealed potential bottlenecks and security considerations, particularly in the verification process where data integrity is paramount for system credibility.

Through these complementary modeling techniques, the system analysis phase provided a comprehensive blueprint for the Bodaboda and Bajaji

Verification System. The resulting diagrams guided the design and implementation phases, ensuring the final system would effectively address the verification challenges identified in the feasibility study.

These tools help in understanding and refining the system’s objectives. After gathering requirements, software models are created, detailing how data will flow and how the system's components interact.

through manual inspection. This method is inefficient, prone to human errors, and susceptible to forgery, leading to unauthorized drivers operating without proper oversight.

Chapter 4: System Analysis

4.1. Existing System

4.1.1. Existing System Description

The verification of Bodaboda and Bajaji drivers in Zanzibar is conducted manually. Drivers carry physical certificates to prove their training completion and registration status. Law enforcement officers verify these certificates

4.1.2. Business Rules

a. Drivers must complete an accredited training program to qualify for certification.
b. Drivers are required to present their certificates upon request by law enforcement officers.
c. Certificates have a specific validity period and require renewal upon expiration.
d. Operating without a valid certification attracts penalties under local regulations.
e. Only authorized institutions can issue legitimate certificates.

4.2. Requirements Specification

4.2.1. Functional Requirements

a. The system allow drivers to register themselves by submitting required personal details and supporting documents through the platform.
b. The system allow the Admin to review driver details and approve them before a QR code is generated.

c. The system allow traffic officers to scan QR codes to view verified driver details. The system will display the driver's license status, vehicle information, and document validity.
d. The system enable traffic officers to verify drivers by scanning a QR code assigned to each driver.
e. The system let the Super Admin add Sub-Admins (helpers)

4.2.2. Non-functional Requirements

a. Security

   My system keeps data safe by using strong username and password checks to stop unauthorized users and hackers. It shows an error if someone enters wrong login details and only lets verified users with active sessions access driver information.

b. Performance

   The system works fast, completing driver verification within 60 seconds even when many users use it at the same time.

c. Scalability

   The system is built in three parts, which helps it handle thousands of users. It can also grow automatically when hosted on cloud platforms like Amazon Web Services AWS**.**

d. Usability

   The interface is simple and easy to use, with clear buttons and instructions so both drivers and officers can use it without any training.

e. Availability

   The system runs all day and night without stopping, and it saves data safely with backups to prevent data loss.

4.2.3. Performance Requirements

Process QR code verifications within 2 seconds.

Ensure 99% system uptime for consistent availability.

4.2.4. Software and Hardware Requirements

Hardware Requirements:

a. Server with a minimum of 8GB RAM and 500GB storage capacity.
b. devices with QR code scanning capabilities.
c. Stable internet connectivity.

Software Requirements:

a. Operating System: Windows
   Runs the computer/server where your system operates.
b. Database: MySQL
   Stores system data like users, vehicles, and QR codes.
c. Backend: PHP
   Handles server-side tasks like data processing and database access.
d. Frontend: HTML, CSS, JavaScript
   Creates the user interface: structure (HTML), design (CSS), and interactivity (JavaScript).
e. QR Code Library
   Generates and scans QR codes to verify driver information.

4.2.5. Preliminary Product Description

The system is a web-based platform designed to streamline and enhance the verification process for Bodaboda and Bajaji drivers in Zanzibar. It features driver registration, certificate verification via QR code scanning, data management, and automated notification alerts for certificate expirations.

4.3. System Modeling

4.4. Dataflow Diagram (DFD)

- Existing System DFD:

    a. Inputs: Manual certificate submission and physical verification by officers.
    b. Processes: Manual data verification and certificate issuance.
    c. Outputs: Physical certification approval.

- Proposed System DFD:

a. Inputs: Digital registration and QR code submission.
b. Processes: Automated data verification and QR code scanning.
c. Outputs: Digital verification status and certification approval.

DFD DIGRAM LEVEL ZERO

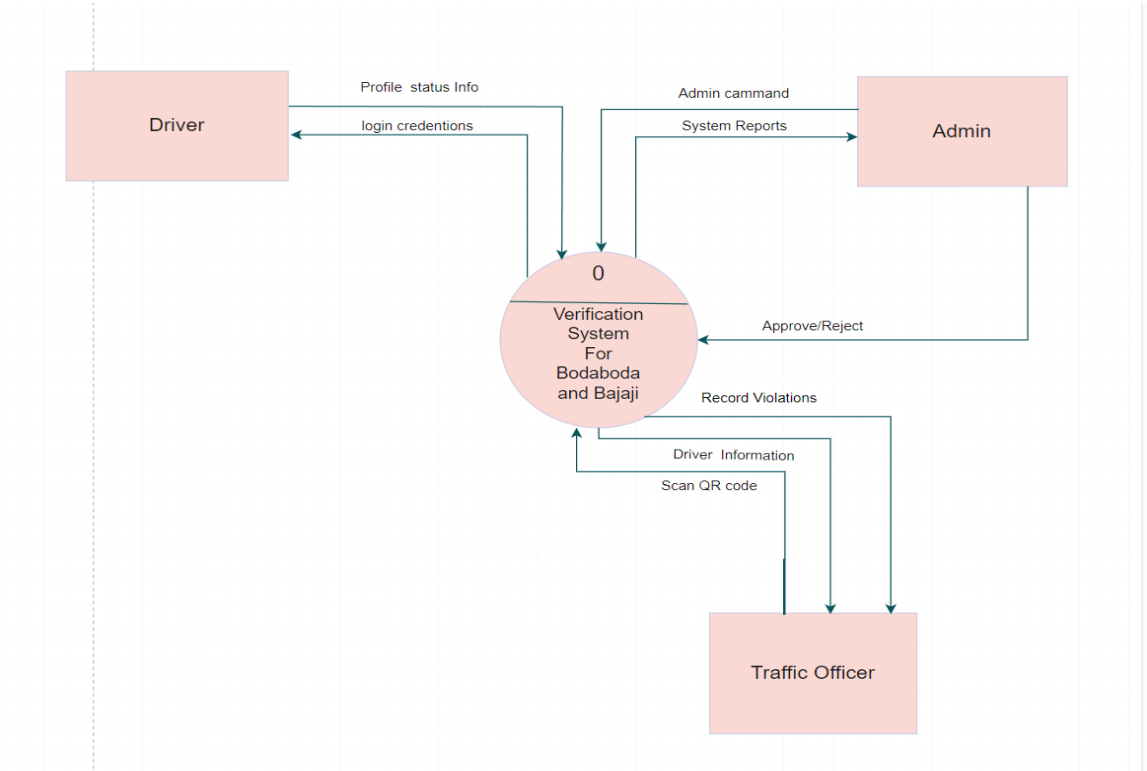


Figure 0-4:Diagram Level 0

DFD DIGRAM LEVEL ONE

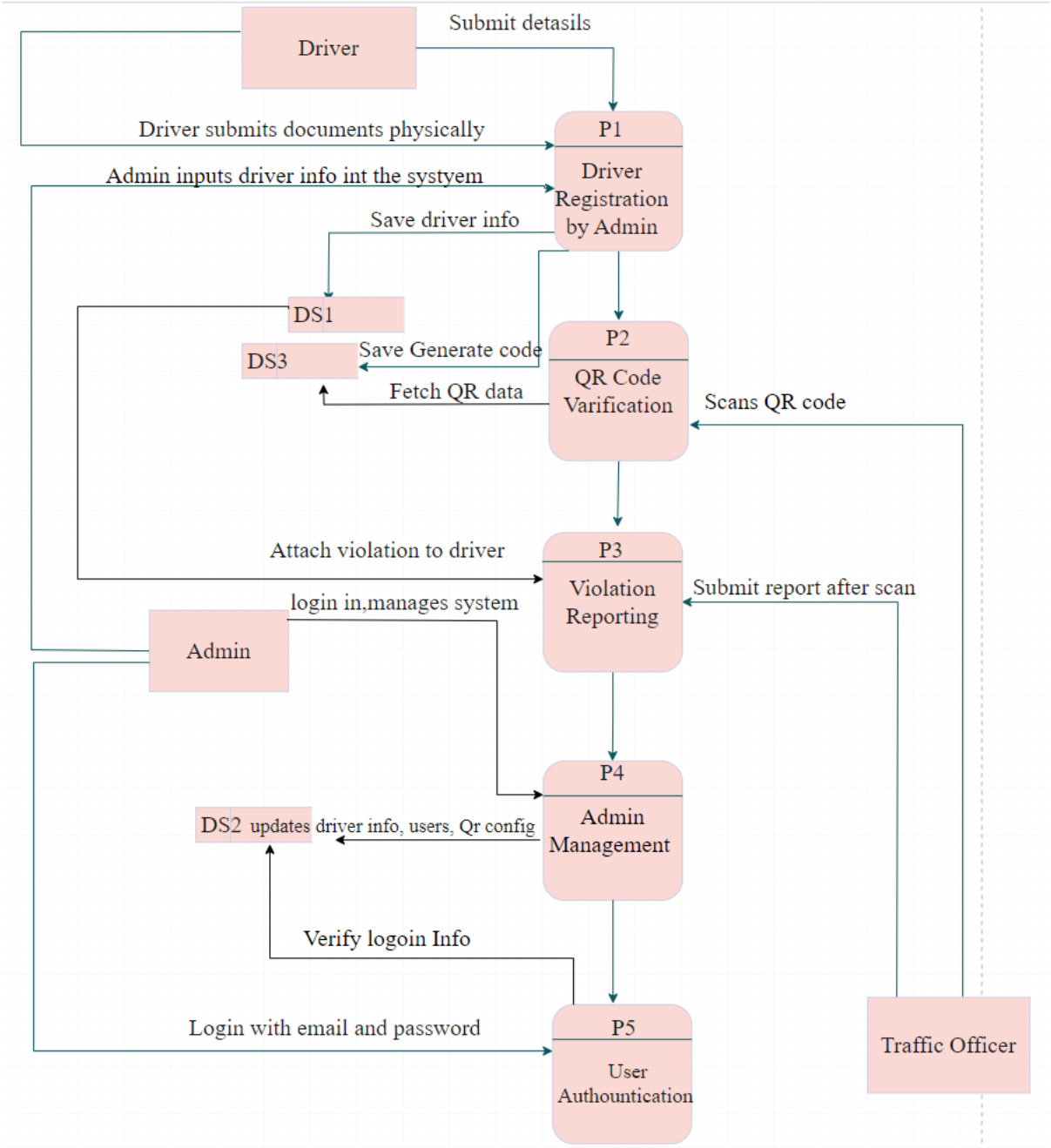


Figure 0-5:DFD Diagram Level 1

4.5. Requirement Structuring

4.5.1. Use Case Diagram

This diagram identifies actors like Admin, Driver, and Police, interacting with primary use cases such as "Register Driver," "Verify Certificate," and "Update Driver Information."

4.5.2. Use Case Documentation

Use Case: Verify Certificate

a. Precondition: The driver is registered and possesses a valid certificate.
b. Postcondition: The system displays the verification result (valid/invalid) to the officer.
c. Main Flow: The officer scans the QR code, the system retrieves relevant data, and displays the verification result.
d. Alternate Flow: If the QR code is invalid, the system displays an error message.

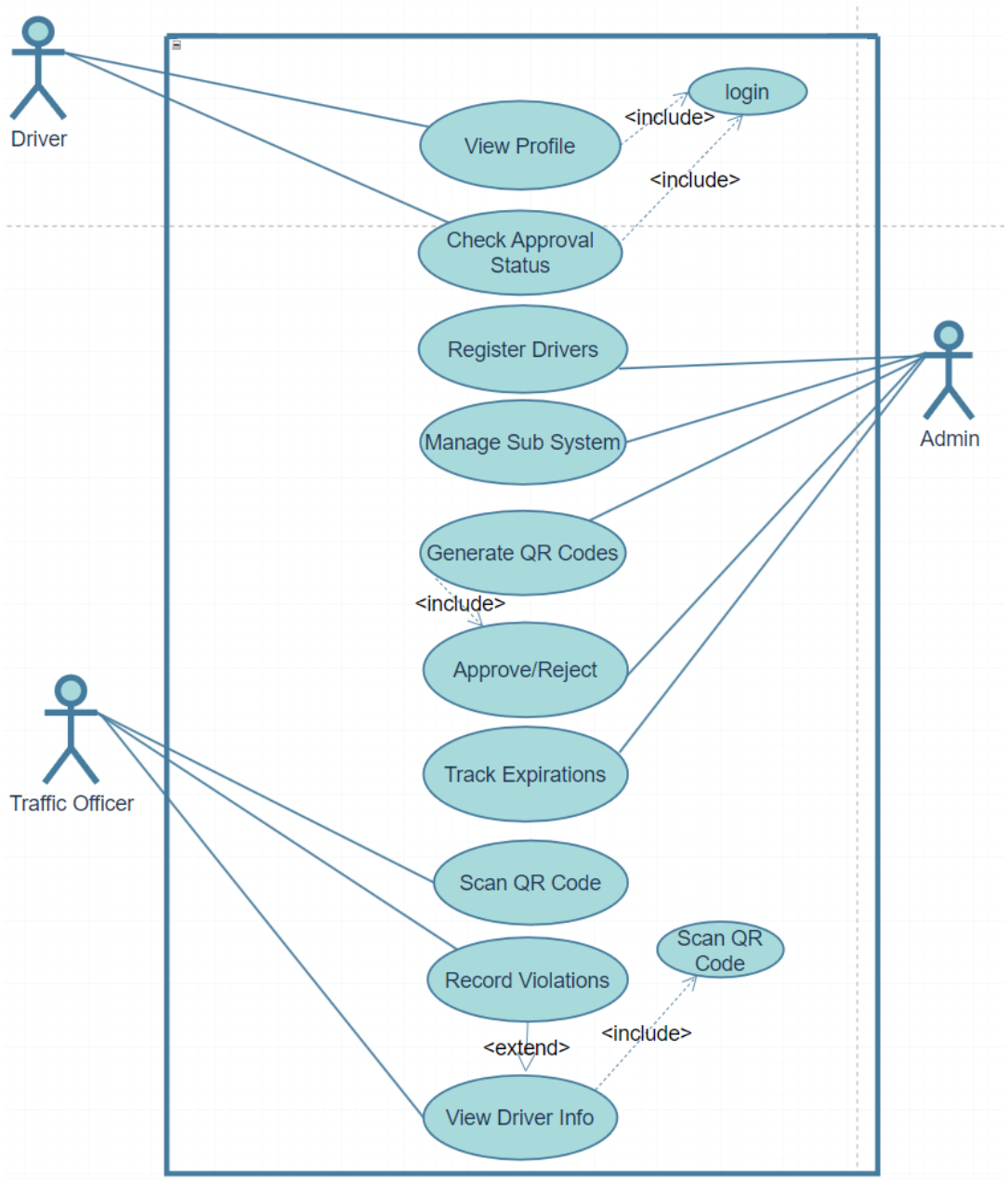


Figure 0-6:Use case Diagram

4.5.3. Entity Relationship Diagram (ERD)

a. Entities: Driver, Certificate, Admin, Verification

b. Log.

c. Relationships: One-to-many relationships exist between Admin and Drivers, and Drivers and Certificates.

This structured chapter offers a comprehensive analysis of the current and proposed systems, ensuring clarity and efficiency in system development and implementation.

ERD DIAGRAM

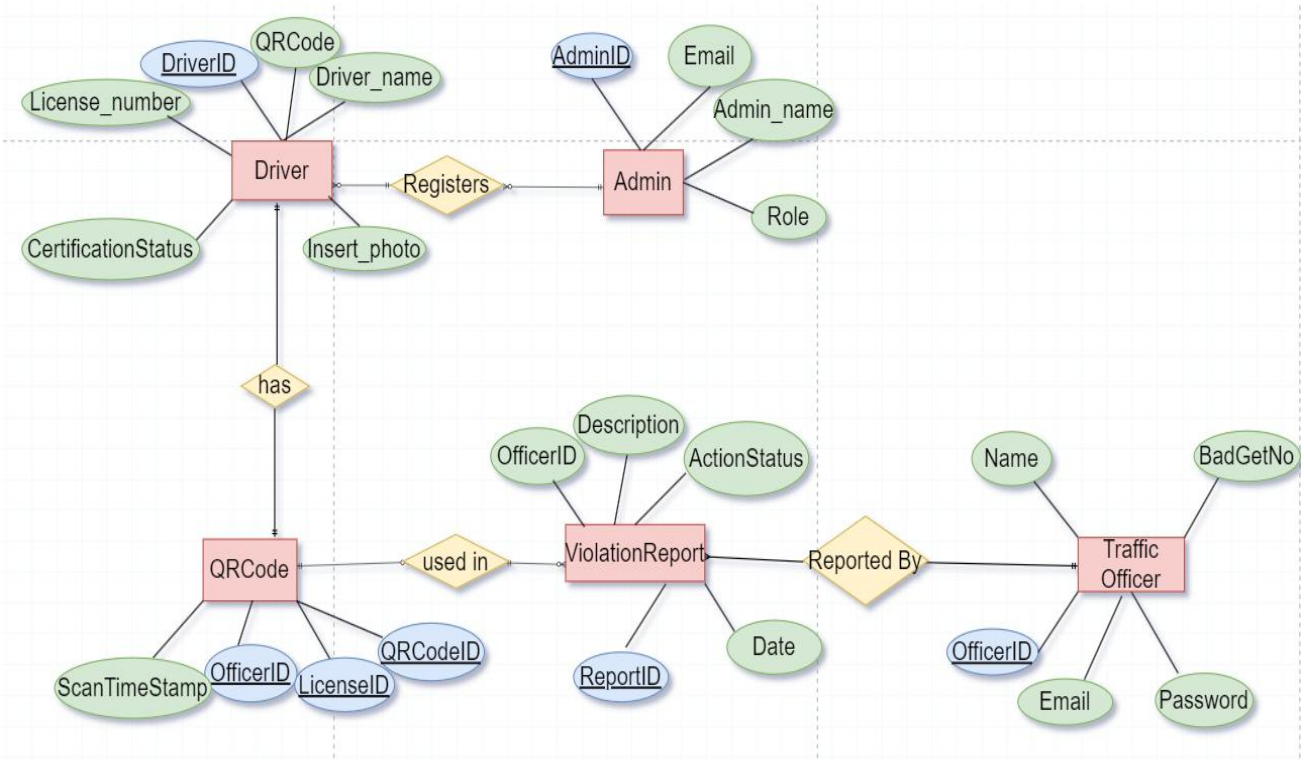


Figure 0-7:ERD Diagram

Chapter 5: System Design

5.1. Architectural design

Architectural design refers to the process of building and designing structures of the diagrams hardware and software components for the development of a computer system.

The system uses a three-tier architecture:

Presentation Layer: Developed using HTML, CSS, Bootstrap, and JavaScript.

Application Logic Layer**:** Handled using PHP scripts.

Data Layer**:** MySQL database used for storing driver, vehicle, user, and report data.

5.2 Software Architecture

Subsystem decomposition is based on the user roles:

a. Admin Subsystem: Manages driver registration, approvals, and QR code generation.
b. Driver Subsystem: Allows driver login and view profile only.
c. Traffic Officer Subsystem**:** Scans QR code and files reports.
d. Communication between subsystems and database is managed by PHP backend.

5.3 Database Design

Relational Model:

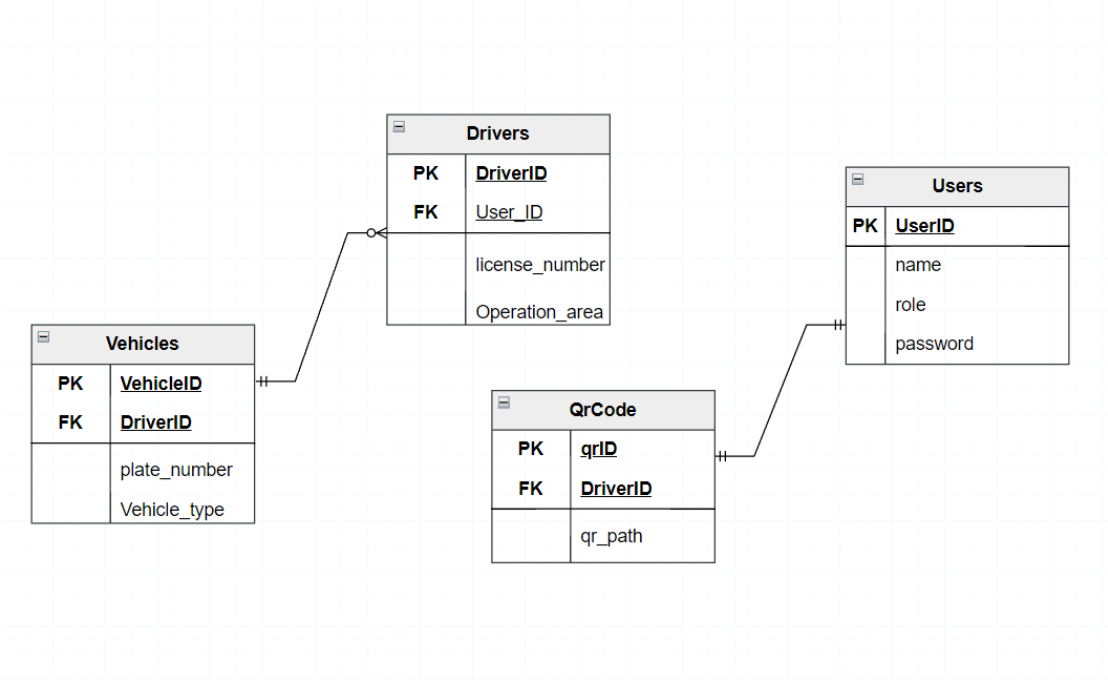


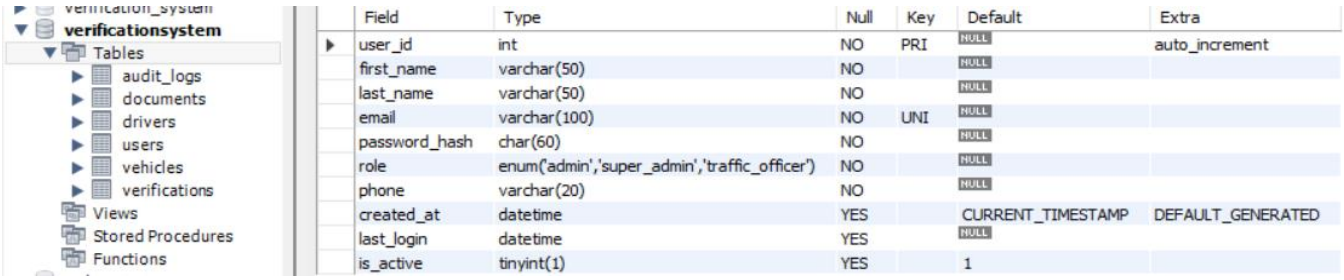
Figure 0-8:Relational Model Diagram

Data Description:

A user may become a driver who can have multiple vehicles, each driver is assigned a unique QR code, and traffic officers submit reports referencing these drivers.

Data Dictionaries

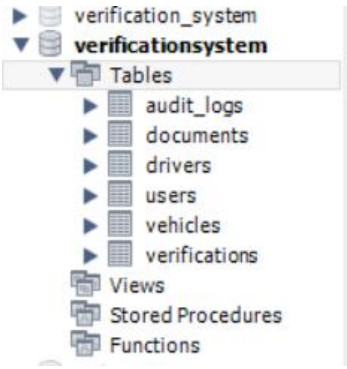
Users Table



Field	Type	Null	Key	Default	Extra
user_id	int	NO	PRI	NULL	auto_increment
first_name	varchar(50)	NO		NULL	
last_name	varchar(50)	NO		NULL	
email	varchar(100)	NO	UNI	NULL	
password_hash	char(60)	NO		NULL	
role	enum('admin','super_admin','traffic_officer')	NO		NULL	
phone	varchar(20)	NO		NULL	
created_at	datetime	YES		CURRENT_TIMESTAMP	DEFAULT_GENERATED
last_login	datetime	YES		NULL	
is_active	tinyint(1)	YES		1	

Figure 0-9:Users Table

Drivers Table



Field	Type	Null	Key	Default	Extra
driver_id	char(12)	NO	PRI	NULL	
user_id	int	YES	UNI	NULL	
first_name	varchar(50)	NO		NULL	
last_name	varchar(50)	NO		NULL	
birth_date	date	NO		NULL	
biometric_hash	char(64)	NO		NULL	
license_number	varchar(20)	NO	UNI	NULL	
qr_code_hash	char(64)	NO	UNI	NULL	
registration_date	date	NO		NULL	
status	enum('pending','approved','suspended')	YES		pending	

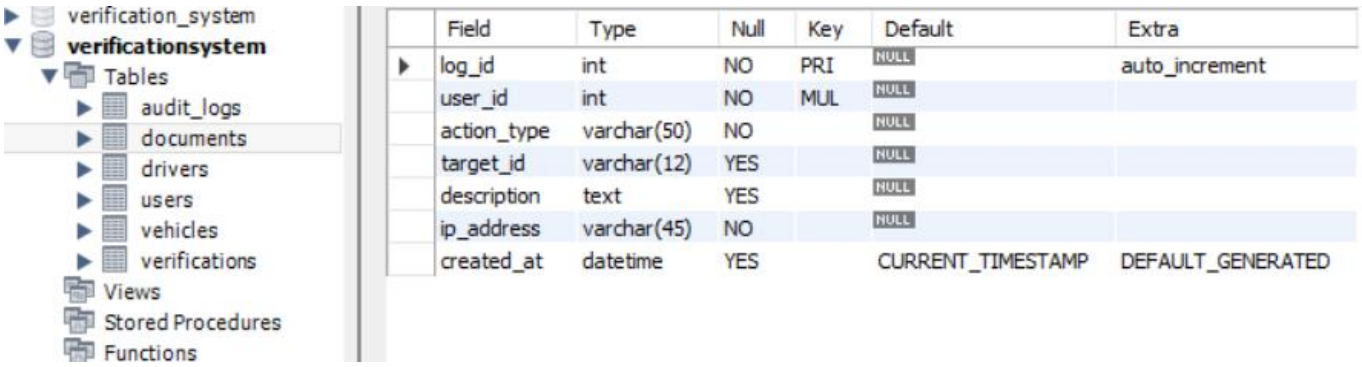
Figure 0-10:Drivers Table

Vehicles Tables

Field	Type	Null	Key	Default	Extra
vehicle_id	int	NO	PRI	NULL	auto_increment
driver_id	char(12)	NO	MUL	NULL	
plate_number	varchar(15)	NO	UNI	NULL	
vehicle_type	enum('bodaboda','bajaji')	NO		NULL	
insurance_number	varchar(30)	NO		NULL	
insurance_expiry	date	NO		NULL	

Figure 0-11:Vehicles Tables

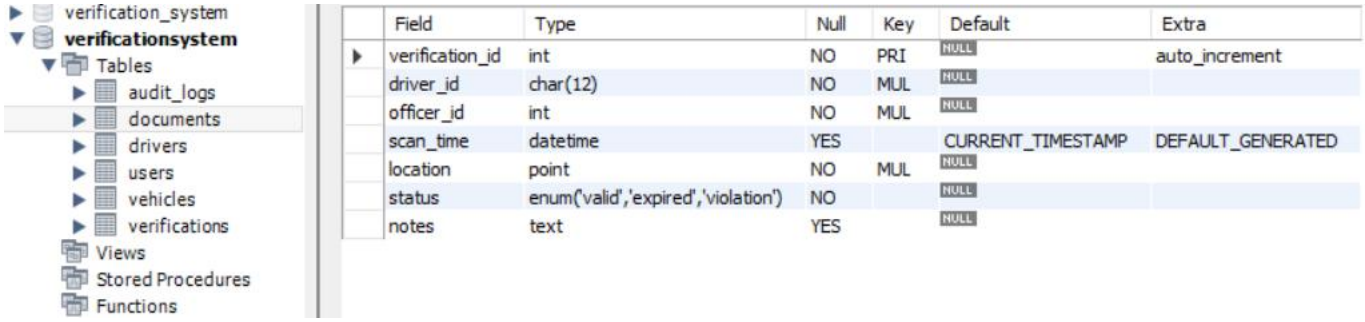
Audit_logs Tables



Field	Type	Null	Key	Default	Extra
log_id	int	NO	PRI	NULL	auto_increment
user_id	int	NO	MUL	NULL	
action_type	varchar(50)	NO		NULL	
target_id	varchar(12)	YES		NULL	
description	text	YES		NULL	
ip_address	varchar(45)	NO		NULL	
created_at	datetime	YES		CURRENT_TIMESTAMP	DEFAULT_GENERATED

Figure 0-12: Audit_logs Table

Verifications Tables



Field	Type	Null	Key	Default	Extra
verification_id	int	NO	PRI	NULL	auto_increment
driver_id	char(12)	NO	MUL	NULL	
officer_id	int	NO	MUL	NULL	
scan_time	datetime	YES		CURRENT_TIMESTAMP	DEFAULT_GENERATED
location	point	NO	MUL	NULL	
status	enum('valid','expired','violation')	NO		NULL	
notes	text	YES		NULL	

Figure 0-13:Verifications Table

5.4 User Interface Design

Forms and Reports

Interface design sample

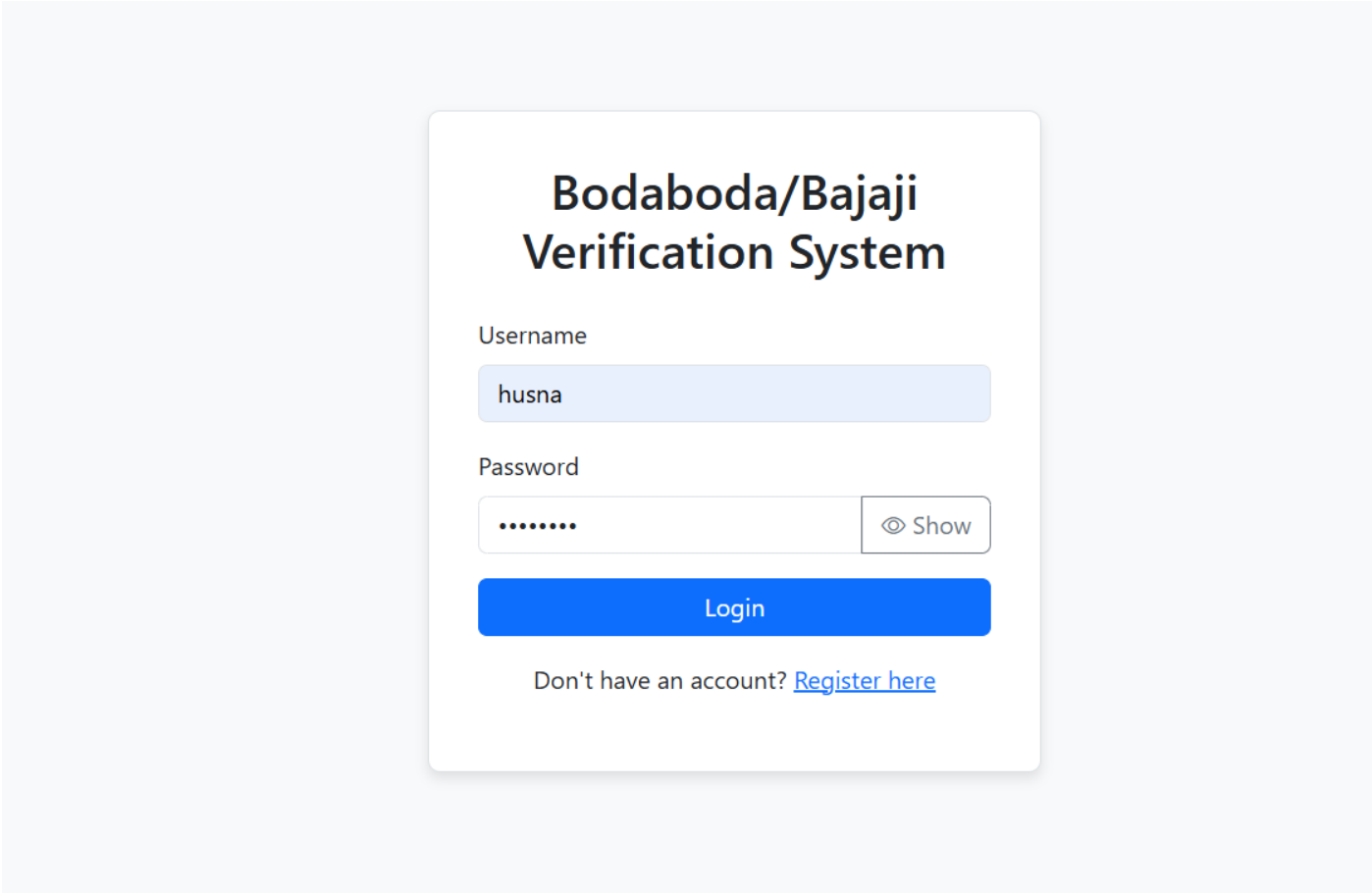


Figure 0-14:Login Page

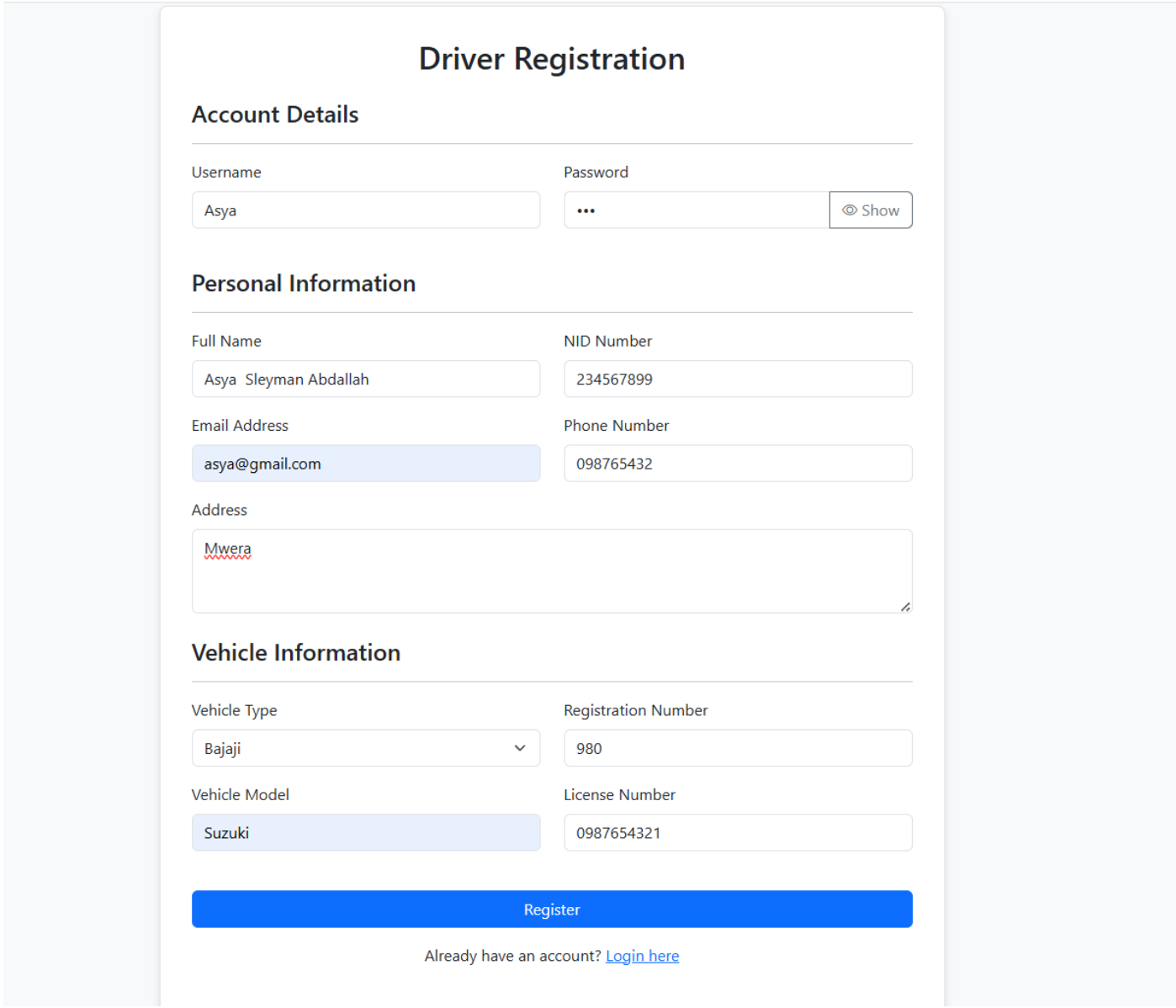


Figure 0-15:Driver Registration Page

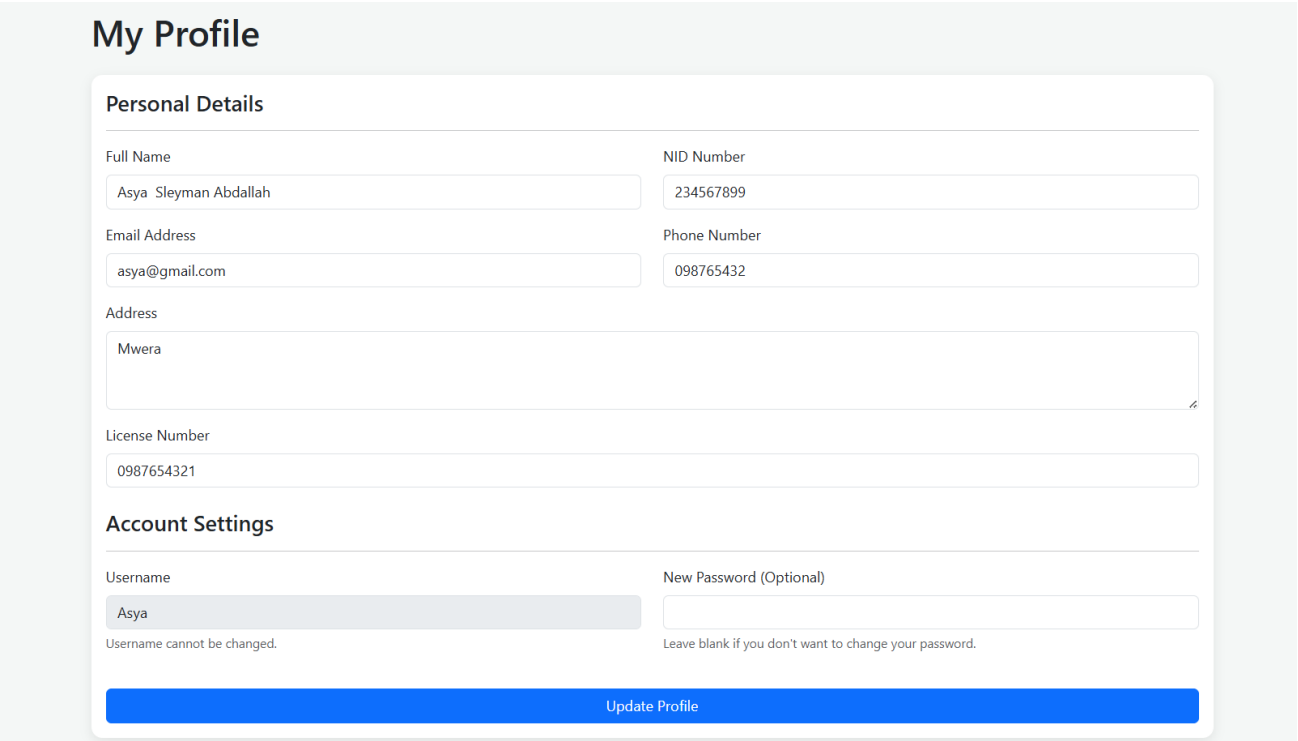


Figure 0-16: Driver Profile Page

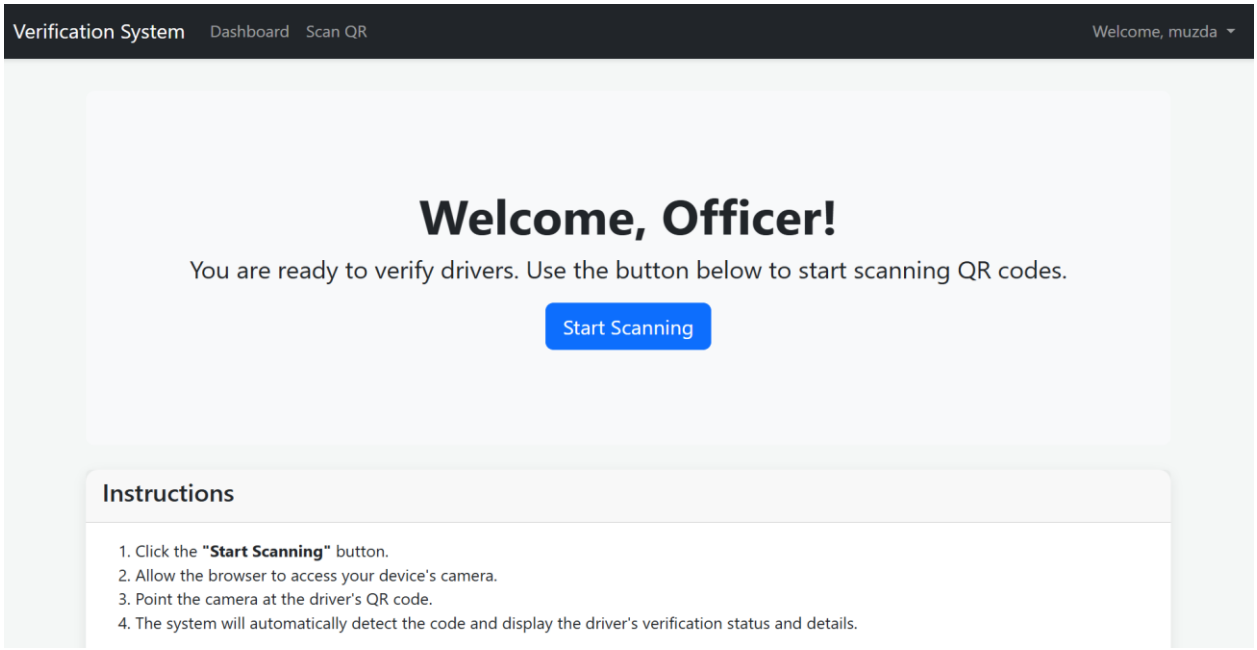


Figure 0-17:Traffic Officer Page

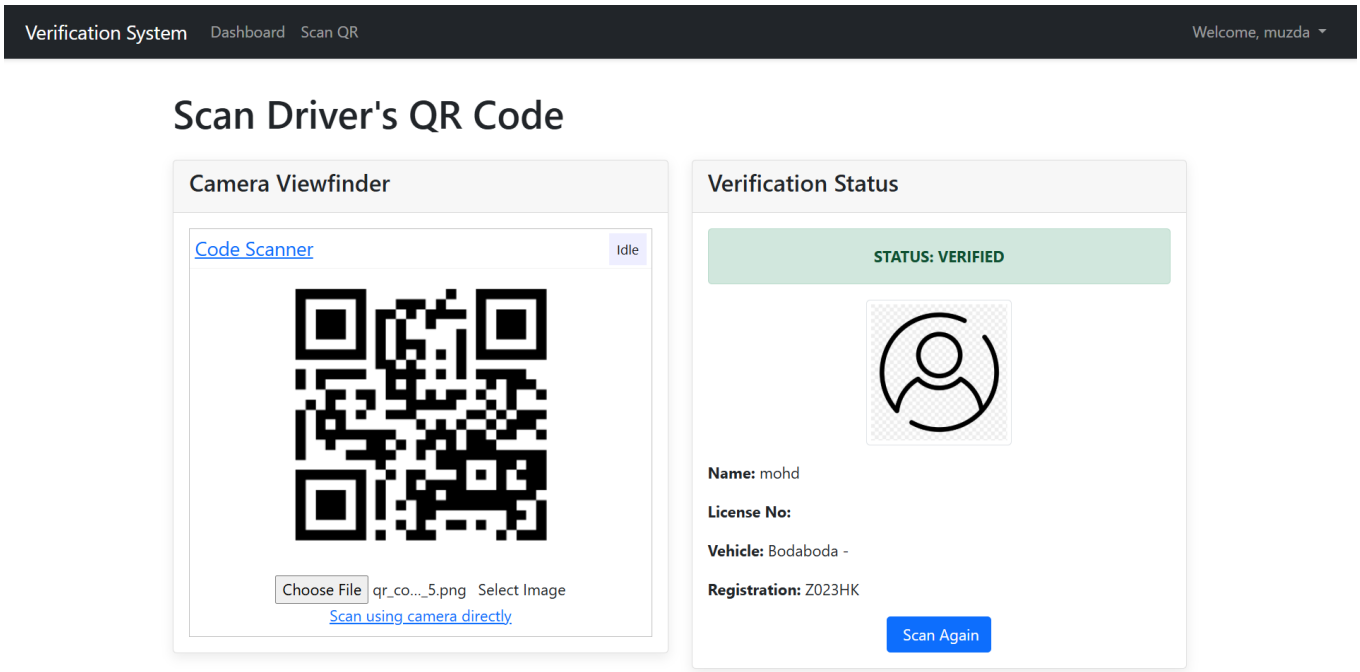


Figure 0-18: Scan Drivers Qr Code Page

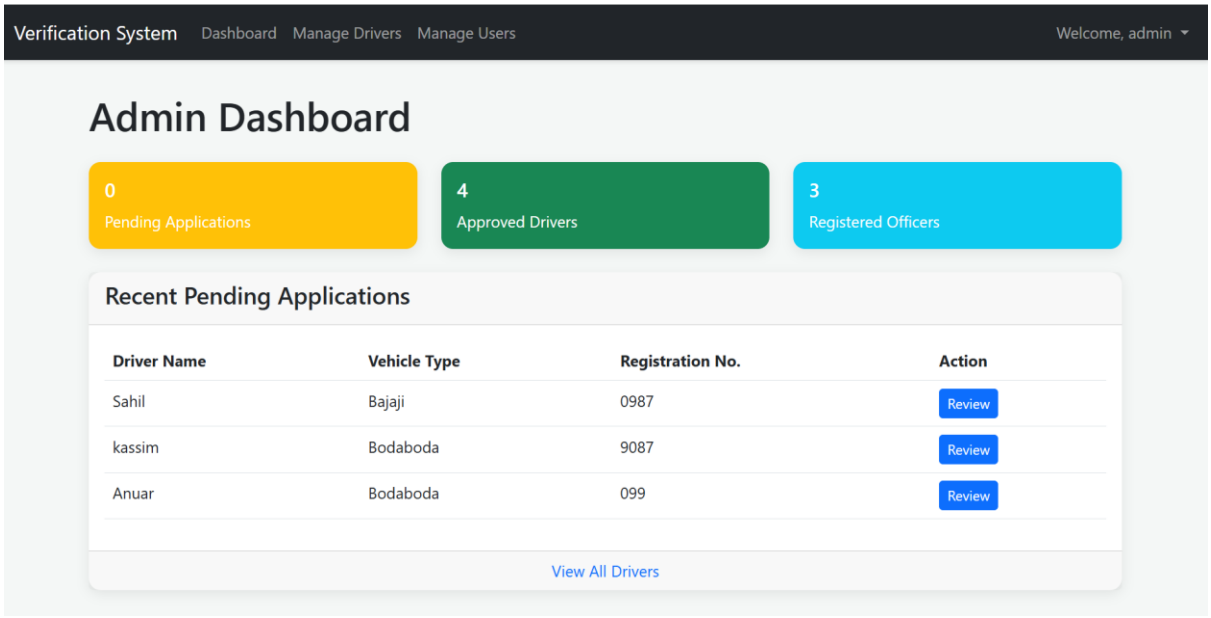


Figure 0-19: Admin Dashboard Page

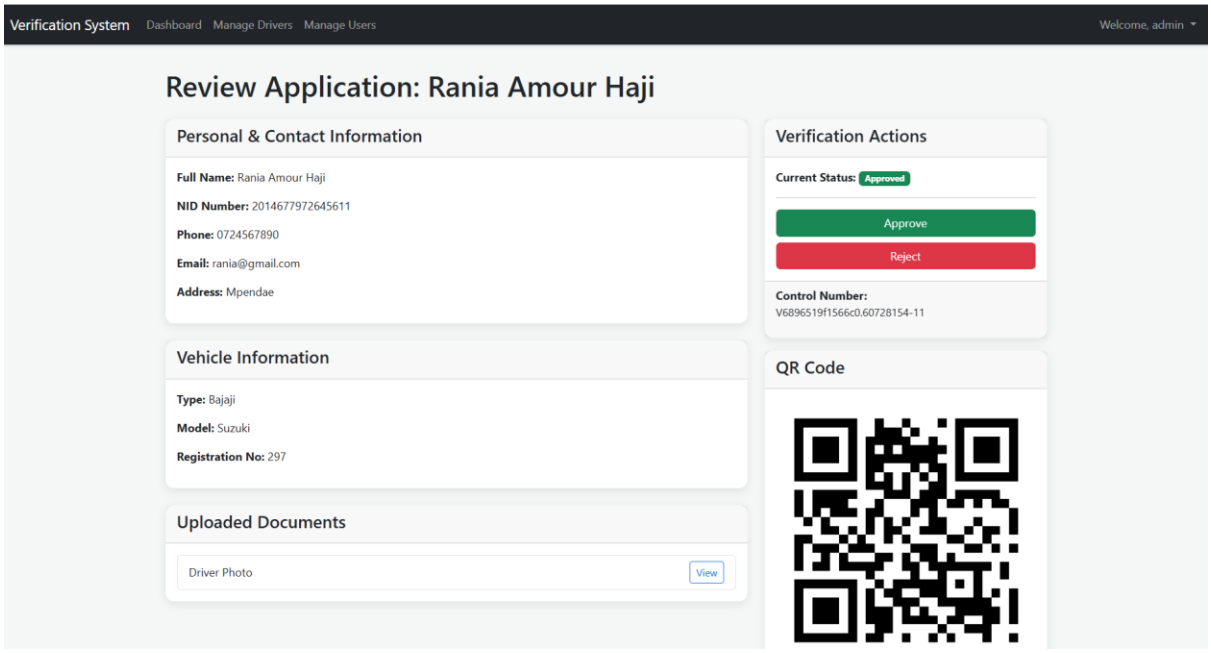


Figure 0-20:View Driver Details

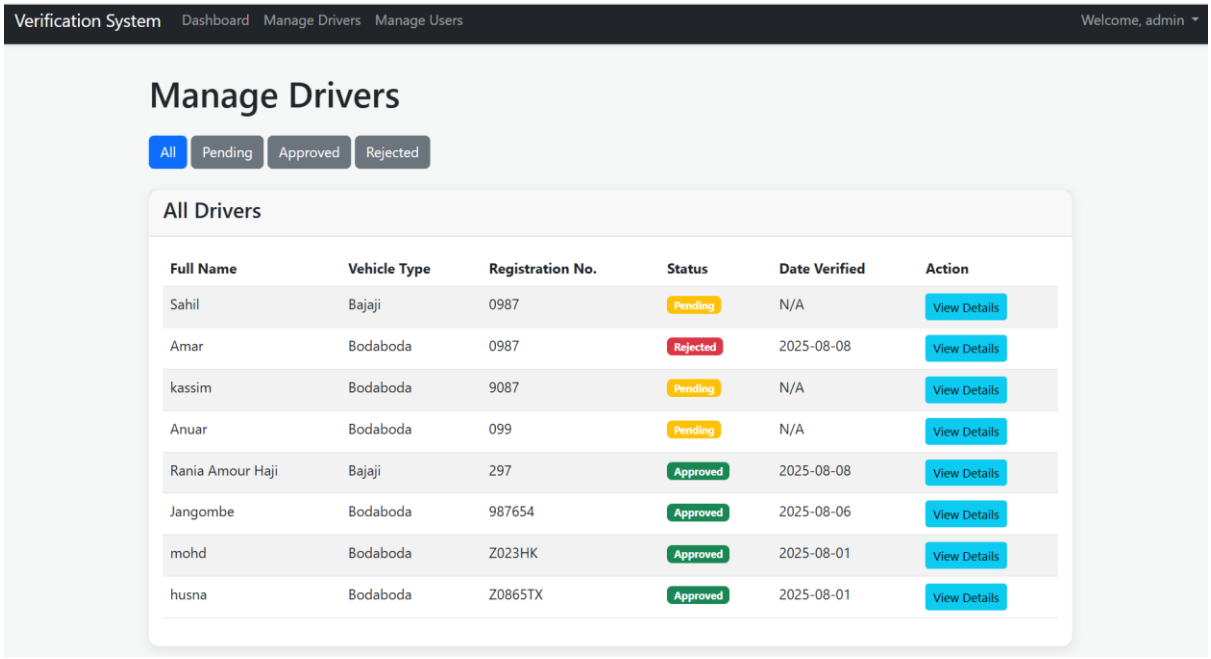


Figure 0-21: Manage Drives Page

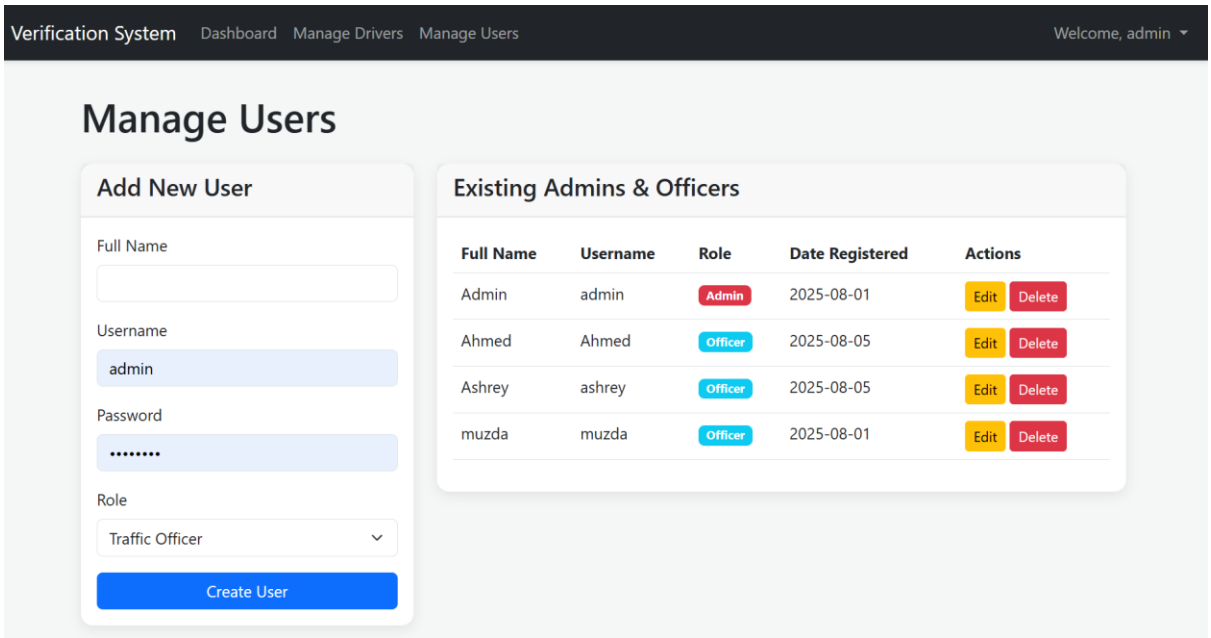


Figure 0-22:Manage Users Page

5.5 Access Control and Security

a. Admin: Full system access and permissions.
b. Driver: Can only access personal profile data.
c. Officer: Can scan QR codes and file reports.
d. Role-based access is implemented using PHP session management.

Chapter 6: System Implementation and Testing

6.1 Technologies

a. Frontend (HTML5, CSS3, Bootstrap):
   Builds the user interface with structure, styling, and responsive design.
b. Backend (PHP):
   Handles server-side logic and connects to the database.
c. Database (MySQL):
   Stores data like users, vehicles, and QR codes.
d. Tools (VS Code):
   Code editor used for writing and managing the project code.
e. Library (Endroid QR Code):
   Used to generate and scan QR codes via Composer.

6.2 Database Implementation

6.2.1 Internal Schema of Database

- Tables and relations are implemented as described in the relational model.

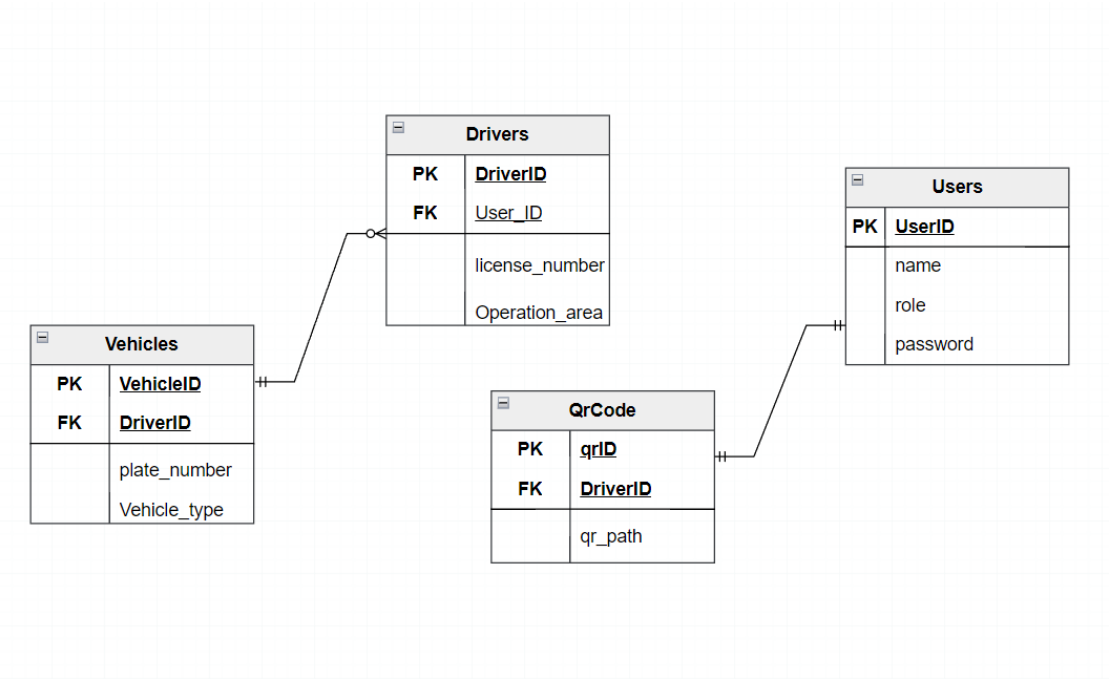


Figure 0-23: Relational Model

6.3. Testing

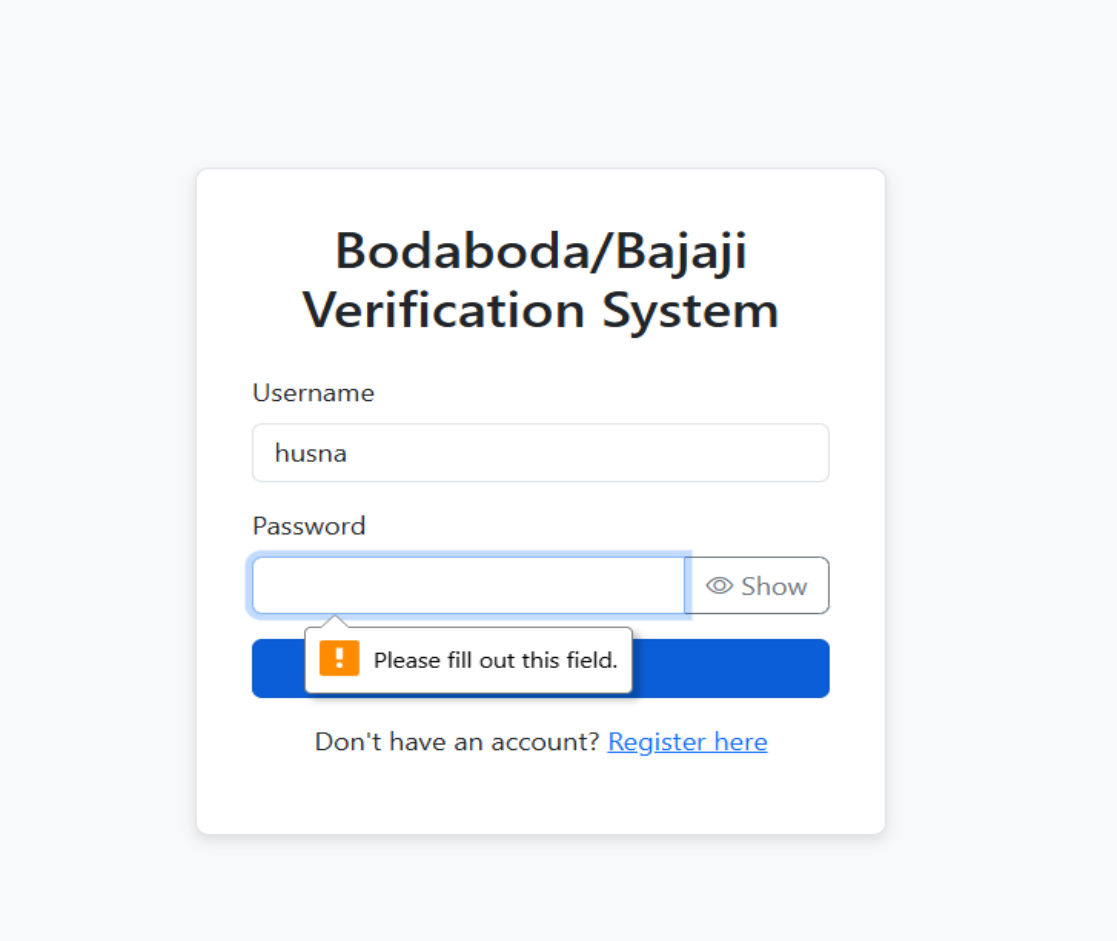


Figure 0-24: Invalid Data Test Page

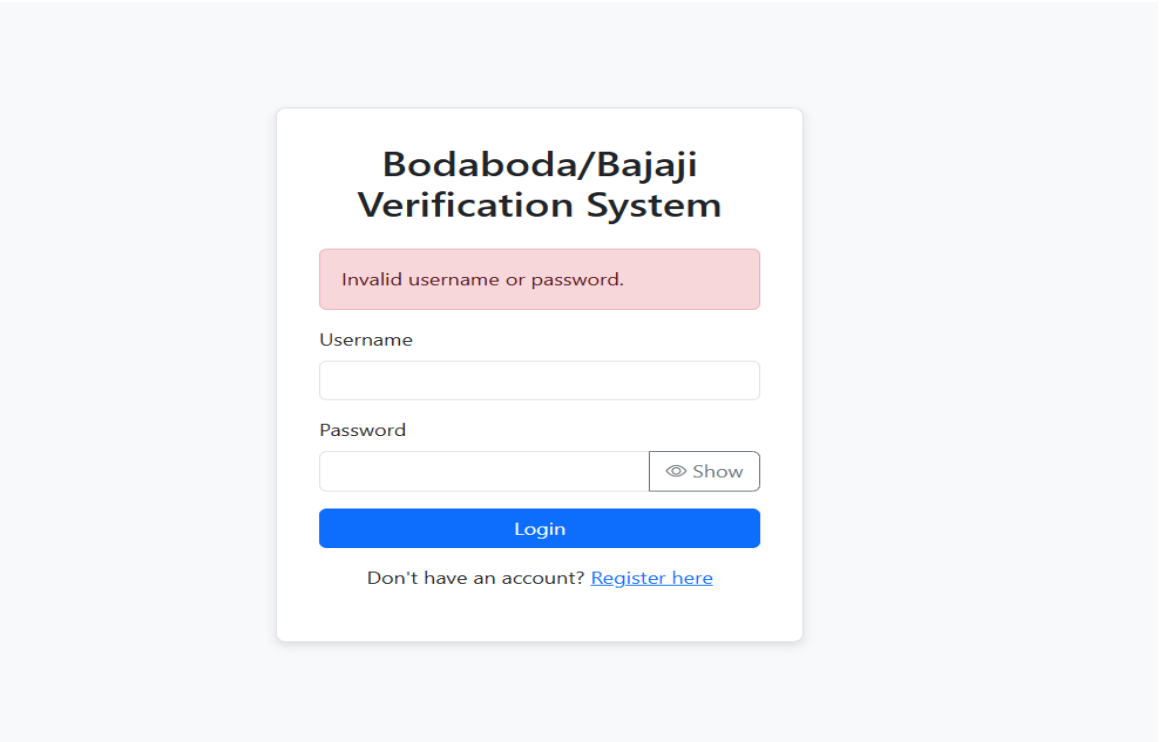


Figure 0-25: Invalid Credentials

Chapter 7: Conclusions Recommendations Challenges and References

7.1 Conclusion

The Bodaboda and Bajaji Driver Verification System has successfully met its main goals. It helps make transport in Zanzibar safer and more organized. The system allows the admin to verify drivers and give them QR codes. Traffic officers can scan these QR codes to see driver details and send reports. The system also controls what each user can do, depending on their role (admin, driver, or officer), which helps keep the data safe. In general, this project has helped solve the problem of unverified and unsafe drivers in the community.

7.2 Recommendations

7.2.1 For Future Work

a. To improve the system in the future, the following ideas can be added:
b. Allow drivers to register themselves online, and the admin can approve or reject their registration.
c. Make sure the system works well on mobile phones, so traffic officers can scan QR codes easily using their smartphones.
d. Add more user roles or features that help with security and management of driver information.
e. Improve the system speed and appearance to make it easier for allusers.

7.2.2 For Industry and Academia

This system can be helpful for both the transport industry and academic institutions:

For Industry: Transport authorities or government offices can use this system to help verify drivers and reduce unlicensed operators on the roads. It can also improve road safety and make it easier to manage driver records.

For Academia: Universities and colleges can use this system as a good example for final-year student projects in software engineering, information systems, or ICT. It shows how web technologies, QR codes, and verification processes can be combined to solve real problems in the community.

7.3 Challenges

7.3.1 Technical Challenges

During development, the system faced some technical issues, including:

It was difficult to set up the MySQL database on localhost due to configuration errors.

Connecting the QR code library with the system required extra effort and fixing some issues.

Setting up user sessions and managing access based on roles (admin, driver, officer) was challenging at the beginning.

7.3.2 Operational Challenges

The project also experienced some practical challenges, such as:

There was limited time to work on the system because of other academic responsibilities.

It was hard to test the system in real conditions because there was no access to live user data.

Some parts of the system had to be tested manually because external smartphones and QR code scanners were not always available.

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