Republic of the Philippines
Laguna State Polytechnic University
Province of Laguna

COLLEGE OF COMPUTER STUDIES

TODARESKYU: AN INTEGRATED MOBILE AND WEB APPLICATION FOR PROCESSING COMMUTER COMPLAINTS ON TRICYCLE DRIVER VIOLATIONS

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of the Requirements for the Degree
Bachelor of Science in Information Technology
Specialized in Web and Mobile Development

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APPROVAL SHEET

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DEDICATION

The developers formally dedicate this Capstone Project to the Almighty God, whose grace and guidance have been a continuous source of strength, wisdom, and inspiration. They also extend their gratitude to their professors, who have offered indispensable support and encouragement throughout their academic endeavors. They also acknowledge their families, whose steadfast love, encouragement, and material assistance have facilitated this accomplishment. Furthermore, they express appreciation for their friends, who have provided essential support and understanding. Finally, to themselves, for their tenacity, strength, and dedication in overcoming challenges and successfully completing this project.

Bruto, Cedeño, Celerio, Lorredo

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We are indeed thankful to that One True and Almighty God, whose love guides and blesses us, the same One upon whom we rest for comfort when facing problems or issues and have managed to execute this project in perfect order by his grace.

ABSTRACT

TODAreskyu is a mobile and web application designed to facilitate the process of commuter complaints against tricycle drivers who violates the law. The mobile application was built using React Native in combination with the Expo framework, while the web interface was built using Laravel. It is aimed at streamlining the resolution of complaints as well as making communication between commuters and the City Traffic Management Office fluid. The system allows users to file complaints about registered and unregistered tricycles, track the status of their complaints, and receive immediate notifications. It was subjected to intense usability testing using all dimensions such as attractiveness, clarity, efficiency, reliability, stimulation, and novelty. Results showed that a high number of users were satisfied, citing favorable user experiences based on the user-friendly interface, reliability, and data security of the system. It includes mobile features for complaints reported by registered as well as unregistered tricycles. On the backend part, the web platform has complaint management tools, data analytics, and user/system management functionalities. The results supported that the TODAreskyu system effectively caters to the needs of the users, and thus enhances the experience of commuters and CTMO officials in complaining. Based on user feedback and assessments of the system, potential future improvements have been recommended; these include implementing payment capabilities for fines and penalties and setting up a feedback channel to gather user recommendations. The project has successfully managed to develop an innovative, user-centric, and reliable solution in the management of commuter complaints.

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CHAPTER I

THE PROJECT AND ITS BACKGROUND

Introduction

Governments and international organizations are promoting information and communication technologies (ICTs) as a way to enhance the co-production of public services. Various major initiatives utilizing ICTs are being implemented globally. These technologies are seen as essential tools for improving efficiency and effectiveness in delivering public services. They are expected to facilitate collaboration between governments, organizations, and citizens in service provision (Clifton et al., 2020).

Mobile information and communication technology (ICT) has revolutionized the accessibility of government public services. Mobile government services have changed how people and businesses can benefit from government public services at any time and from any place. The success of these services is becoming more dependent on satisfying the needs and the expectations of both citizens and business organizations (Alqaralleh et al., 2020).

Sustainable Development Goal 16 aims to promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions. Achieving SDG 16 is crucial for attaining all SDGs, ensuring no one is left behind, and safeguarding and advancing human rights. The realization of SDG 16 is vital for promoting peace and justice, as well as for establishing institutions that are transparent and responsible (Martin, 2023).

Specifically, under the SDG 16.6 stating that the delivery of fundamental public services is a central duty of governing structures. These services are essential for meeting the needs of the population and ensuring the well-being of society (SDG 16.6.2: Understanding Satisfaction With Public Services for More Effective, Accountable and Inclusive Public Institutions, n.d.).

This research seeks to develop a complaint management system through web and mobile application that addresses the challenge faced by tricycle commuters, offering a solution for an easier reporting process and enhances the overall management of traffic violators.

Project Context

Commuting is a fundamental aspect of daily life that spans various sectors and job roles. It plays a crucial role in connecting individuals to their workplaces and facilitating economic activities (Calderwood & Mitropoulos, 2020). However, like any other transportation system, it has its share of issues, including violations and misconduct by tricycle drivers. These incidents range from minor to more significant disruptions that affect the commuting experience.

In the Philippines, tricycle drivers possess knowledge of road traffic rules and regulations but some of them often fail to comply with them despite being licensed (Aydinan, 2020). Reckless driving, overcharging, and other violations are frequent issues, but many commuters still find it difficult to report these problems.

In a global context, as cities continue to expand, the strain on public transportation infrastructure intensifies, leading to challenges such as overcrowding, service delays, and increased commuter dissatisfaction (Kuberkar,

2020). In the Philippines, reporting an incident typically involves commuters to physically visit the nearest law enforcement office (Ignaco, 2021).

The current reporting process involves filing complaints in person at government offices, which is burdensome for commuters. They have the option to report drivers through text messages to government officials, but this method still requires manual record-keeping and is not efficient (Abana, 2020). The inefficiency of these traditional reporting methods worsens the situation, further intensified by the lack of real-time reporting options, leading to delays in reporting infractions or, in many cases, the failure to report them entirely.

The San Pablo City Traffic Management Office (CTMO) is instrumental in regulating transportation services within the city, particularly in managing the tricycle system. One of its key responsibilities is handling complaints from residents regarding driver misconduct and violations. Residents can file complaints through multiple channels: by visiting the CTMO office, reaching out through their official social media accounts, or contacting them via phone. Upon receiving a complaint, the CTMO collects detailed information from the complainant using a formal complaint form. The office then arranges a meeting between the complainant and the tricycle driver involved to mediate and settle the issue. If the driver is found guilty of a violation, based on the CTMO's list of infractions, they may face penalties such as fines.

In cases involving unregistered or "colorum" tricycles, the CTMO requires additional information to track and address these issues effectively. Complainants must provide three key details: the color of the tricycle, its plate number, and a

description of its appearance. This information helps the CTMO in identifying and managing colorum tricycles, ensuring a more comprehensive approach to enforcement. While this process helps to address disputes and regulatory issues, its effectiveness is sometimes hampered by the lack of a more streamlined system for managing and resolving complaints efficiently.

To address the challenges in the current complaint management process and provide a reliable way for commuters to report violations, a comprehensive system is needed. This project aims to develop a web and mobile application that aligns with m-government principles, leveraging mobile technology for efficient service delivery (Alharbi et al., 2020). The application will simplify complaint reporting for tricycle commuters and help the San Pablo City Traffic Management Office organize and document these complaints more effectively.

Project Purpose

The TODAreskyu's project purpose is to develop a mobile application that will be beneficial to various entities by transforming the way tricycle driver violations are reported and managed. The entities are as follows:

Tricycle Commuters

The TODAreskyu mobile application empowers tricycle commuters by offering a platform for reporting driver violations. It innovates the reporting process, enabling real-time submission of reports through smartphones, saving time and effort for commuters.

San Pablo City Traffic Management Office (CTMO)

The TODAreskyu website will serve as a centralized platform for receiving, tracking, and managing reports of tricycle driver violations. By innovating the reporting process, the CTMO can address complaints more efficiently, leading to prompt responses and enhanced traffic management. Moreover, the app's data management capabilities empower the CTMO to analyze driver violation trends and patterns.

Future Researchers

This may serve as a basis for developers for their future research.

Project Objectives

General Objective

The TODAreskyu project aims to establish a complaint management system that enables commuters to report tricycle driver violations and helps the City Traffic Management Office (CTMO) handle these reports.

Specific Objectives

The study specifically aims:

1. To design a web and mobile application for San Pablo City Traffic Management Office and tricycle commuters, respectively.
2. To develop and build the web and mobile application with the following capabilities:
    a. Intuitive mobile application that allows tricycle commuters to:
        i. report driver violations.
        ii. view latest updates and announcement from CTMO.
    b. Complaint Management feature for the CTMO that:

   i. manages, views, categorizes, and tracks received complaints.
   ii. organizes information on tricycles and TODA (Tricycle Operators and Drivers Association).
   iii. maintains and updates lists of violations.
   iv. provides access to user information.
   v. integrates tools for data management and descriptive analytics to monitor trends in tricycle driver violations.
3. To test the developed application using functionality, browser compatibility and mobile compatibility testing.
4. To evaluate the developed application using User Experience Questionnaire.
5. To document the developed web and mobile application.

Project Scope and Limitation

The TODAreskyu project aims to create a mobile app and a web-based system for reporting tricycle driver violations. This system, developed in collaboration with local authorities and tricycle commuters, will streamline complaint handling. Currently, complaints come in through physical visits, social media, and phone calls, with the CTMO using a complaint form to collect and gather information. The new application will centralize these submissions, simplifying the tracking, categorizing, and management of complaints.

The mobile application will facilitate the submission of complaints through two main methods: scanning QR codes and manually filling out a complaint form. When users choose to scan a QR code, the application will automatically generate

a pre-filled complaint form containing the driver and complainant details after scanning the QR code. This streamlined process enables users to select the type of violation, provide a summary of the incident, and attach supporting images and videos. Additionally, users can monitor the status of their complaints to determine whether they have been addressed or are still pending.

Alternatively, if users opt to fill out the complaint form manually, they will be required to input the Motorized Tricycle Operation Permit (MTOP) number to identify the driver. For complaints related to “colorum” tricycles, users will utilize a dedicated form designed to capture specific details. This form requires users to provide the tricycle’s color, plate number, and a description of its appearance, along with attaching relevant images of the tricycle. This approach ensures comprehensive data collection and validation, enhancing the effectiveness of the complaint resolution process.

In order to ensure the authenticity and validity of complaints submitted through the mobile application, the system will incorporate an ID submission process. Each user will be required to provide a unique identification number when filing a complaint. This ID validation helps the San Pablo City Traffic Management Office (CTMO) verify the legitimacy of the complaint, reducing false submissions and ensuring that only genuine concerns are addressed. This measure enhances the reliability of the complaint management system and supports more accurate and effective resolution of issues.

This application provides two main benefits: for commuters, it simplifies the process of reporting infractions, eliminating the need for physical visits to CTMO

offices; for the CTMO, it enhances operational efficiency by offering a centralized platform to receive, review, and manage complaints. Moreover, the system will generate descriptive analyses of tricycle violation trends, providing deeper insights into patterns and the frequency of infractions. Ultimately, the application is expected to improve both the commuter experience and the CTMO's ability to respond to and manage transportation issues in San Pablo City.

On the other hand, the City Traffic Management Office administrators will have access to a web-based platform to monitor and manage complaints. This system will provide tools for admins to receive, review, and analyze complaints, as well as generate reports on the number and types of violations per driver. Additionally, the platform will feature descriptive analytics capabilities, allowing administrators to gain insights into patterns and trends in tricycle driver violation.

The descriptive analytics feature will provide the CTMO a violation trend report that presents a detailed analysis of trends in tricycle driver violations by displaying several key metrics. It shows the frequency of violations per day or month, offering insights into how the incidence of infractions varies over time. The report also provides an overview of the overall status of complaints, categorizing them as pending, denied, or settled. Additionally, it presents the percentage distribution of each type of violation on an all-time basis, allowing for a clear understanding of the relative prevalence of different issues. This functionality will enable the CTMO to identify common issues, track recurring offenders, and make data-driven decisions to improve traffic management. Administrators will also have

the privilege to receive real-time updates on complaints, ensuring they can monitor and address issues promptly.

A limitation of the project is that it does not cover the enforcement of fines for driver violations. While the application effectively helps with reporting and managing complaints, it does not include features for tracking or processing fines. The project's focus is on facilitating complaint submissions, managing and categorizing these complaints, and analyzing violation trends. Handling fines and updating violation records is not included in the application’s scope and would require separate systems or processes.

Conceptual Model of the Project

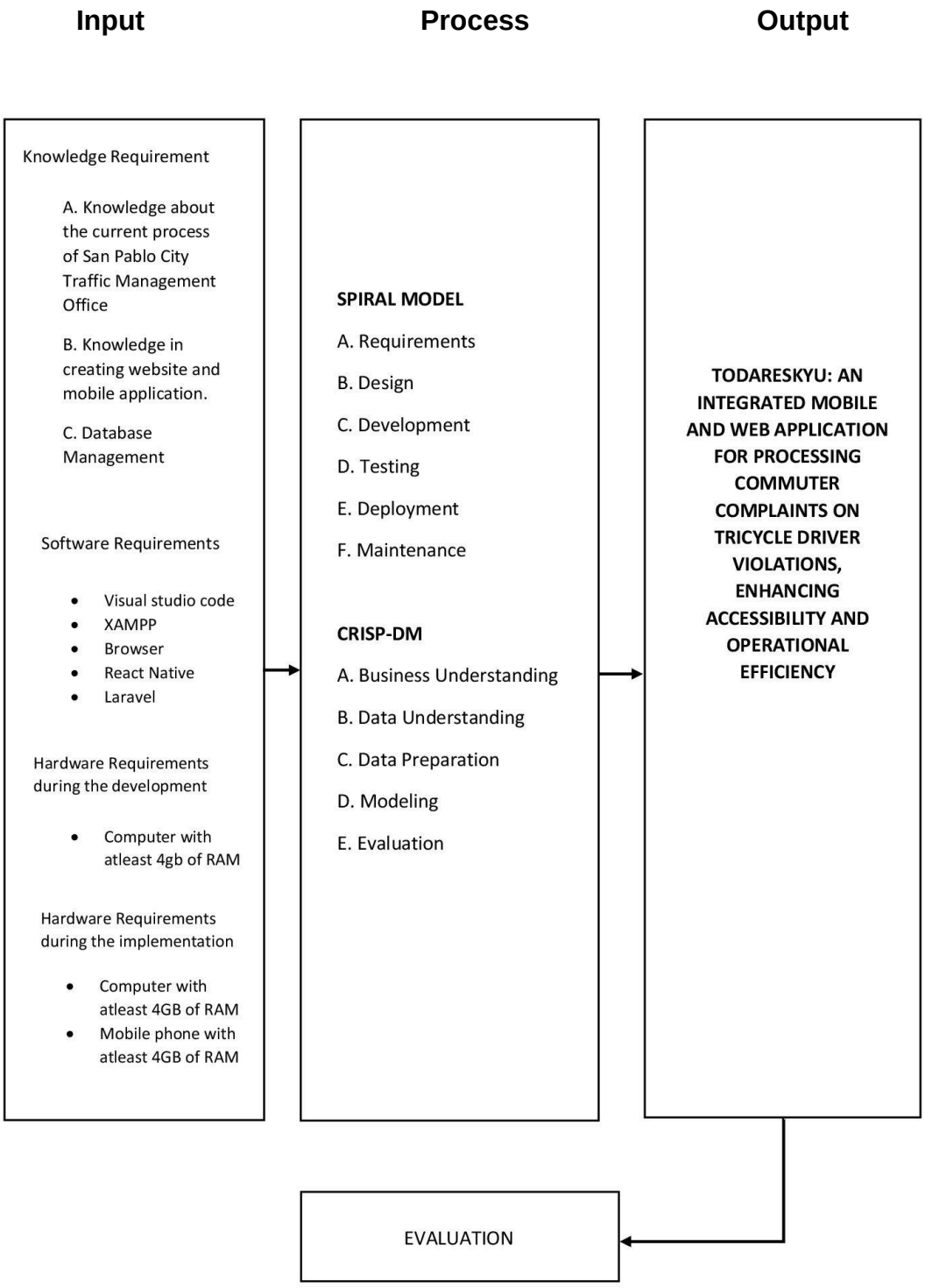

Figure 1. Conceptual Model of TODAreskyu Web and Mobile Application

Operational Definition of Terms

TODAreskyu – from the phrase “to the rescue” to “TODAreskyu”.

Dashboard Page – The central hub displaying an overview of system data, activities, and quick access to key features.

Complaint Page – A section for users to report issues or concerns related to tricycles and their operations.

Violation Page – A page that shows violations information of CTMO San Pablo City.

TODA Page – A page dedicated to managing and viewing details about Tricycle Operators and Drivers Associations (TODA).

Tricycle Driver Page – A section containing profiles and details of tricycle drivers.

Commuters Page – A page for managing commuter information.

Announcement Page – A section for posting and viewing official updates, news, and important notifications.

Administrator - The one that has all the access to the system.

User – An individual who interacts with a system, software or service.

Motorized Tricycle Operation Permit (MTOP) – A government-issued permit authorizing tricycles to operate legally in a specific area.

QR Code – A machine-readable code that, when scanned, provides information about a tricycle, including driver and vehicle details.

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

The literature review section presents a thorough overview of previous research and advancements related to the TODAreskyu project, situating it in the realm of mobile apps for public transportation monitoring. The section delves into past studies and literature to lay the groundwork for the unique approach taken by the TODAreskyu app in enhancing commuter safety and promoting accountability among tricycle drivers.

Urban Public Transportation and Sustainable Development

Shing, et al. (2019) discussed key concepts like transport connectivity, which is crucial for allowing passengers to easily switch between different transit systems. It also discusses transport integration, covering aspects such as fare, schedule, and information integration to create a unified transit network. This integration is vital for enhancing efficiency, reducing travel times, and providing reliable connections, which are central to the success of urban public transportation systems.

Transportation is really important for the economy in cities. When cities have good transportation systems, it helps boost economic activities because people can get to jobs, schools, and services more easily. According to Badassa, et al. (2020), investing in sustainable transportation infrastructure can bring big economic benefits. This isn't just about making travel easier; it also helps the economy by reducing traffic jams and pollution, which can save money and make the city stronger overall.

Mobile Technology in Public Services

Over recent years, the evolution of mobile wireless communication in the world has become more important after the arrival of 5G technology. This evolution journey consists of several generations starting with 1G followed by 2G, 3G, 4G, and under research future generations 5G is still going on. The advancement of remote access innovations to achieve 5G mobile systems will focus on the improvement of the client stations anywhere the stations. The fifth era ought to be an increasingly astute innovation that interconnects the whole society by the massive number of objects over the Internet, its internet of things IOT technologies.

UberX, Lyft, Sidecar, Carpool, and DiDi are a few of the most well-known application-based (app-based) transportation services in the US, Europe, and China. In the meanwhile, Uber, Careem, and Cykiq offer the most well-known app-based individual ridesharing transportation services in Pakistan. Air-conditioned (AC) automobiles, non-AC cars, rickshaws, and motorbikes may all be booked individually through Careem and Uber. However, Javid, et al. (2021) discussed that in order to stay competitive, these services must enhance their customer care and handle complaints from customers.

According to Javid, et al. (2021),due to this gap between the rising demand for passenger mobility and the declining quality of services, local start-ups to understand passenger behavior, intention, and happiness with a particular service or product, it is crucial to evaluate the service quality of an online transport system in m-commerce. Oliveira (2020) stated that by virtual environment of social participation I understand: an Internet platform where themes for direct or indirect

dialogue between civil society and the various spheres of government are made available through the digital participation of the citizen.

Oliveira (2020) stated that by virtual environment of social participation I understand: An Internet platform where themes for direct or indirect dialogue between civil society and the various spheres of government are made available through the digital participation of the citizen.

Based on the studies of Samonte, et al. (2019), the application will serve as the people's mouth to directly shout out their concerns that bothers them in every way possible. They added that the E-Complaint is a crowdsourcing mobile application, which automates the manual processes of filing, handling and creating data analysis of the complaints of a local government unit in the central business district in the Philippines.

Web Technology in Public Services

According to Martinez-Ruiz et al (2019), the World Wide Web has evolved through different stages: Web 1.0 (static, read-only content), Web 2.0 (interactive, user-generated content), and Web 3.0 (semantic web with AI integration). These advancements have transformed how we interact online, moving from basic information sharing to dynamic, immersive experiences with more automation and decentralization.

Web applications have revolutionized public transportation by enabling real-time tracking, digital ticketing, and ride-sharing services like Uber and Grab. These changes have increased efficiency, convenience, and accessibility for commuters (Fuentelsaz et al., 2019).

Rivera (2019) discusses community-based web platforms that deliver public services in the Philippines. One key initiative involves the development of online tools that allow communities to manage and share vital public information, improving access to government services. These projects support transparency and citizen participation in public affairs. While Paringit (2019) highlights the implementation of several e-governance systems in local government units (LGUs), including the e-Building Permit System and the Real Property Assessment and Tax Management System. These web-based solutions streamline processes such as permit applications, property tax assessments, and business registrations, promoting efficiency and transparency in public services.

Intersection of Transportation and Technology

Intelligent Transporting System (ITS) is one of the many smart city applications that can be realized via 5G technology. Gohar and Nercioni (2021) discussed and presented the technological context and the economic benefits of the 5G and how key vertical industries will be affected in a smart city, i.e., energy, healthcare, manufacturing, entertainment, and automotive and public transport. Smart cities rely on Information and Communication Technologies (ICT) and aim to improve the quality of services by managing public resources and focusing on comfort, maintenance, and sustainability.

Vaičiūtė et al. (2022) explores how technological advancements and logistics cooperation in road transport companies can create a synergy that enhances operational efficiency. The study developed a model to assess the interaction between technological development and logistics cooperation,

highlighting the importance of technological literacy among logistics employees and the compatibility of transport system technologies. This synergy is crucial for improving the efficiency and sustainability of transport operations.

Dr. Hilario Sean O. Palmiano from the University of the Philippines Diliman. This project is a decision-support system designed to help transport planners in analyzing and visualizing traffic through simulations, aiding in the management of road congestion.

Real-Time Reporting Systems for Transportation Issues

A study of Cueto et al. (2021) focuses on electric tricycles in General Santos City discussing the potential of real-time complaint management systems in improving public transport services, highlighting how real-time data can be used to enhance response times and service quality.

Dar and Lone (2022) addresses the integration of real-time technologies in managing public transportation complaints, emphasizing their role in achieving sustainability and improving urban mobility.

The study by Pagalan (2020) focuses on the Philippine public transportation system, emphasizing the need for an efficient complaint management system to improve service quality. It highlights the local context, addressing specific challenges in the Philippines such as inadequate infrastructure and communication barriers. On the other hand, Oliveira and Branco (2019) provide a broader, global perspective, discussing how effective complaint management systems can enhance service quality across various industries. While both studies emphasize the importance of complaint management, the local study is more

specific to transportation in the Philippines, whereas the international study offers insights applicable to multiple sectors globally.

Effectiveness of Mobile Applications in Public Reporting

The study of Pendang (2024) focuses on the use of mobile apps in waste management in Legazpi City, Philippines, which has improved operational efficiency and reduced environmental impact. Hassan and Rahman (2019) highlights how mobile apps enhanced customer service in the telecommunications sector by streamlining complaint management processes. Lastly, Müller and Klein (2021) from Europe examines how digital transformation through mobile apps has improved customer feedback mechanisms across service industries. All studies emphasize the importance of mobile apps in improving efficiency, though they differ in application sectors and geographical focus.

Cruz (2023) identifies challenges such as lack of infrastructure and resistance to technology in implementing e-government complaint systems. In contrast, Davis and Smith (2022) discusses similar issues but in the context of public services globally, where organizational resistance and funding constraints are major hurdles. Both studies highlight the importance of addressing technical and human factors in successful implementation.

Effectiveness of Web-Based Applications in Public Reporting

In Burundi, Theirry et al. (2019) discusses the combination of web and SMS platforms for complaints provided broader accessibility, especially for citizens with

limited internet access. This system improved the quality of service by making it easier to report issues.

In India, a web-only platform for civic complaints increased efficiency by offering real-time tracking, ensuring transparency in resolving public grievances (Kumar 2020).

In the Philippines, Santos (2021) stated that the e-complaint system in local government units focused on streamlining administrative processes, particularly for permits and tax-related issues, promoting faster resolution and reducing bureaucratic delays.

Impact of Technology on Transportation Efficiency

Johnson and Wang (2020) explores how mobile technology, particularly mobile apps, has transformed urban transportation systems globally by improving efficiency, reducing congestion, and enhancing commuter experiences. The integration of real-time data and user feedback into transportation planning is emphasized as a key factor in these improvements.

According to Elsayed et al. (2021) that the impact of web technology on transportation systems has been transformative, greatly enhancing their efficiency. The integration of smart transportation systems with the Internet of Things (IoT), artificial intelligence (AI), and advanced data analytics has streamlined operations, reducing congestion, improving safety, and enhancing environmental sustainability. For example, smart transportation leverages real-time data from various sources like sensors and communication devices to optimize traffic flow, reduce travel time, and lower fuel consumption. Cities like Singapore and

Barcelona have successfully implemented such systems to reduce congestion and enhance mobility

Alvarez and Santos (2020) examines various metrics used to measure operational efficiency improvements in small and medium-sized enterprises (SMEs) in the Philippines due to technological advancements. It highlights key performance indicators (KPIs) such as process time reduction, cost savings, and productivity enhancements.

Smith and Kumar (2021) provides a comprehensive review of metrics used globally to evaluate improvements in operational efficiency resulting from technology integration. Metrics discussed include throughput rates, error reduction, and customer satisfaction.

Gonzales and Reyes (2021) explores the effectiveness of traditional versus technology-enhanced complaint management systems in the Philippine public sector. It analyzes how technology integration improves response times, tracking, and overall satisfaction compared to conventional methods.

Baker and Thompson (2020) discussed the transition from traditional to technology-enhanced complaint management systems, focusing on improvements in efficiency, customer satisfaction, and data management. It includes case studies from various international companies.

The study of Gonzales and Reyes (2021) focuses on the public sector in the Philippines, examining practical differences in complaint management systems within this specific context. The study of Baker and Thompson (2020) on the other hand, provides a broader perspective on the benefits of technology-enhanced

systems, highlighting improvements in efficiency and customer satisfaction across various sectors globally.

Impact Analysis

Lopez and Mendoza (2022) investigates how accessible reporting systems influence accountability among commuters and drivers in Metro Manila. It covers aspects such as reporting ease, response times, and changes in behavior as a result of enhanced reporting mechanisms.

This study of “The impact of accessible reporting on transportation system accountability: An international review. Global Journal of Transportation Studies” shows how easy access to reporting mechanisms impacts accountability in various transportation systems worldwide. Johnson and Wilson (2023) examines case studies from different countries to understand how accessible reporting influences both commuter and driver behavior.

Evaluation of Current Mobile Reporting Systems

Dela Cruz and Santos (2020) discussed various criteria for evaluating the success of technology-driven systems within the Philippines, focusing on metrics such as user satisfaction, system reliability, and integration with existing processes.

This study entitled “Evaluating the success of technology systems: Criteria and frameworks” shows the different criteria and frameworks used globally to evaluate the success of technology systems. Lee and Chang (2021) provides a

detailed analysis of success factors such as implementation efficiency, user adoption, and impact on organizational goals.

Tan and Gomez (2021) examines how easily commuters in the Philippines can access and use reporting systems, considering factors like system design, user training, and technological barriers.

This study entitled “User access and usability in commuter reporting systems: An international analysis” shows how different commuter reporting systems across various countries address accessibility and usability. Morris and Green (2022) assesses the effectiveness of these systems in facilitating user engagement and reporting ease.

Measuring the Impact of Technology on Sustainable Transportation

De Guzman and Santos (2021) explores the integration of intelligent transport systems (ITS) in Metro Manila, focusing on how these technologies improve traffic management and reduce congestion. The study highlights successful case studies and provides insights into the challenges and benefits of implementing ITS in a rapidly growing urban environment.

Zhang and Zhao (2022) stated that the implementation of smart transportation systems across various global cities, focusing on successful case studies that illustrate how technology integration can enhance transportation efficiency and sustainability. It provides a comparative analysis of different approaches and their outcomes.

Development Tools

Laravel is a free PHP web framework created by Taylor Otwell in 2011. It simplifies web application development with its elegant syntax and built-in features. Laravel offers several conveniences such as a lightweight layout template, numerous object-oriented libraries, and artistic command line tools that aid in website and web-based application development. These features make the process of creating large websites quicker and more efficient (Sinaga, 2022). It is widely recognized as the top programming tool for PHP web development. It is highly interactive and intuitive, offering an expressive and elegant syntax for building web applications (Amini et al., 2021). It provides to create high-end secure web applications. It facilitates developers by saving time and the thinking for planning for the web-apps from scratch (Bagwan & Ghule, 2019). Laravel in this research was utilized for its ability to simplify web application development through its refined syntax, comprehensive built-in features, and efficient tools that save time. This makes it a secure and effective choice for creating advanced web applications.

MySQL is a relational database management system that is open-source and was originally developed by MySQL AB, a Swedish company. It is now owned by Oracle Corporation. MySQL offers connectors and libraries for a variety of programming languages such as PHP, Python, Java, and Node.js. This allows developers to easily interact with the database using their preferred programming language. It is advisable to utilize this to applications during the learning process, as they have been shown to enhance educational activities (Muslim et al., 2019).

MySQL is a reliable open-source database that is compatible with all major hosting providers. It is a cost-effective and easy-to-manage database solution (Ohyver et al., 2019). It is responsible for managing a well-organized set of data, allowing users to easily add, retrieve, and manipulate the information stored within the database. Data in MySQL is stored in individual tables, with the database structures arranged in physical files that are designed for optimal speed (Christudas, 2019). This research is intended to use MySQL for managing the data with secured and optimized database for reliable data security.

MySQL is a relational database management system that is open-source and was originally developed by MySQL AB, a Swedish company. It is now owned by Oracle Corporation. MySQL offers connectors and libraries for a variety of programming languages such as PHP, Python, Java, and Node.js. This allows developers to easily interact with the database using their preferred programming language. It is advisable to utilize this to applications during the learning process, as they have been shown to enhance educational activities (Muslim et al., 2019). MySQL is a reliable open-source database that is compatible with all major hosting providers. It is a cost-effective and easy-to-manage database solution (Ohyver et al., 2019). It is responsible for managing a well-organized set of data, allowing users to easily add, retrieve, and manipulate the information stored within the database. Data in MySQL is stored in individual tables, with the database structures arranged in physical files that are designed for optimal speed (Christudas, 2019). This research is intended to use MySQL for managing the data with secured and optimized database for reliable data security.

React.js is a widely-used JavaScript library that is open-source and designed for constructing user interfaces (UIs). It allows developers to easily create reusable UI components and define how the UI should appear and function in response to changes in the application state. React creates a smart and responsive user interface for websites and mobile apps. Define basic views for each state in your application, and React will automatically update and render the appropriate components when your data changes (Rawat & Mahajan, 2020). Every component library has its own distinct style and functional technology. This provides developers with a wider range of options to cater to their clients' needs and engage a larger audience (Reddy, 2021). It is preferred by developers due to its high demand in the market and its reputation for being easier and quicker to code (Ritwik & Sandeep, 2020). This research is intended to use ReactJS for designing user interfaces and create responsive page sizes for TODAreskyu mobile application.

Visual Studio Code is a user-friendly source code editor that offers a wide range of developer tools, such as code completion, debugging, and extensions. With support for numerous languages, it is an ideal option for cross-platform application development. VSCode is a free software that is fully funded by Microsoft, with no external funding involved (Plainer, 2020). It is an editor that can be used on multiple platforms. This means that it is compatible with Windows (7, 8, and 10), macOS, and Linux operating systems (Johnson, 2019). One of the main features of VS Code is its support for extensions, allowing users to enhance their installation by adding languages, debuggers, and tools for future development

needs (Tan et al., 2023). This study explores the potential of Visual Studio Code as an IDE that can support the programming languages utilized in this project.

PhpMyAdmin is a tool that provides an easy-to-use web interface for managing MySQL databases in PHP development. It simplifies database management tasks such as backup, restore, and query building, making it accessible to users without technical expertise. This software allows to perform various tasks on MySQL database tables, such as creating, modifying, deleting, importing, and exporting. It can also execute queries, optimize, repair, and check tables, change collation, and carry out other database management tasks (Kaushal, 2019). It is used as a tool for database to store all the data sent through the created system (Zani, Nasir, & Wahab, 2024). The PHP connection is utilized to establish a link between the PHP file and the database created in phpMyAdmin whereas PHP programming language will be used in the development (Vijayasarveswari et al., 2021). This study intends to use phpMyAdmin for efficient management and manipulation of MySQL databases in TODAreskyu web and mobile development.

HyperText Markup Language, commonly known as HTML, is the essential code utilized to organize the structure and content of a webpage. It dictates the arrangement of headings, paragraphs, images, data tables, and various other elements on a webpage. HTML empowers developers to design the layout and appearance of web content, establishing it as a crucial language for the development of web applications. An HTML document contains information in various text formats such as unstructured text, structured key-value pairs, and

tables. It is crucial to effectively represent these documents for machine comprehension in order to support a variety of applications (Deng et al., 2022). HTML maintains the document's structure and purpose while displaying smoothly on mobile devices (Frankston et al., 2024). Utilizing semantic HTML goes beyond simply adhering to recommended guidelines; it involves establishing a strong base for web content that is inclusive and accessible to all individuals (Johnson & Lee, 2019). This research aims to create web content using HTML to manage the structure and follow the standard of producing a web and application.

Cascading Style Sheets (CSS) is a tool utilized to customize the appearance and arrangement of web pages. It enables developers to modify various visual elements such as font, color, size, spacing, and more. Minimizing visual elements and utilizing CSS coding can enhance the speed of the site during loading (Parlakkiliç, 2022). The style of the website can only be completed using CSS, specifically CSS3, which provides a modular layout. Each module in CSS3 defines one aspect of good style, allowing for a structured and organized approach to styling. This modular design ensures that the developmental cycles of individual modules are unbiased and functional across many browsers. This consistent functionality across different browsers is essential for the website's compatibility and performance (Semil, 2022).

As cited in Mitropoulos, S. (2021), The special computer program for the operations center was made using PHP (Hypertext Preprocessor). When it starts, the program starts another program that helps with talking to clients through sockets. To handle all the talking between the operations, center and the

ambulance program, they used something called REST. REST helps the computer programs talk to each other easily using the internet, which makes the programs run faster. This also makes it easier to add new types of clients without having to change the main program.

CHAPTER III

METHODOLOGY

This chapter presents the project design, project development, testing and evaluation procedures that the developers used in developing the system.

Project Design

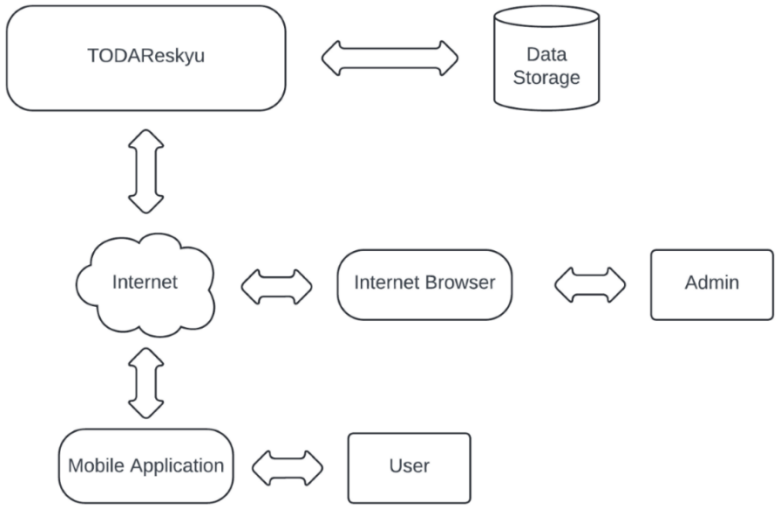

Figure 2. Project Design of TODAreskyu Mobile and Website Application

Figure 2 shows the project design of the TODAreskyu mobile application and the website for administrators. The diagram above shows how users and administrators will interact with the system through the use of an internet browser and a mobile application. The user can use the services and view information of the TODAreskyu application using their mobile phone as long as they are connected on the internet. While the administrator is the one who has all the access to the information given by the user through using TODAreskyu admin

website. All the information of the system will be directly stored in a data storage or database.

Context Diagram

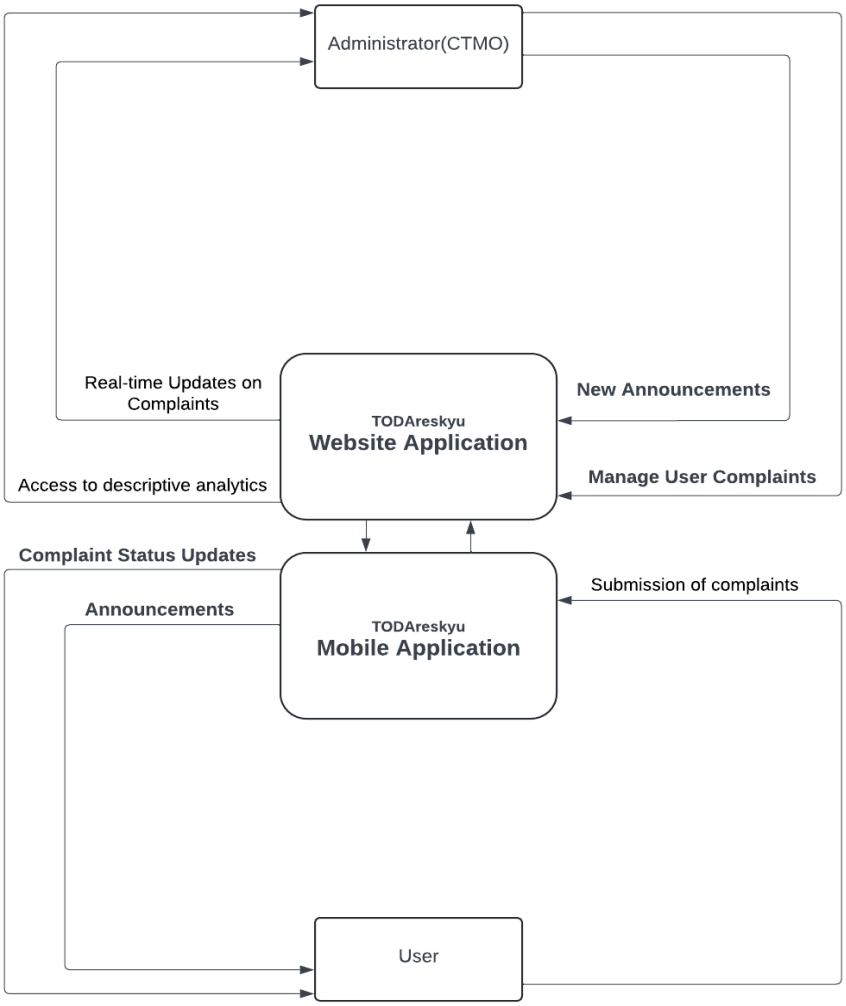

Figure 3. Context Diagram of TODAreskyu Mobile and Website Application

Figure 3 shows the context diagram of the TODAreskyu mobile application and the website for administrators. The system is designed to handle tricycle violation reports, offering real-time updates and comprehensive analytics.

Commuters use the mobile app to submit complaints, scan identification details, categorize violations, view the status of their complaints, and receive notifications about progress. **City Traffic Management Office (CTMO) Administrators** access a web-based platform to monitor and manage these complaints, utilize descriptive analytics for trend analysis, generate detailed reports on violations, and stay updated with real-time information. The system facilitates efficient data exchange between commuters and administrators, ensuring timely responses and informed decision-making.

Data Flow Diagram (Level 1)

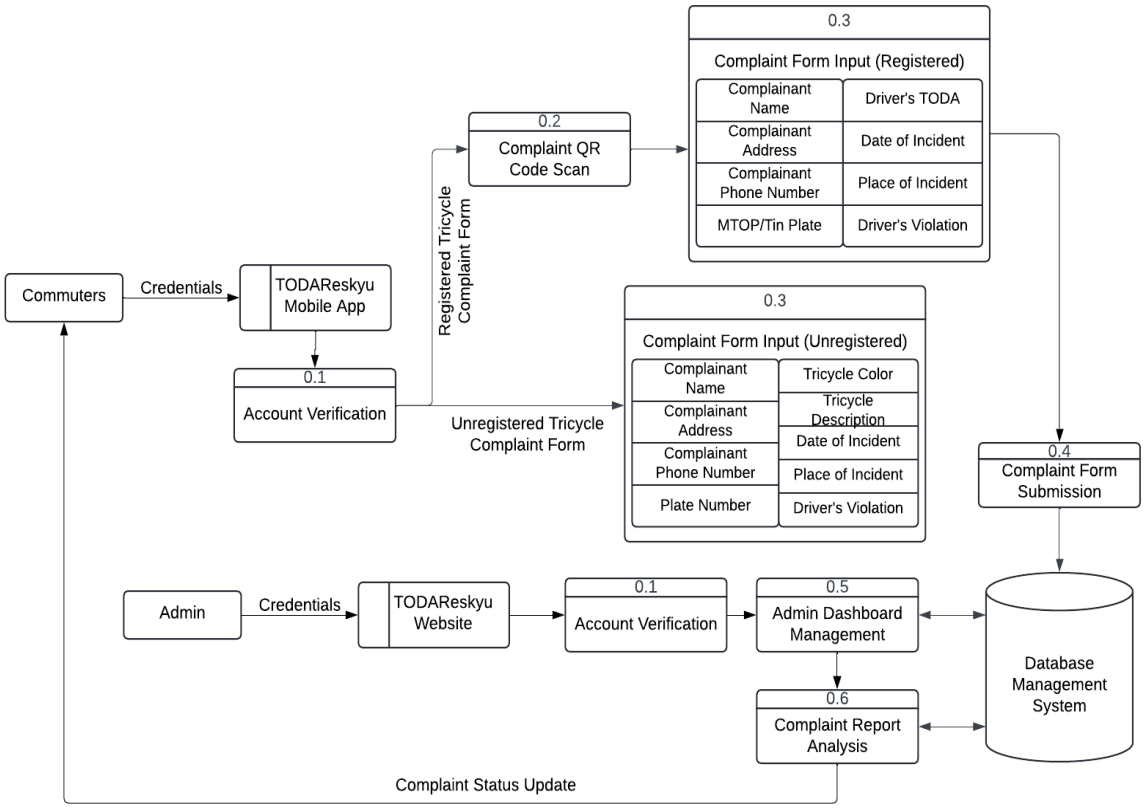

Figure 4. Data Flow Diagram of TODAreskyu Mobile and Website Application

Figure 4 shows the level 1 data flow diagram of the TODAreskyu mobile application and the website for administrators. The primary actors, "Admin" and "Commuters," interact with the system by managing user information, filing complaints, and handling violations.

The diagram depicts the process of an administrator logging in with their credentials, which is then verified on the database. Once verified, the administrator gains access to the system and database, allowing them to view, add, delete, and update information. The "Admin" has direct access to the system's core database tables which store essential data related to system administration, user complaints, violations, driver information, and Tricycle Operators and Drivers' Association (TODAs). The administrator can also monitor users wherein he can also add/update information and extract trends analysis reports.

"Commuters" interact with the TODAreskyu app by logging in to verify their credentials. This allows them to access and modify their data, as well as submit complaints against either registered or unregistered tricycles. Once a report is submitted, the admin can update its status to notify the complainant about the progress of their complaint. Additionally, the Database Management System supports the entire architecture, ensuring that all CRUD operations are securely managed and that data is efficiently stored and retrieved

Entity Relationship Diagram

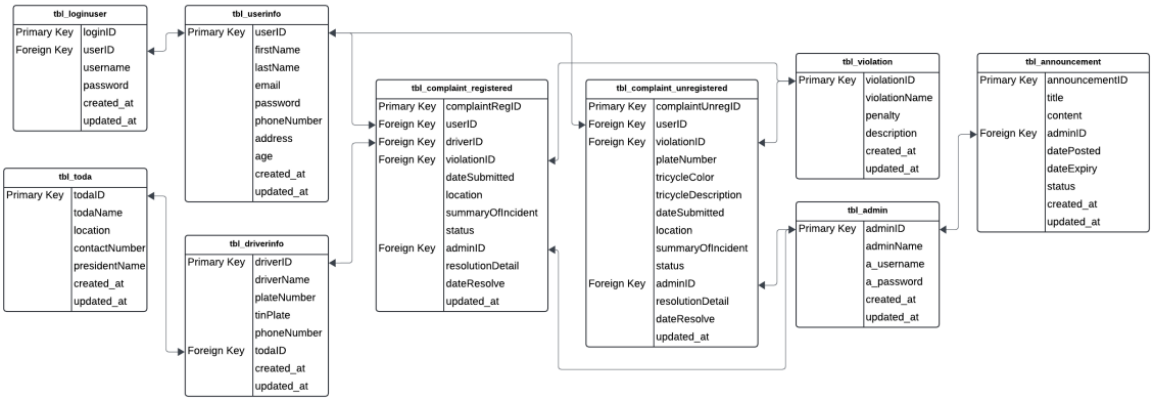

Figure 5. Entity Relationship Diagram of TODAreskyu Application

Figure 8 shows the Entity Relationship Diagram of tShe TODAreskyu Mobile Application and Website. The database is named 'db_todareskyu,' and it contains several tables. SsThe tbl_userInfo table stores user information, while the tbl_loginuser table manages their login credentials. The tbl_admin table holds the admin's name and sign-in details. Additionally, the database includes the tbl_driverInfo table for driver details, such as plate numbers and tin plates, and the tbl_toda table, which contains information on the Tricycle Operators and Drivers' Association (TODA). The tbl_violation table records violations and their corresponding penalties.

The complaint report form uses two data stores: tbl_complaint_registered for submitting complaints concerning violations committed by registered tricycles, and tbl_complaint_unregistered for those involving violations committed by unregistered tricycles. Lastly, the tbl_announcement table stores announcements from the CTMO San Pablo, while the tbl_complaint table holds user complaints and their resolution details.

Wireframe of the Website

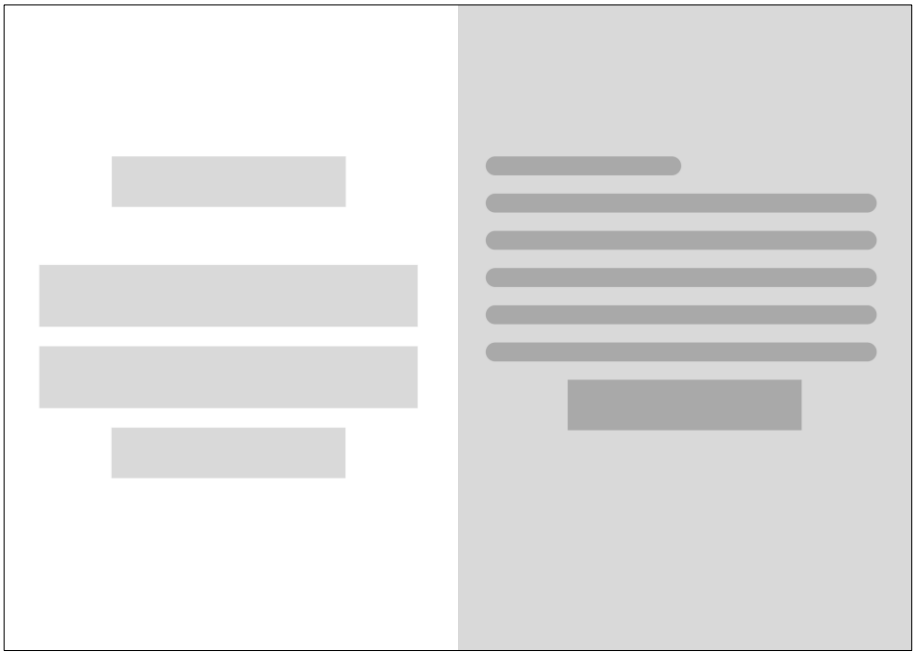

Figure 6. Login & Sign Up Page of TODAreskyu Admin Side

Figure 6 illustrates the Login and Sign Up pages of the TODAreskyu Admin Side. The Login page ensures that only existing admin users can securely access and manage the system, maintaining strict control over system operations. The Sign Up page is used for creating new admin accounts, allowing new administrative officials to be added to the system with appropriate access privileges.

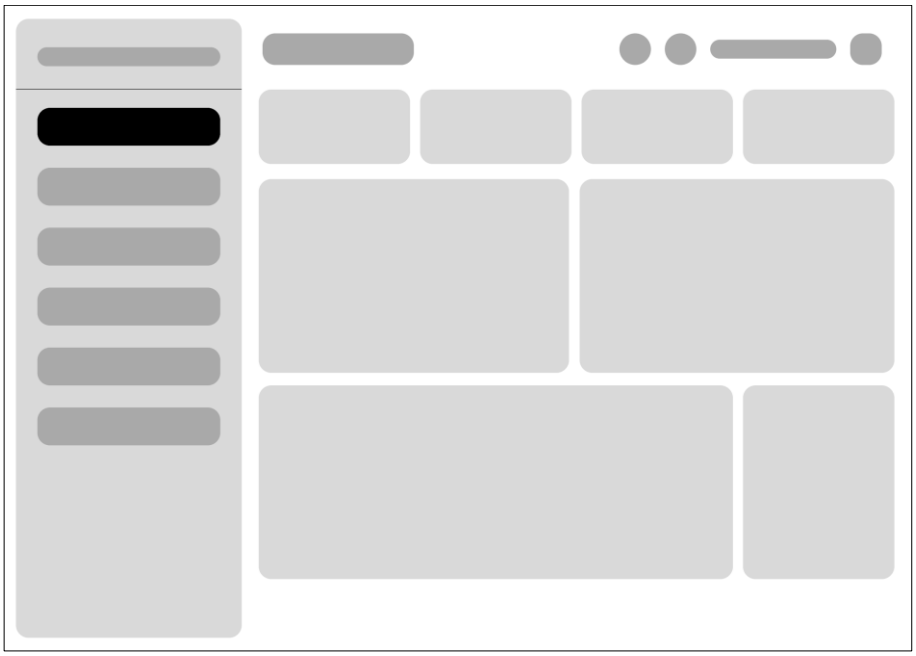

Figure 7. Dashboard Page of TODAreskyu Admin Side

Figure 7 illustrates a comprehensive web dashboard which serves as the central hub for monitoring and managing tricycle driver violations reported by commuters. It provides a summarized overview of the total number of complaints, clearly categorized into different statuses: pending, denied, ongoing, and successful reports.

In addition, the dashboard features a descriptive analytics section that includes visual elements such as graphs and charts. These representations offer a percentage breakdown of the types of violations reported, providing insights into patterns and trends.

Figure 8. User Complaint Information Page of TODAreskyu Admin Side

Figure 8 shows the User Complaint Information Page of the TODAreskyu Admin Side, which is a vital component of the system for managing and resolving commuter complaints. This page provides administrators with the ability to observe and closely examine each complaint submitted by users.

The complaint information page presents a comprehensive view of the report, displaying essential details such as the user who filed the complaint, the driver involved, the date of the incident, and the specific violation reported. The status of each complaint—whether it is pending, under investigation, denied, or successfully resolved—is also prominently displayed, allowing administrators to track the progress of each case.

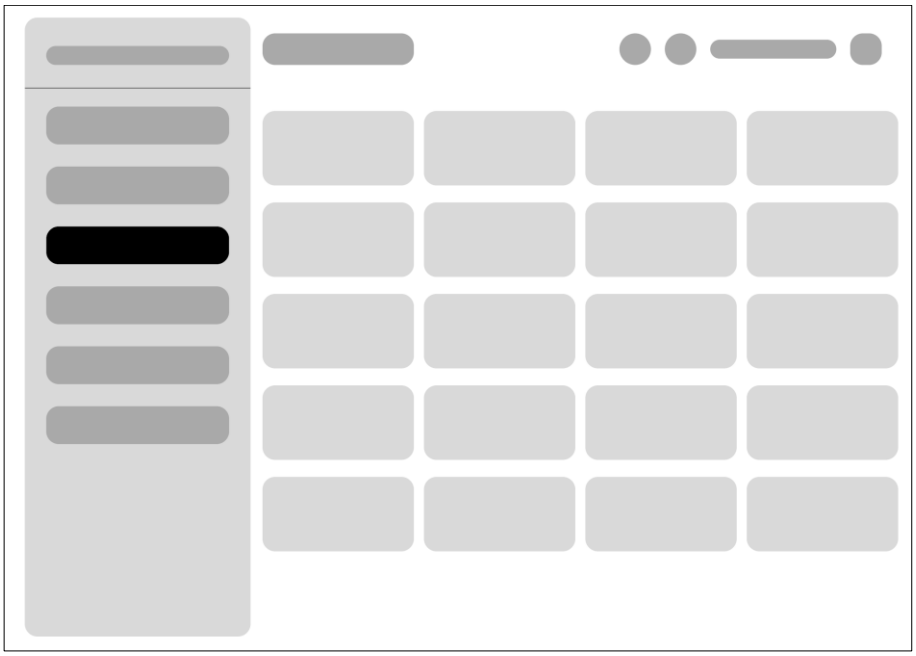

Figure 9. Drivers' Information Page of TODAreskyu Admin Side

Figure 9 illustrates the Drivers Page of the TODAreskyu Admin Side. This page functions as a comprehensive database, allowing administrators to access detailed information about all registered drivers across San Pablo City.

On this page, administrators can view critical details such as the driver's name, plate number, and TIN plate, providing a clear identification of each driver. Additionally, the page displays the QR code associated with the driver, which can be used for quick reference or verification purposes. The page also indicates the specific TODA to which each driver belongs, ensuring that administrators can easily track and manage drivers according to their respective associations.

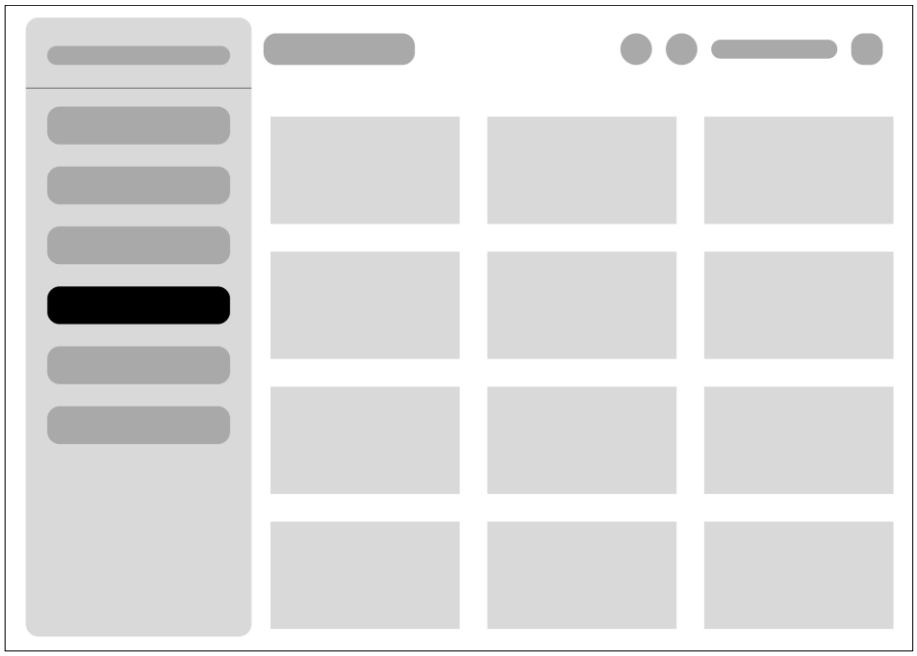

Figure 10. TODA Information Page of TODAreskyu Admin Side

Figure 10 displays a comprehensive list of all Tricycle Operators and Drivers Associations (TODAs) within the TODAreskyu system. This section of the web dashboard is designed to provide administrators with easy access to essential information about each TODA operating in San Pablo City. The list includes detailed information for each association, such as the name of the TODA, the name of the president who leads the association, and the specific location where the TODA is based. Additionally, it provides the contact number for each TODA, ensuring that administrators can quickly reach out to the appropriate representatives when necessary. This organized and easily navigable list enhances the efficiency of communication and coordination between the City Traffic Management Office (CTMO) and the various TODAs, supporting effective management of tricycle operations across the city.

Figure 11. Violation Information Page of TODAreskyu Admin Side

Figure 11 provides a detailed overview of all recorded violations within the TODAreskyu system. It includes crucial information about each violation, such as a comprehensive description of the infraction, which provides context and details about the nature of the violation. Additionally, the page lists the associated penalty amount, giving administrators insight into the financial implications of each violation.

The section also records the date when the violation was first created. To keep track of ongoing updates and changes, the most recent date when the record was last updated is also displayed. This feature ensures that administrators are informed of the latest developments related to each violation.

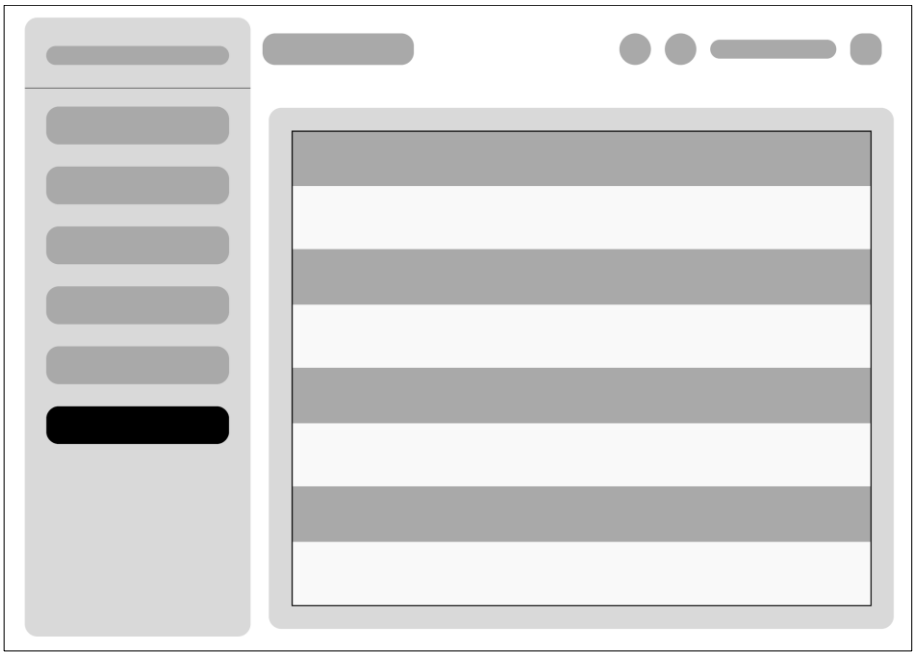

Figure 12. Users Information Page of TODAreskyu Admin Side

Figure 12 displays a detailed list of all users who have signed up for the TODAreskyu system. This section of the web dashboard is designed to provide administrators with a comprehensive view of the user base.

The list includes essential information about each user, starting with their unique user ID, which serves as a key identifier within the system. It also provides the user's first name and last name, allowing administrators to easily recognize and address individuals. The email address of each user is included for communication purposes, while the physical address provides additional context for geographic location. Furthermore, the user's age is displayed, offering demographic insights that may be relevant for understanding user profiles and tailoring interactions.

Screen Hierarchy

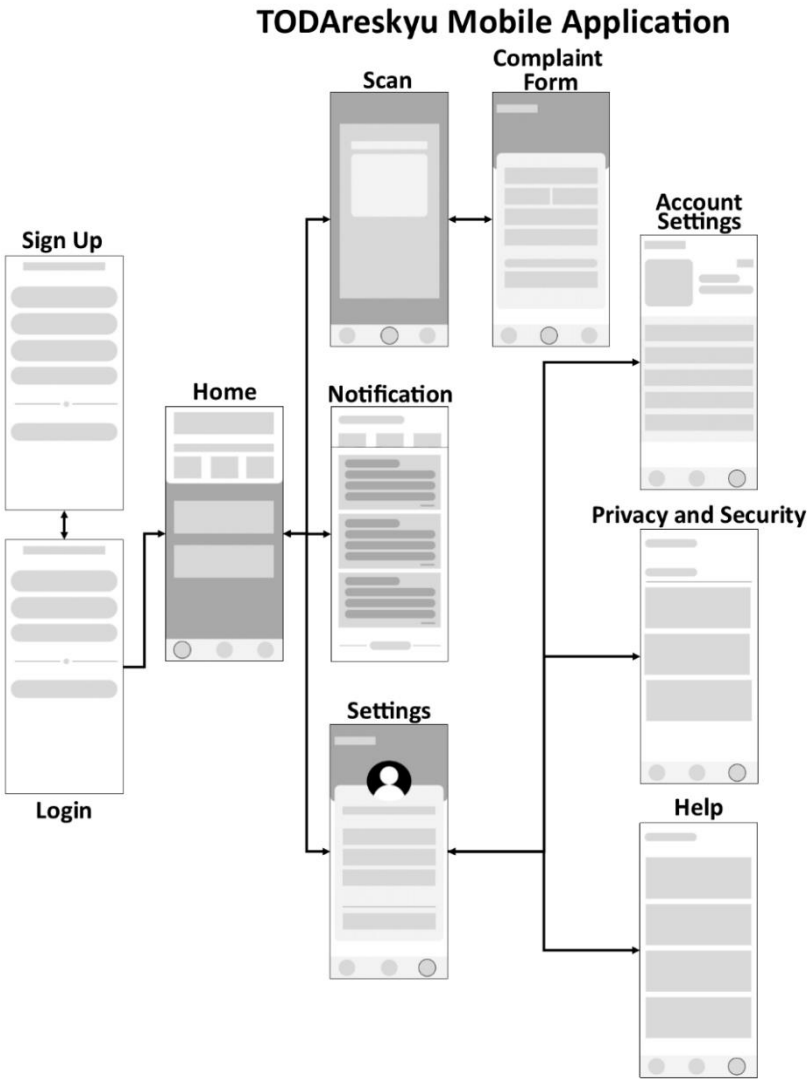

Figure 13. Screen Hierarchy of Mobile Application of TODAreskyu

Figure 13 shows the TODAreskyu mobile app's documentation, the screen hierarchy is visually represented to illustrate the flow and structure of the application. Starting with the Sign Up and Login screens, users are guided through the initial access points of the app. Once logged in, they arrive at the Home screen, which acts as the main navigation hub.

From the Home screen, users can proceed to three main sections: Scan, Notification, and Settings. The Scan section is designed to scan QR codes, allowing the system to automatically identify the tricycle driver involved in a complaint. This information is then seamlessly transferred to the Complaint Form, where the driver's details are auto-filled, streamlining the reporting process. The Notification section provides updates on complaints, while the Settings section includes sub-options for Account Settings, Help, and Privacy and Security to customize the user experience.

Use Case Diagram

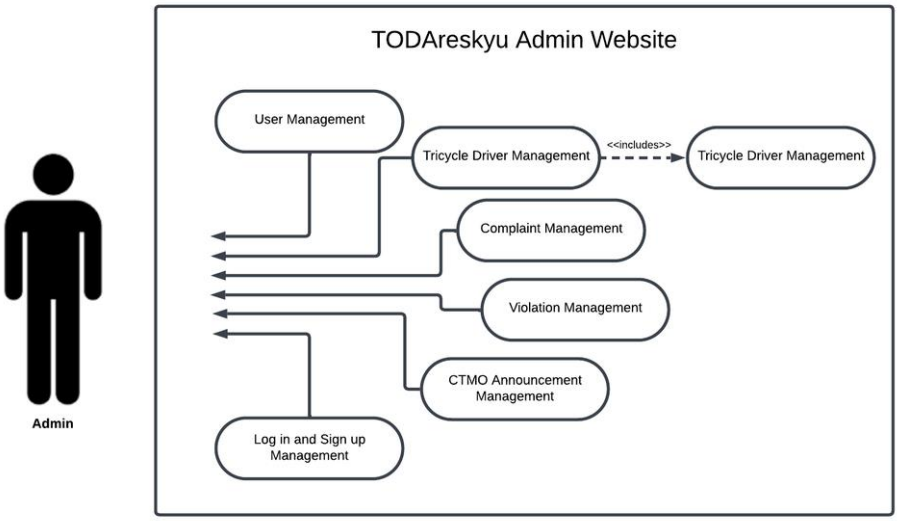

Figure 14. Use Case Diagram of Administrator TODAreskyu Website

Figure 14 shows how the administrator can manage the whole system. The administrator has login and signup functionalities, allowing them to securely access the system. Once logged in, they can view, update, and manage the information of both users and tricycle drivers on the TODAreskyu website.

Additionally, they administer TODA (Tricycle Operators and Drivers' Association) information that is included in Tricycle Driver Management. The admin is capable of handling complaints filed by users against drivers which includes tracking complaints, issuing violations, and responding to user concerns. They can also manage violations and CTMO (City Traffic Management Office) announcements, ensuring functional system operation and effective communication within the TODAreskyu platform.

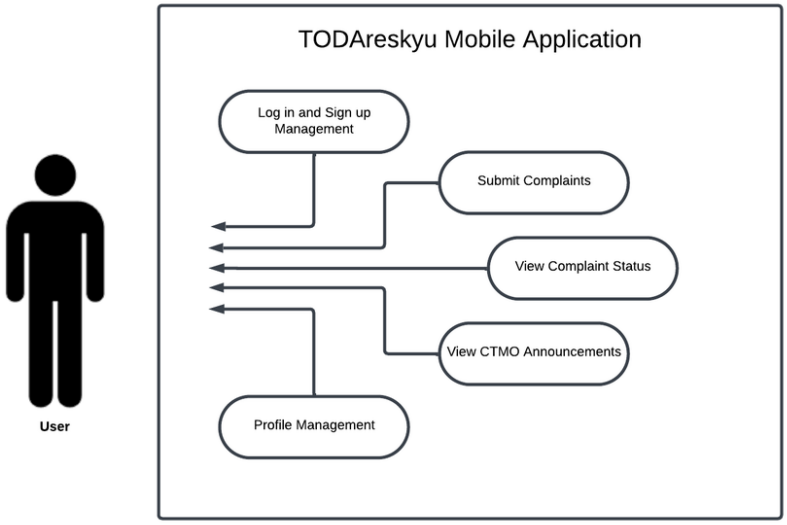

Figure 15. Use Case Diagram of User of TODAreskyu Mobile Application

Figure 15 shows key functionalities that streamline the reporting of tricycle driver violations. Users can log in and sign up through the app, providing secure access to the system. Once logged in, they can easily submit complaints through the app, detailing incidents of driver misconduct or violations. Once submitted, they can view the status of their complaints in real-time, allowing them to track whether their reports are pending, ongoing, or settled. Additionally, users have access to CTMO announcements, where important updates and information from the City

Traffic Management Office are shared. Through profile management, users can update and edit their personal information, ensuring their details are always accurate and up to date.

Project Development

The project employed a modified approach to the Waterfall methodology, integrating the Spiral model for system development and CRISP-DM for data analytics. Unlike the traditional Waterfall model's linear progression, the Spiral model facilitates iterative development cycles, where each phase builds on the results of the previous one. Meanwhile, CRISP-DM offers a structured approach to data analytics, guiding the process through iterative stages to refine and enhance analytical insights. This combination ensures both system development and data analytics evolve through continuous refinement and integration.

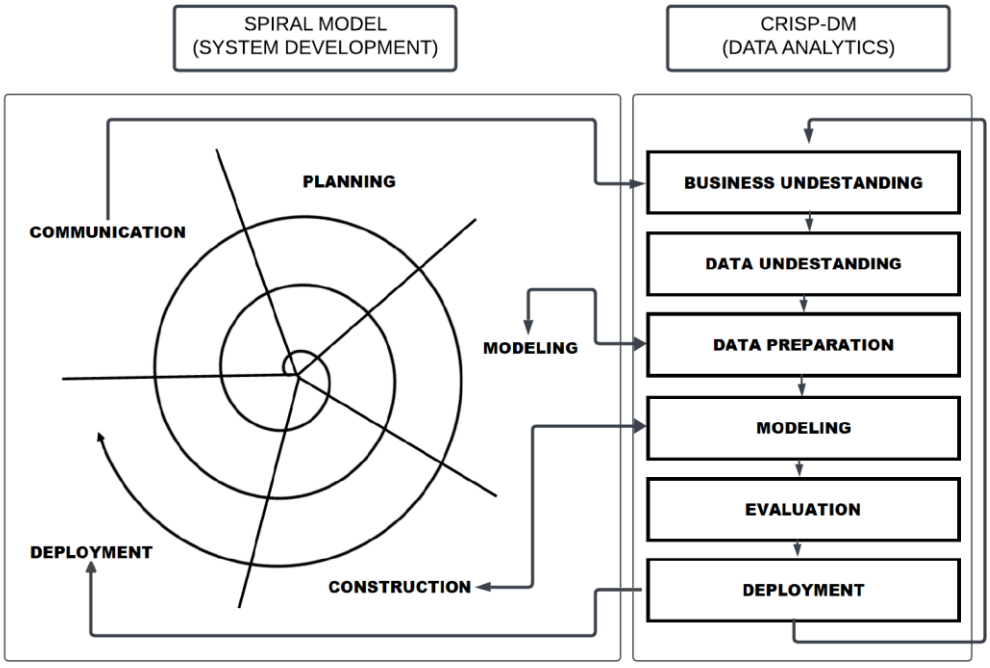

Figure 16. Spiral Model and CRISP-DM of TODAreskyu Application

Spiral Model (System Development)

The Spiral Model is a software development methodology that combines iterative cycles with risk management, focusing on continuous refinement and stakeholder feedback.

Phase 1: Communication

This phase will focus on gathering critical information through interviews with the San Pablo City Transportation Management Office and tricycle passengers. These interviews aim to provide a deep understanding of the current complaint management processes, common issues, and challenges faced within San Pablo. By obtaining insights from both the CTMO and commuters, developers can define the key objectives and requirements for the TODAreskyu App, ensuring the system addresses real-world problems. This phase helps in shaping a clear vision of how the app will improve complaint management and overall operational efficiency, aligning it with the specific needs of the stakeholders involved. The collected data will serve as the foundation for the first phase of the CRISP-DM (Cross-Industry Standard Process for Data Mining) model, which is Business Understanding.

Phase 2: Planning

In the Planning Phase of the Spiral Model, the project team sets goals, defines requirements, and considers limitations, involving stakeholders for feedback. Risk assessment prepares for potential obstacles, with backup plans ready. An initial project schedule details goals, key points, deadlines, and necessary resources.

Phase 3: Modelling

During the Modelling Phase of the Spiral Model, the primary focus lies in creating models or prototypes to depict different facets of the software. This involves designing the system architecture to delineate its components and interactions, formulating data models and schema diagrams for database design, crafting user interface prototypes for UI design, outlining algorithms and logic in pseudocode, defining API specifications for communication, and developing Data Flow Diagrams (DFDs) to illustrate data movement with the help of Data Preparation from the CRISP-DM. These activities aim to furnish stakeholders with visualizations and blueprints of the system's design, enabling feedback, validation, and informed decision-making before advancing to the subsequent development phase.

Phase 4: Construction

Construction, the system development process parallels the Modeling phase in the CRISP-DM framework, as both involve the core task of building and coding the solution. Developers utilize various scripting languages such as CSS, PHP, HTML, and JavaScript, alongside MySQL for data storage. For mobile development, React Native with Expo is used to build the application. Testing encompasses unit testing to verify individual component functionality and system testing to validate overall performance. Integration merges all elements to form the complete system, which is then deployed for initial use or further evaluation. Debugging and troubleshooting are integral during this phase. Iterative refinement

takes place based on feedback and testing outcomes to uphold quality standards and meet stakeholder expectations.

Phase 5: Deployment

During the Deployment Phase of the Spiral Model, the software is prepared for release, with user feedback crucial for refinement. This phase includes finalizing configurations, packaging the software, and conducting acceptance testing to ensure satisfaction. Tasks involve verifying deployment procedures, releasing the software to production or staging environments, and providing user training. Collecting user feedback is essential during this phase. Post-deployment, activities focus on monitoring performance, gathering feedback, and making updates, ensuring continuous improvement aligned with the Spiral Model's iterative approach.

CRISP-DM or Cross-Industry Standard Process for Data Mining (Data Analytics)

The CRISP-DM (Cross-Industry Standard Process for Data Mining) framework offers a structured approach for analyzing data trends, essential for improving the TODAreskyu complaint management system. The process involves several key phases:

Phase 1: Business Understanding

In the Business Understanding phase, the focus is on defining the objectives and requirements for the data analysis project. It ensures that the analytics are aligned with overall project goals by collecting data on commuter

behaviors within the app such as complaint submission times and most common types of violations, as well as identifying patterns and trends in violations by time, location, or driver to support CTMO actions.

Phase 2: Data Understanding

In the Data Understanding phase of the CRISP-DM model of the project, the researchers will begin collecting and exploring data related to users, drivers, violations, locations, resolutions, and dates. This involves gathering comprehensive datasets on each of these aspects: user profiles and their reporting histories, driver details and their violation records, types of violations and their descriptions, geographical data on locations where violations occur, outcomes and timestamps of resolutions, and relevant dates for each record. The insights gained here prepare the groundwork for the next steps in data analysis and align with Data Preparation in CRISP-DM, setting the stage for effective modeling.

Phase 3: Data Preparation

In the Data Preparation phase, the focus shifts to cleaning and transforming the data to make it suitable for analysis. This involves handling missing values, removing duplicates, and converting data into the appropriate format for modeling. Effective data preparation ensures that the analysis is based on high-quality, relevant data, and directly connects to the Modeling phase of CRISP-DM. This preparation is essential for developing accurate and reliable models in the Spiral Model’s Modeling phase.

Phase 4: Modeling

The Modeling phase involves developing and testing data using data visualizations such as bar charts, line charts, and tables to visually represent data patterns and trends. The results from this phase inform the Construction phase of the Spiral Model, where system development and refinement are carried out based on the analytical insights obtained.

Phase 5: Evaluation

In CRISP-DM, the Evaluation phase involves assessing the performance of analytical models to ensure they meet business objectives. This phase focuses on validating the results of the data analysis and confirming that they contribute effectively to the project's goals.

Phase 6: Deployment

The Deployment phase involves implementing the findings into the practical application of the TODAreskyu system. This phase integrates descriptive data analytical tools to show the summary of data that has been prepared from the last phases. It aligns with the Deployment phase of the Spiral Model, which focuses on releasing the software, integrating feedback, and making necessary updates to ensure continuous improvement and alignment with user needs.

Project Testing and Evaluation

The website and mobile application underwent several testing methodologies, including functionality testing using different test scenarios, browser testing, mobile compatibility testing and performance testing. For

evaluation, the User Experience Questionnaire (UEQ) was utilized to gather insights on user interaction and satisfaction.

Functionality Testing

Functionality testing was conducted to validate the core features of the application against predefined test scenarios. The developers conducted testing to verify that the system meets its objectives and evaluate the interface to ensure all functions are working properly. This approach assisted the developers in determining if the system is functionally working for administrators and users. Additionally, testing provided valuable insights into areas requiring improvement. Each test scenario followed a structured format to ensure consistency and thoroughness. Below is an example format used in functionality testing:

Table 1. Functionality Testing

<table>
<tr><td>TEST SCENARIO</td><td colspan="2">User Login</td><td>REMARKS</td><td>Passed or Failed</td></tr>
<tr><td>TEST CASE</td><td colspan="4">Enter valid credentials and log in successfully.</td></tr>
<tr><td colspan="5">TEST STEPS</td></tr>
<tr><td colspan="5">1. Open the application on your mobile device.
2. Enter a valid email address in the Email field.
3. Enter the corresponding password in the Password field.
4. Tap the Login button.</td></tr>
<tr><td colspan="2">EXPECTED RESULT</td><td colspan="3">ACTUAL RESULT</td></tr>
<tr><td colspan="2">User is successfully logged in and redirected to the home page.</td><td colspan="3"></td></tr>
<tr><td colspan="5">POSTCONDITION</td></tr>
</table>

Table 1 the Functionality Testing table that will be used by the developers. The format includes columns that detail specific aspects of the test. The Test Scenario column describes the particular functionality being tested. The Test Case outlines the condition or action being tested. The Test Steps provide a detailed step-by-step guide on how to execute the test, ensuring consistency across all testers. The Expected Result specifies the anticipated outcome if the functionality is working correctly. The Actual Result records the observed outcome during test execution, which is compared to the expected result. The Remarks column indicates whether the test passed or failed based on this comparison, with a status of “Passed” signifying that the expected result matches the actual result. The Postcondition states the system's state after the test. This structured approach ensured that all scenarios, including edge cases and error handling, were thoroughly tested.

Browser and Mobile Compatibility Testing

BrowserStack, a cloud-based platform for cross-browser and cross-device testing. This approach ensured that the application functioned consistently across different browsers, devices, and network conditions.

Browser Compatibility Testing focused on ensuring that the application provided a consistent user experience across major web browsers such as Chrome, Safari, and Edge. Key aspects of the testing included evaluating the user interface to ensure that elements like buttons, forms, and layouts rendered correctly across all selected browsers and operating systems. The goal was to

identify and resolve any browser-specific issues, such as layout shifts or broken features, and ensure a seamless experience for users regardless of their browser or device.

Table 2. Browser Testing

Web Browsers	Status/Result	Actual Result	Recommended
Google Chrome	Passed or Failed	Result	Yes or No
Microsoft Edge	Passed or Failed	Result	Yes or No
Apple Safari	Passed or Failed	Result	Yes or No

Table 2 displays the Browser Testing results for developers. The first column lists the browsers tested. The Status/Result column indicates whether the browser passed or failed. A pass means the browser met expectations, while a fail means it did not. The final column contains recommendations based on the results - a pass results in a recommendation, while a failure does not.

Mobile Application Testing was also performed using BrowserStack to ensure that the mobile version of the application worked seamlessly across various smartphones and tablets. Testing was conducted on different operating systems, including iOS and Android, to evaluate the behavior of the app on diverse mobile platforms. The testing included checking the responsiveness of the application's interface, ensuring smooth navigation, and verifying that key features such as form submissions, image uploads, and camera usage worked as intended across a wide range of devices.

Table 3. Mobile Compatibility Testing

Mobile Devices	Status/Result	Actual Result	Recommended
Oppo Reno 6	Passed or Failed	Result	Yes or No
Samsung Galaxy S24	Passed or Failed	Result	Yes or No
Google Pixel 8 Pro	Passed or Failed	Result	Yes or No

Table 3 displays the Mobile Compatibility Testing results for developers. The first column lists the smartphone tested. The Status/Result column indicates whether the application passed or failed. A pass means the mobile met expectations, while a fail means it did not. The final column contains recommendations based on the results - a pass results in a recommendation, while a failure does not.

Project Evaluation Procedure

The evaluation of the user experience for the TODAreskyu mobile and web application utilized the User Experience Questionnaire (UEQ), a 26-item questionnaire designed to assess user experience across six key dimensions. Respondents rated their agreement with each item using a five-point Likert scale, ranging from strongly disagree to strongly agree.

Table 4. Likert Scale of UEQ

Scale Point	Description
1	Strongly Disagree
2	Disagree

3	Neutral/Neither Agree nor Disagree
4	Agree
5	Strongly Agree

Table 4 illustrates the numerical scale and its corresponding interpretations, used to analyze the test responses.

To determine the required sample size for the survey, the A-priori Sample Size Calculator for Multiple Regression was employed. This tool is essential for ensuring that the study's sample size is statistically sufficient to yield reliable and valid results while avoiding underpowered or excessively large sample sizes. The following parameters were utilized:

Table 5. Parameters for Sample Size Calculation

Parameter	Value
Anticipated Effect Size (f^2)	0.35
Desired Statistical Power Level	0.8
Number of Predictors	6
Probability Level (α)	0.05

Table 5 presents the parameters used for calculating the minimum sample size required for the UEQ evaluation. An anticipated effect size (f^2) of 0.35 was selected, representing a medium-to-large effect size, which reflects the expected significant relationship between the predictors (the six dimensions of UEQ) and the dependent variable (overall user experience). A desired statistical power level of 0.8 (80%) was chosen to minimize the risk of committing a Type II error, ensuring

the study's ability to detect true effects in the data. The number of predictors was set at 6, corresponding to the six dimensions of the UEQ: Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. Finally, a probability level (α) of 0.05 was adopted, representing a 5% chance of committing a Type I error, which is widely accepted in information technology research to claim statistical significance. Based on these parameters, the A-priori Sample Size Calculator indicated that a minimum sample size of 46 participants was necessary, ensuring that the analysis is statistically robust and capable of producing reliable conclusions.

The UEQ evaluates six distinct dimensions of user experience, which are defined as follows:

1. **Attractiveness**: The overall impression of the product's appeal.
2. **Perspicuity**: The ease with which users can understand and become familiar with the application.
3. **Efficiency**: The extent to which users can achieve their goals quickly and effectively.
4. **Dependability**: The reliability and predictability of the application during usage.
5. **Stimulation**: The level of engagement and enjoyment provided by the application.
6. **Novelty**: The perception of innovation and creativity in the application's design and features.

CHAPTER IV

RESULTS AND DISCUSSION

The project specifications and requirements, as well as the project's capabilities and constraints, are presented in this chapter. The aforementioned chapter also includes the testing and evaluation results of the project.

Project Requirements and Specification

This section outlines the hardware, software, and human resource requirements necessary to develop and implement TODAreskyu: An Integrated Mobile and Web Application for Processing Commuter Complaints on Tricycle Driver Violations.

Hardware Requirements

The requirements and equipment that are needed for the development and implementation of the aforementioned project are as follows.

For the Development and Implementation

The following hardware specifications must be met to successfully develop and implement the system:

1. Mobile Application
    - Mobile device with a camera and internet connectivity
    - 4GB of RAM or higher
2. Website Application

- Computer with 4GB of RAM or higher
- Internet connectivity

Software Requirements

To achieve the desired results and system development goals, the developers use the various software requirements listed below.

For the Development

The software listed below is required for the development of the mobile and web applications.

1. Mobile Application
    - Front End: React Native Expo
    - Back End: Laravel
    - Development Environment: Visual Studio Code
2. Website Application
    - Full-stack Framework: Full-stack Laravel for both the front end and back end
    - Development Environment: Visual Studio Code
3. For Database
    - Local Database Development: XAMPP
    - Database System: MySQL

For Implementation

The following software is necessary for deploying and building the applications:

1. Web Application Deployment

- Web Hosting: Hostinger for website deployment
- Mobile Application Deployment
- APK Build: Build the mobile application as an APK for installation on Android devices

Human Resources Required

This section identifies the human resources that are needed for the proper execution of TODAreskyu: An Integrated Mobile and Web Application for Processing Commuter Complaints on Tricycle Driver Violations.

Administrator (CTMO Admin) - The administrator has all control over the database linked to the project and is expected to oversee data obtained by the system. The administrator's role includes handling complaints by the users, monitoring the status of the complaint, and ensuring the success of the both the mobile and the web application. Additionally, the administrator can update information, edit the complaint records, as well as oversee the backend operations of the system.

Commuters (Users of the system) - The system is mostly used by commuters who file complaints against tricycle drivers, including colorum ones. They may use the mobile or web application to submit complaints and upload evidence regarding the complaint they have filed, which would be traced and updated to their account for status tracking. The front-end features of the system are accessed by commuters for the complaint form, photo uploading, and the tracking of their complaint status.

Knowledge Requirements

The following knowledge areas are required for the effective use and operation of the TODAreskyu system:

1. **Local Traffic Rules and Regulations**
    - Knowledge of traffic laws pertaining to tricycles for both the CTMO admin and commuters so that valid complaints are made.
2. **Knowledge of System Features**
    - CTMO Admin: The ability to process complaints, manage the database, and generate reports.
    - Commuters: Basic skills to file complaints, upload evidence, and track complaint status.
3. **Technical Knowledge of Platforms**
    - Commuters: Familiarity with using mobile apps to access and use the system.
    - CTMO Admin: Knowledge of web-based tools for managing complaints.
4. **Basic Information Security**
    - Awareness of data protection and confidentiality practices for both CTMO Admin and Commuters.
5. **Complaint Processing and Feedback**
    - CTMO Admin: Understanding how to update and resolve complaints, and notify commuters of status changes.
    - Commuters: Understanding how to track complaint progress and receive updates.

Project Description

For the City Traffic Management Office and the commuting population of San Pablo City, a project titled "TODAreskyu: An Integrated Mobile and Web Application for Processing Commuter Complaints on Tricycle Driver Violations." The major objective of the project is to improve the effectiveness of the complaint management system with regard to easy reporting, monitoring, and addressing commuter complaints involving tricycle drivers, whether they are registered or not.

TODAreskyu integrates a mobile application with a web-based system, which provides CTMO administrators and commuters with a single platform for managing complaints. The system has functionalities such as complaint registration, uploading of evidence, tracking of status, management of violations, and provision of notification updates.

This enables the commuter easily to lodge their complaints and know the status; on the other hand, the Web application equips the CTMO administrators with instruments to systematically handle and monitor those complaints. Through this framework, transparency, accountability, and efficiency are enhanced thereby ensuring a better safe and coordinated tricycle system in the city.

Project Features

This section highlights the features of TODAreskyu, a system developed to enhance the complaint management process for the San Pablo City Traffic Management Office (CTMO) and commuters. The project comprises a mobile application designed for commuters to file complaints and track their statuses and

a website tailored for the CTMO to manage and process these complaints effectively. The strengths and weaknesses of the system are discussed in this section, alongside screenshots of the completed mobile and web applications, showcasing their design, functionality, and workflow.

Screen Hierarchy for Mobile Application

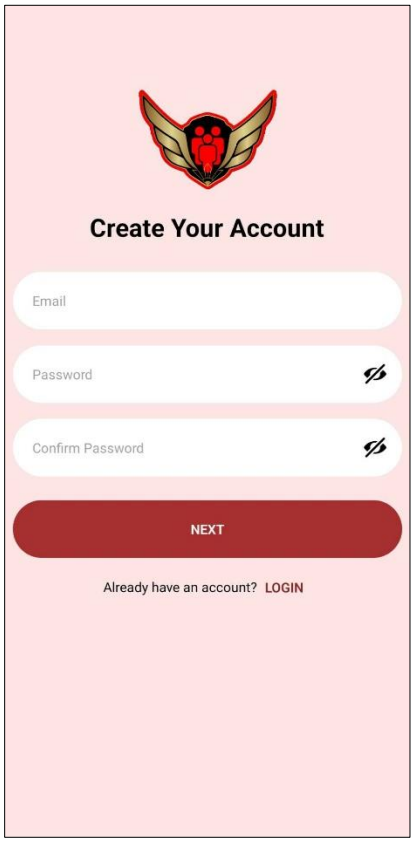

Figure 17. Sign Up Page of TODAreskyu Mobile Application

Figure 17 shows the "Create Your Account/Sign Up" screen of the TODAreskyu Mobile Application, featuring a clean layout with a logo at the top, followed by the title "Create Your Account." It includes three input fields for email, password, and confirm password, with eye icons for toggling password visibility. A

large red "NEXT" button is centered, and below it, there's a login option: "Already have an account? LOGIN." The soft pink background enhances the visual appeal.

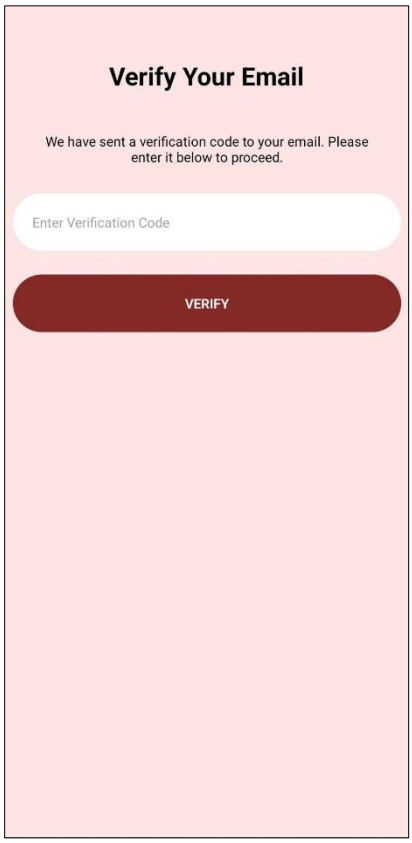

Figure 18. Verify Email Page of TODAreskyu Mobile Application

Figure 18 shows the "Verify Your Email" screen of the TODAreskyu Mobile Application. This screen prompts users to enter a verification code sent to their email. It includes an input field for the verification code and a "VERIFY" button. When the button is pressed, the app verifies the code by sending a request to the server. If the verification is successful, the user proceeds to the next step in the registration process. While loading, a full-screen activity indicator is displayed, and users are informed to wait.

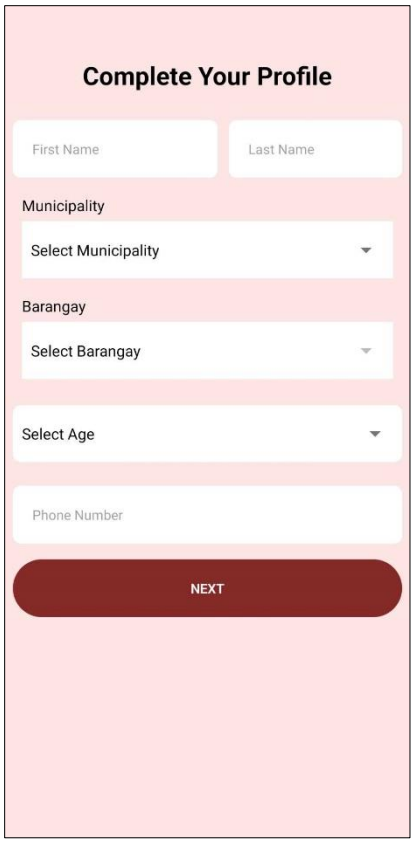

Figure 19. Complete Profile Page of TODAreskyu Mobile Application

Figure 19 shows the "Complete Your Profile" screen of the TODAreskyu Mobile Application. This screen allows users to fill in their personal information, including first name, last name, age, phone number, municipality, and barangay. The age field is a dropdown with options ranging from 13 to 79. A "NEXT" button is provided to proceed after filling in the required information. While the app is processing, a full-screen loading indicator is displayed. The screen layout includes dropdown pickers for municipality and barangay selection, with barangays being dynamically populated based on the chosen municipality.

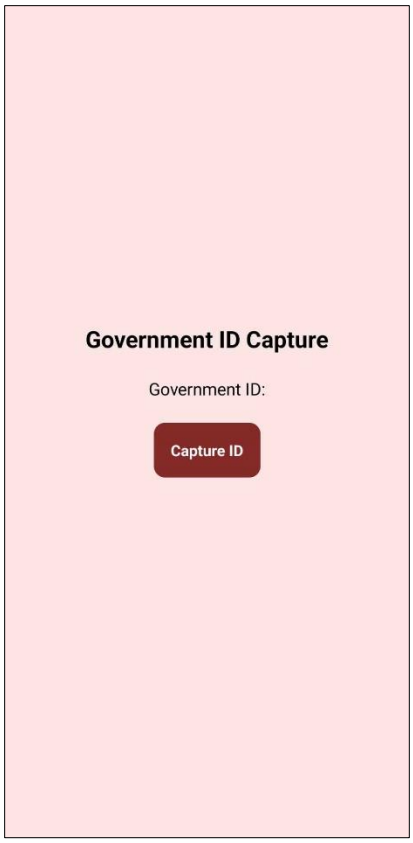

Figure 20. Government ID Capture Page of TODAreskyu Mobile Application

Figure 20 shows he "Government ID Capture" screen where allows users to capture and upload an image of their government ID. It includes a button to take a picture using the camera and displays the captured image. The user can then upload the image to the server. If no image is captured, an alert prompts the user to capture the ID before uploading. A loading indicator appears during the upload process. The screen also handles back button navigation to the Login screen and manages camera permissions. The image is uploaded via a form submission to the backend API.

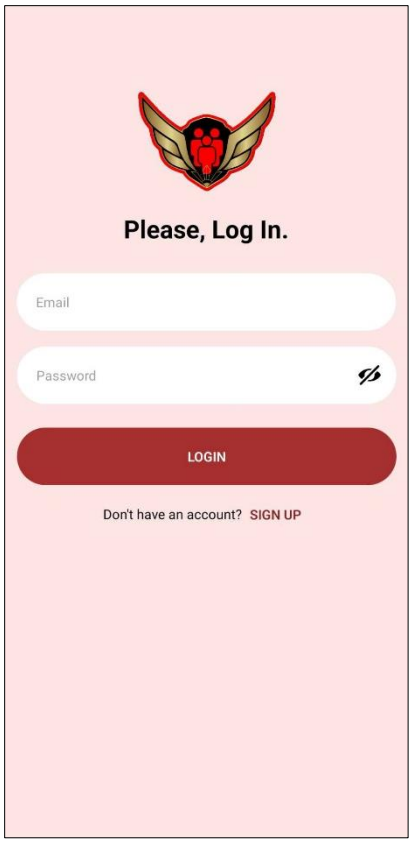

Figure 21. Complete Profile Page of TODAreskyu Mobile Application

The "Login" screen allows users to log in to the application using their email and password. It includes functionality for showing and hiding the password with an eye icon. When the user attempts to log in, the app checks the credentials and, if valid, stores the user data in AsyncStorage and proceed to the home page of the application. Based on the user's profile, it may navigate to the next step (e.g., "SignUpStepTwo" or "firstIDCamera") or the home screen. If login fails, an appropriate alert is shown based on the error received. A loading indicator is displayed during the login process. Additionally, users can navigate to the "SignUp" screen if they don't have an account.

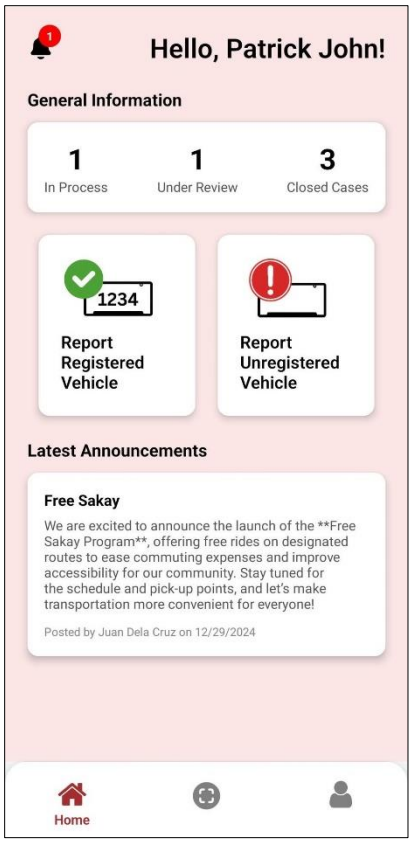

Figure 22. Home Page of TODAreskyu Mobile Application

Figure 22 shows the Home Screen of the application," which serves as the main dashboard for users after logging in. Upon loading, the screen displays the user's first name and provides case counts for complaints in different statuses—such as "in process," "under review," and "closed." The unread notification count is displayed along with an option to view notifications. The screen also displays the latest announcements, with a section to show announcements or indicate that no announcements are available. The user is presented with options to report either a registered or unregistered vehicle by navigating to the respective complaint forms.

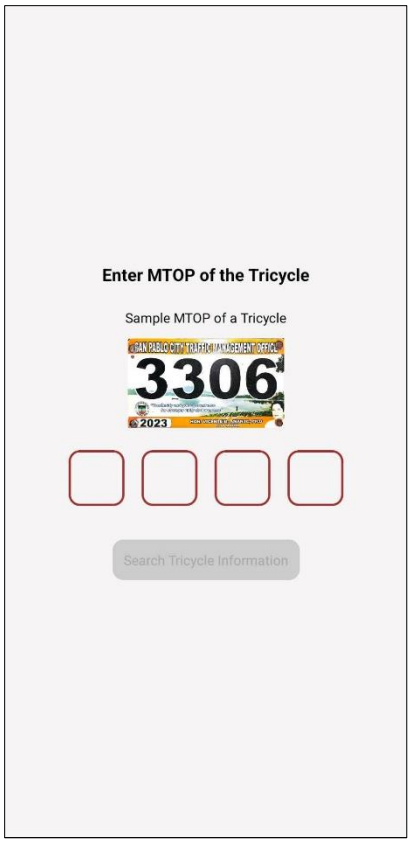

Figure 23. MTOP Input for Registered Vehicle Page of TODAreskyu Mobile Application

Figure 23 shows the MTOP Input Screen for reporting a registered vehicle. The user enters the MTOP (Motorized Tricycle Operators Permit) number in a 4-digit format, with each field accepting a single numeric digit. The "Search Tricycle Information" button is enabled after all fields are filled. When clicked, the system retrieves driver information based on the entered MTOP number. A loading modal appears while the search is in progress. Upon success, the user is redirected to the Complaint Registration Form. If no data is found, an error message is displayed. The screen also includes a sample image of a Tricycle MTOP to guide the user in entering the number correctly.

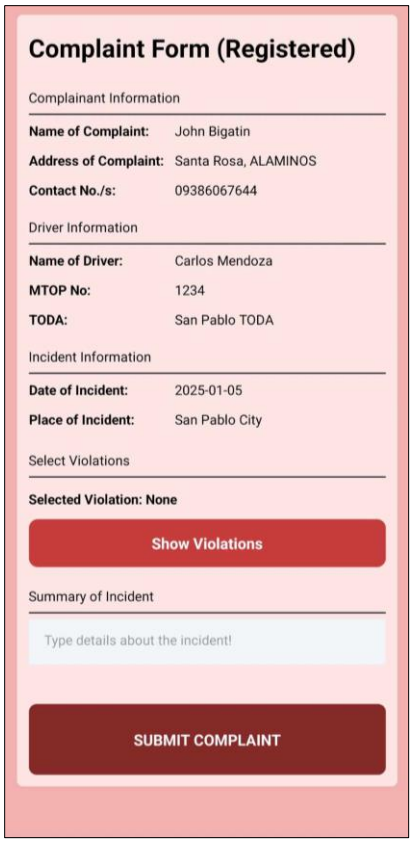

Figure 24. Complaint Registered Vehicle Form of TODAreskyu Mobile Application

Figure 24 shows a complaint form where users can report violations by registered tricycles. The form includes fields for the complainant's information, driver details, and incident specifics. The user is prompted to select a violation from a list, which appears in a dropdown menu. The incident summary is entered through a text input field, and the user can submit the complaint by pressing the button labeled "Submit Complaint". There is also a loading indicator that appears while the complaint is being processed. Additionally, a modal is displayed when the user attempts to navigate away without submitting the form, asking for confirmation.

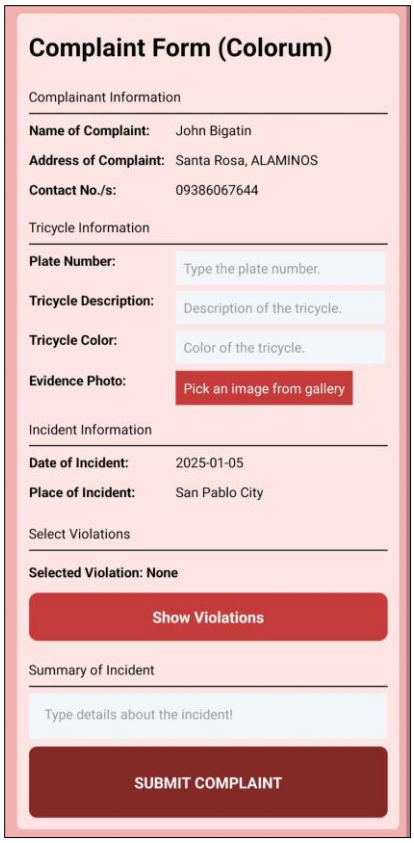

Figure 25. Complaint Unregistered Vehicle Form of TODAreskyu Mobile Application

Figure 25 illustrates the `Complaint` screen component of the mobile application, designed to allow users to file complaints regarding tricycle violations. The form is divided into sections: "Complainant Information," "Tricycle Information," and "Violation Selection." It includes input fields for the complainant's details, tricycle plate number, description, color, and an option to upload an evidence photo. The user can select a violation from a dropdown list, with a "Submit" button to send the complaint. Upon submission, the complaint details are validated, and an alert is shown confirming the submission. A modal is triggered when the back button is pressed, asking whether the user wishes to exit without saving.

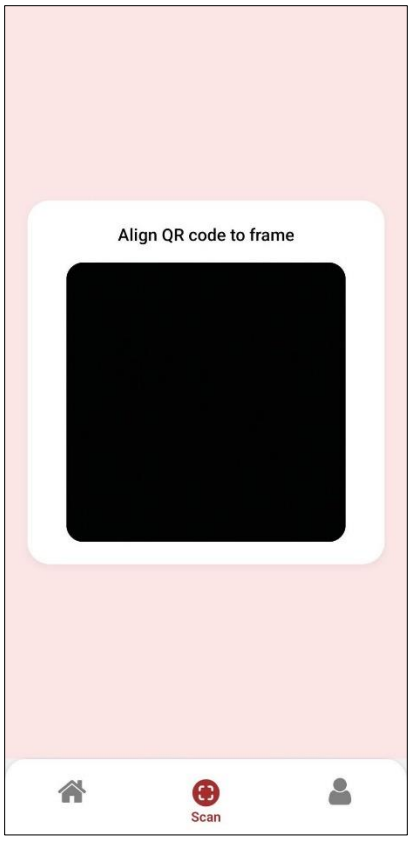

Figure 26. QR Code Scan Page of TODAreskyu Mobile Application

Figure 26 shows the QR code scanner screen in the mobile application. It includes a camera view where users can scan QR or PDF417 barcodes. Upon scanning, it fetches driver data from the API and navigates to a complaint form page with the scanned driver information. If the app lacks camera permissions, the user is prompted to grant them. The component also prevents multiple scans or navigation to avoid errors. The layout is designed with a centered camera view and a message prompting the user to align the QR code to the frame.

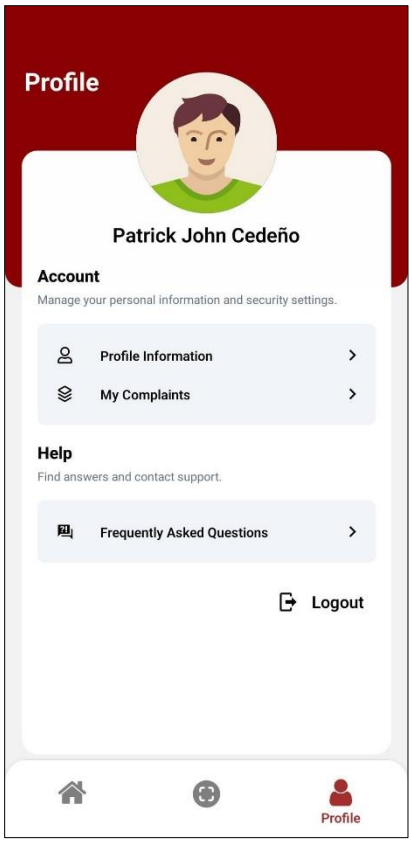

Figure 27. Profile Page of TODAreskyu Mobile Application

Figure 27 displays the user's profile, including personal information and settings options. It features a profile picture, the user's name, and navigation to account management, security settings, and complaint history. Users can also log out, with a loading indicator shown during the process. The layout is designed with a clean interface, including options for managing personal information, viewing frequently asked questions, and navigating to different sections of the app. The page ensures smooth user interaction by providing visual feedback when the app is processing.

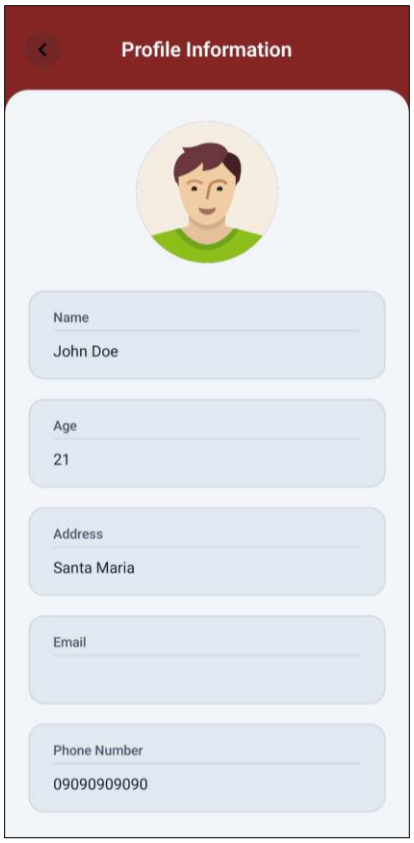

Figure 28. Profile Information Page of TODAreskyu Mobile Application

Figure 28 allows users to view their profile information, including their name, age, address, email, and phone number. The user's profile picture is displayed at the top, and each section of personal information is organized in a card-like layout for clarity. A back button is provided for navigation to the previous screen. If the profile information is still loading, a loading indicator is shown. If there's an error loading the data, an error message is displayed. This page ensures smooth navigation and clear presentation of user details.

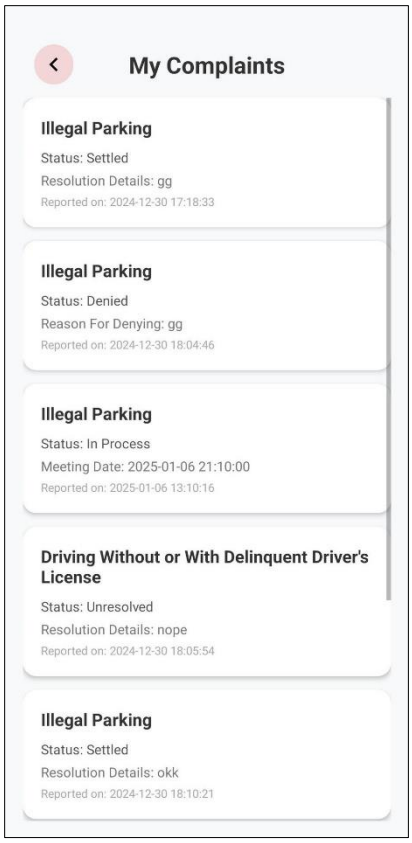

Figure 29. Complaints List Page of TODAreskyu Mobile Application

This screen displays a list of complaints filed by the user, showing the status of each complaint along with additional details. The complaints are fetched from the server based on the logged-in user, and the list is dynamically updated. Each complaint displays the violation name, status, and specific details such as meeting date, reason for denial, or resolution details, depending on the complaint's status. If no complaints are available, a message is displayed indicating that no complaints have been reported yet.

The design includes a back button to navigate to the profile screen, enhancing the user experience by providing easy navigation. The layout is clean and organized, ensuring that the user can quickly understand the status and details of their complaints.

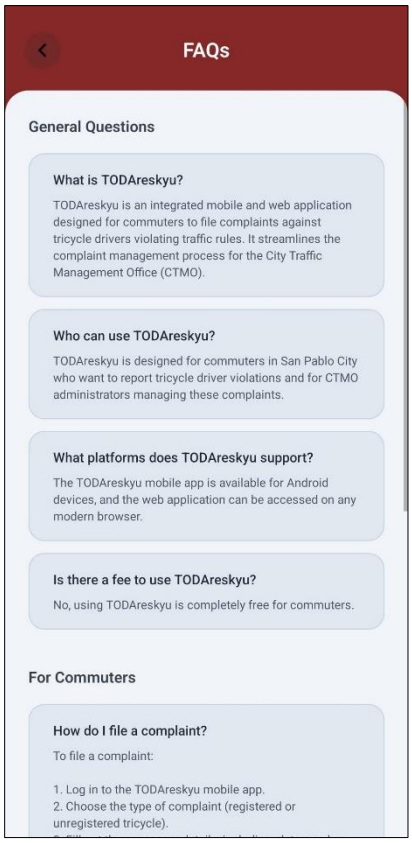

Figure 30. Frequently Asked Questions Page of TODAreskyu Mobile Application

Figure 30 displays the FAQ screen of the TODAreskyu mobile application. It provides users with categorized questions and answers related to general inquiries and specific commuter-related concerns. The page layout includes a back button for navigation, a title section, and a scrollable area for the FAQ content. The FAQ content is organized into two main categories: "General Questions" and "For Commuters." Each category contains several questions, along with detailed answers that guide users on how to use the application, file complaints, and check complaint statuses. The interface is clean and user-friendly, with a consistent color scheme and well-spaced elements to facilitate easy reading and interaction.

Screen Hierarchy for Website

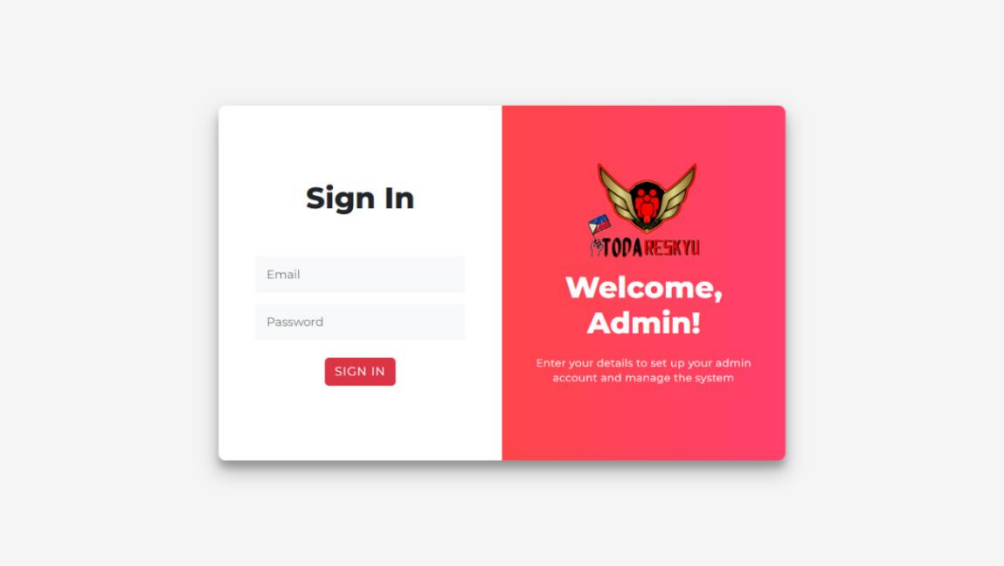

Figure 31. Sign In Page of TODAreskyu Website

Figure 31 provides a sign-in page for accessing the TODAreskyu website. It is the initial screen displayed when the system is used. The Sign-in page consists of a login form where the admin will enter their email and password, the “SIGN IN” button, the website logo, and a welcoming message to show the system’s purpose.

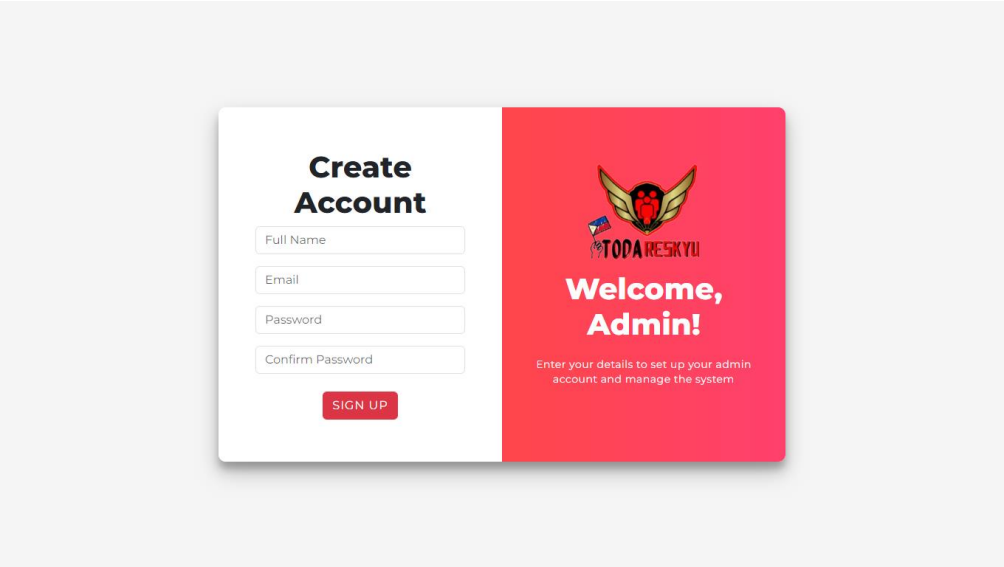

Figure 32. Sign Up Page of TODAreskyu Website

The registration page on the TODAreskyu website allows users to create an account by filling out a form with their full name, email, password, and confirming their password. The page also includes a "SIGN UP" button, the website logo, and a welcoming message explaining the purpose of the system.

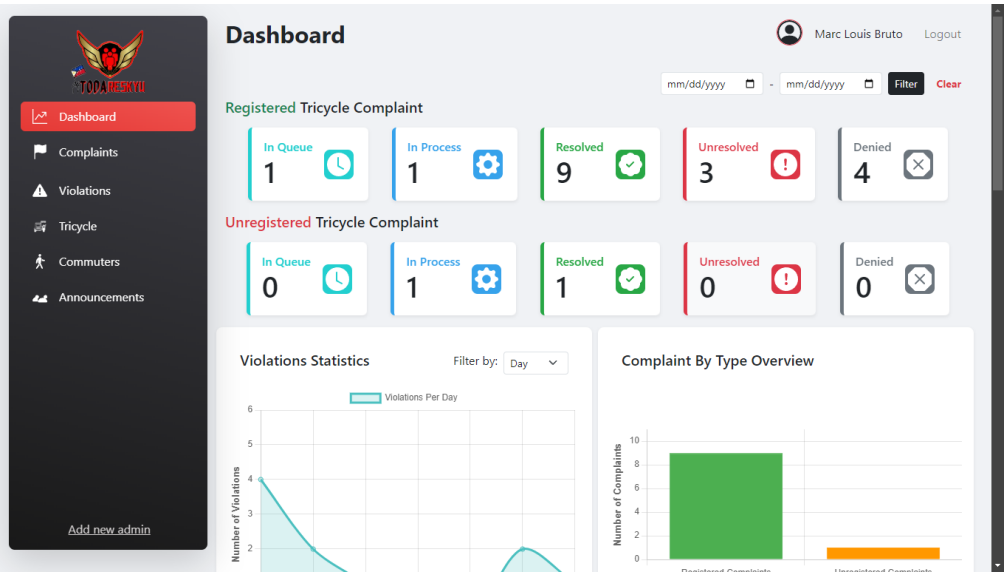

Figure 33. Dashboard Page of TODAreskyu Website

Figure 33 shows the TODAreskyu system's dashboard page. It features a navigation menu that allows user admins to switch between webpages, such as Dashboard, Complaints, Violations, Tricycle, Commuters, and Announcements. Additionally, the dashboard includes a date filter on the top of the screen, which enables users to filter the data displayed. The logged-in user name is displayed on the top as well as the “Log out” button for logging out. Each complaint status for both registered and unregistered tricycle complaints includes a number indicating the total complaints under each status. Furthermore, the system features graphical representations, including Violation Summary, Complaint by Type Overview, Status Summary, and Violation Statistics for enhancing data interpretation.

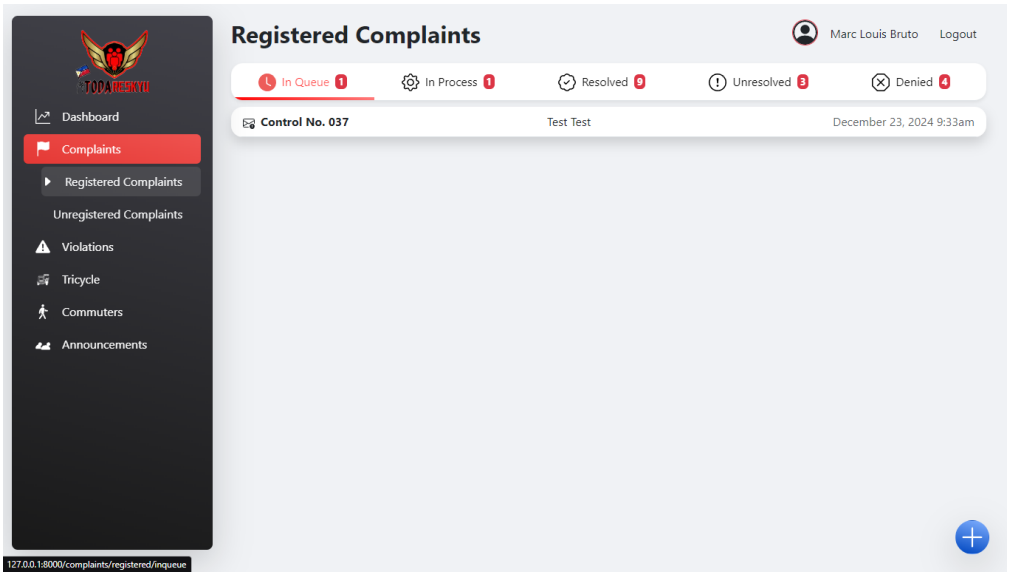

Figure 34. Registered Complaints In Queue Page of TODAreskyu Website

The screen shows the Registered Complaints In Queue status which consists of navigation buttons on the left section and complaint items with in-queue status on the right section. Every complaint item can be clicked and display additional information to review. It also has an update button and delete button for editing and removing operations.

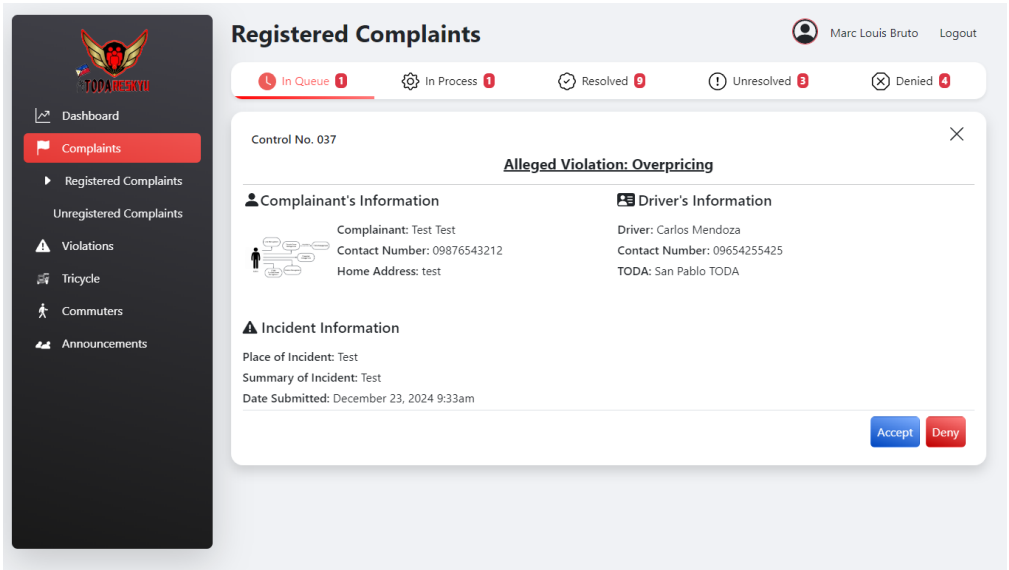

Figure 35. Registered Complaints In Queue Details Page of TODAreskyu Website

Figure 35 view additional information of the complaint for reviewing. It consists of navigation buttons and detailed complaint information. The “Accept” and “Deny” buttons are below the complaint file. The 'Accept' button enables the admin user to set the meeting date for the complainant and driver, while the 'Deny' button allows the admin user to enter the reason for denial.

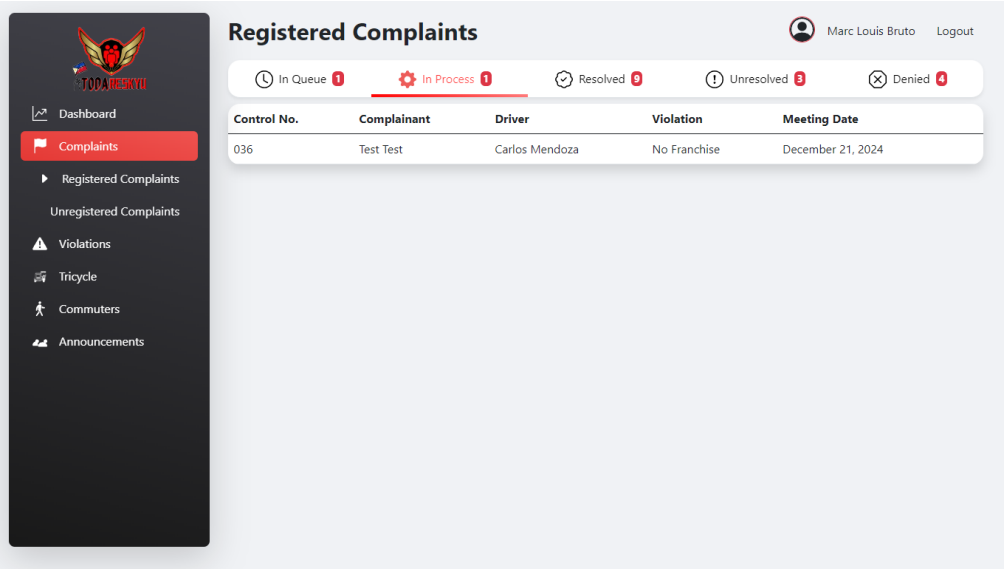

Figure 36. Registered Complaints In Process Page of TODAreskyu Website

Figure 36 illustrates the "Registered Complaints In Process" status, featuring navigation buttons on the left and complaint items marked with an in-process status on the right. Each complaint item has a control number, the complainant, the driver, the committed violation, and the meeting date. Every complaint is clickable, revealing more detailed information for review. Additionally, there are update and delete buttons to allow for editing and removal operations.

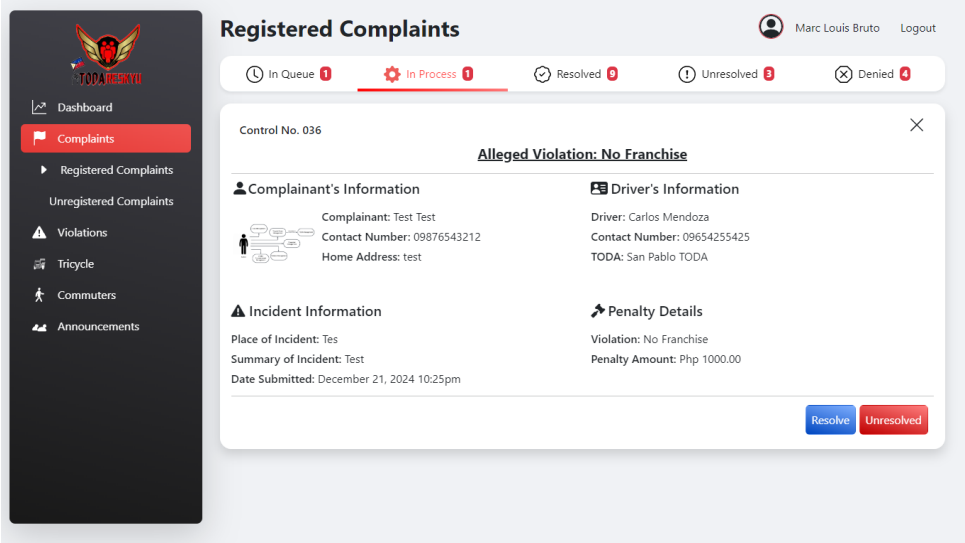

Figure 37. Registered Complaints In Process Details Page of TODAreskyu Website

Figure 37 displays the detailed information of the complaint for review. It includes navigation buttons and the complaint's specific details. Below the complaint details, the "Resolve" and "Unresolve" buttons are located. The "Resolve" button allows the admin user to set the resolution details for the complainant and driver, while the "Unresolved" button enables the admin user to provide a reason for the unresolved complaint.

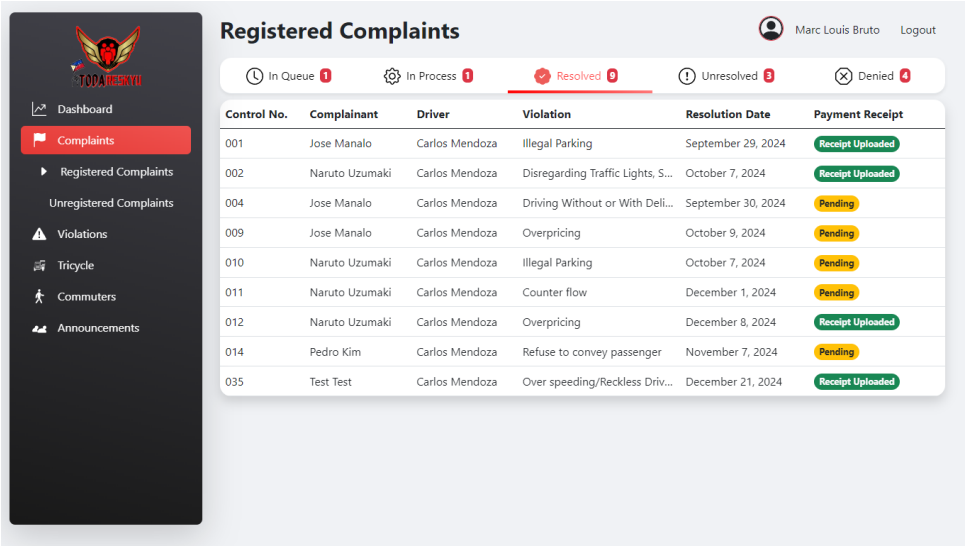

Figure 38. Registered Complaints Resolved Page of TODAreskyu Website

Figure 38 depicts the "Registered Complaints Resolved" status, with navigation buttons on the left and complaint items marked as resolved on the right. Each complaint item includes a control number, the complainant's details, the driver's information, the violation committed, and the payment receipt associated with the complaint. Every complaint is clickable, providing more detailed information for review. Additionally, there are update and delete buttons for editing and removing operations.

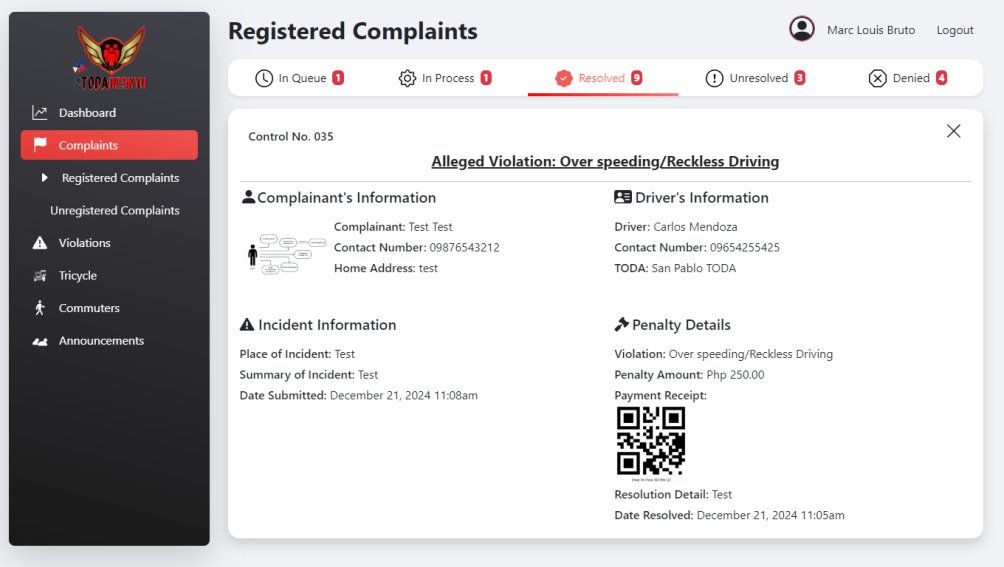

Figure 39. Registered Complaints Resolved Details Page of TODAreskyu Website

Figure 39 depicts the "Registered Complaints Resolved" status, with navigation buttons on the left and a more detailed complaint marked as resolved on the right. The complaint item includes a control number, alleged violation, complainant's information, driver's information, incident information, and penalty details. If the payment receipt is not uploaded, the user admin can submit a photo proof that the complaint has been settled.

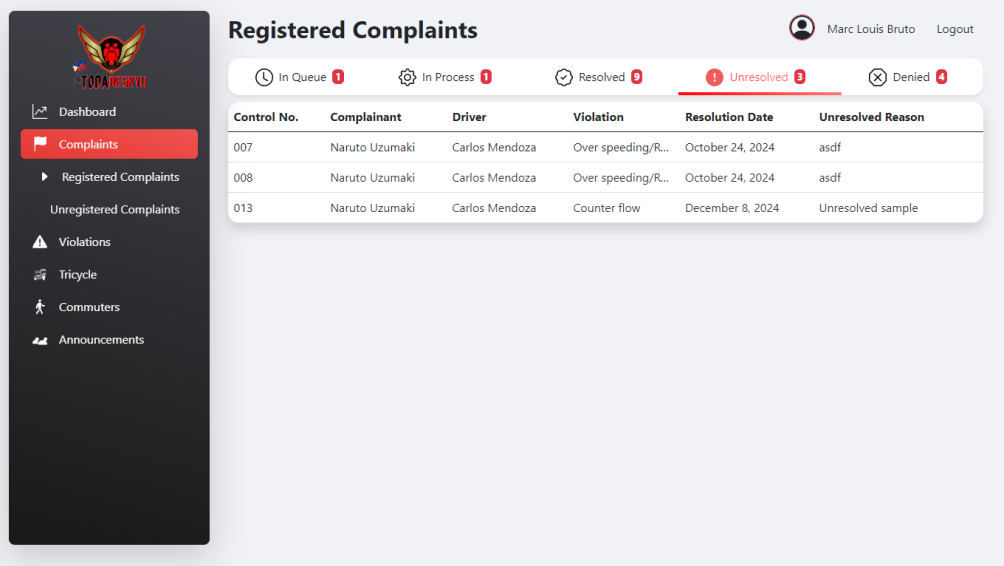

Figure 40. Registered Complaints Unresolved Page of TODAreskyu Website

Figure 40 shows the "Registered Complaints Unresolved" status, with navigation buttons on the left and complaint items labeled as unresolved on the right. Each complaint item contains a control number, details of the complainant, the driver's information, the violation committed, the resolution date, and the reason for the unresolved status. Each complaint is clickable, allowing access to more detailed information for review.

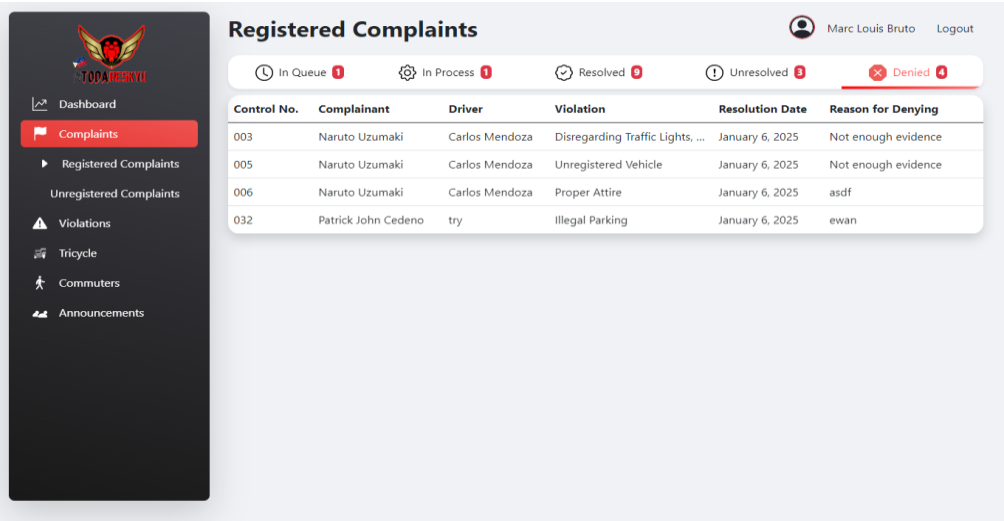

Figure 41. Registered Complaints Denied Page of TODAreskyu Website

Figure 41 displays the "Registered Complaints Denied" status, featuring navigation buttons on the left and complaint items marked as denied on the right. Each complaint item includes a control number, the complainant's details, the driver's information, the committed violation, the resolution date, and the reason for the denial. Each complaint can be clicked, granting access to further details for review.

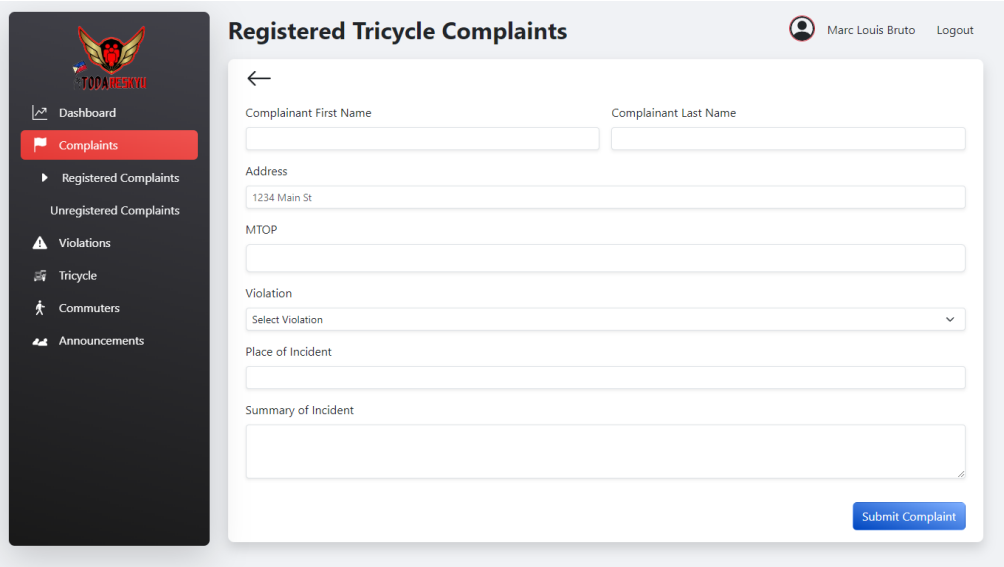

Figure 42. File a Registered Complaint Page of TODAreskyu Website

Figure 42 shows the filing of a registered tricycle complaint status, with navigation buttons on the left and a form on the right. The screen presents a form for filing a complaint through the TODAreskyu website, allowing user admins to create a new complaint. The form includes input fields for the complainant's first name, last name, address, MTOP, violation, location, and a summary of the incident. Upon submitting using the "Submit Complaint" button, the complaint is placed in the "In Queue" status.

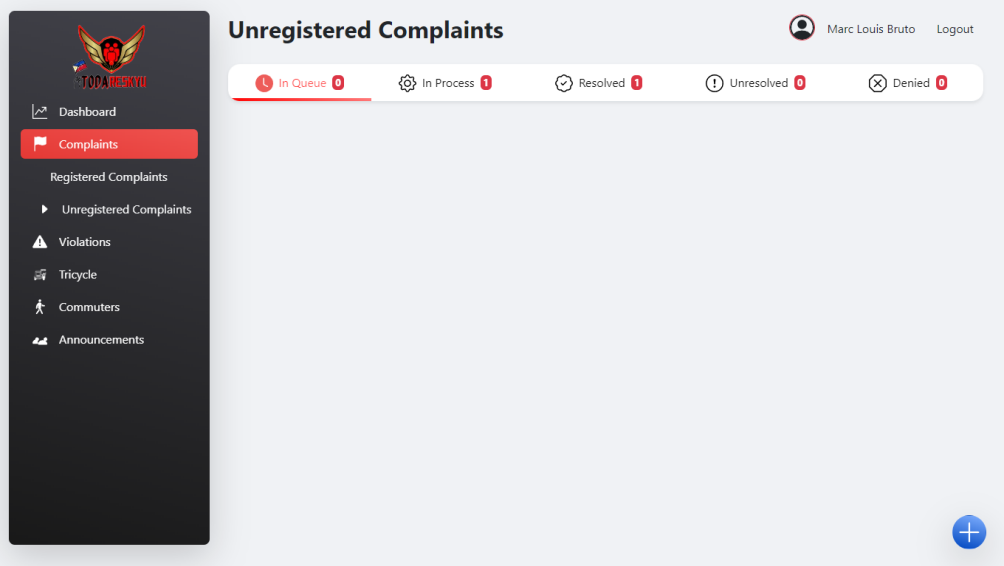

Figure 43. Unregistered Complaints In Queue Page of TODAreskyu Website

The screen shows the Unregistered Complaints In Queue status which consists of navigation buttons on the left section and complaint items with in-queue status on the right section. Every complaint item can be clicked and display additional information to review. It also has an update button and delete button for editing and removing operations.

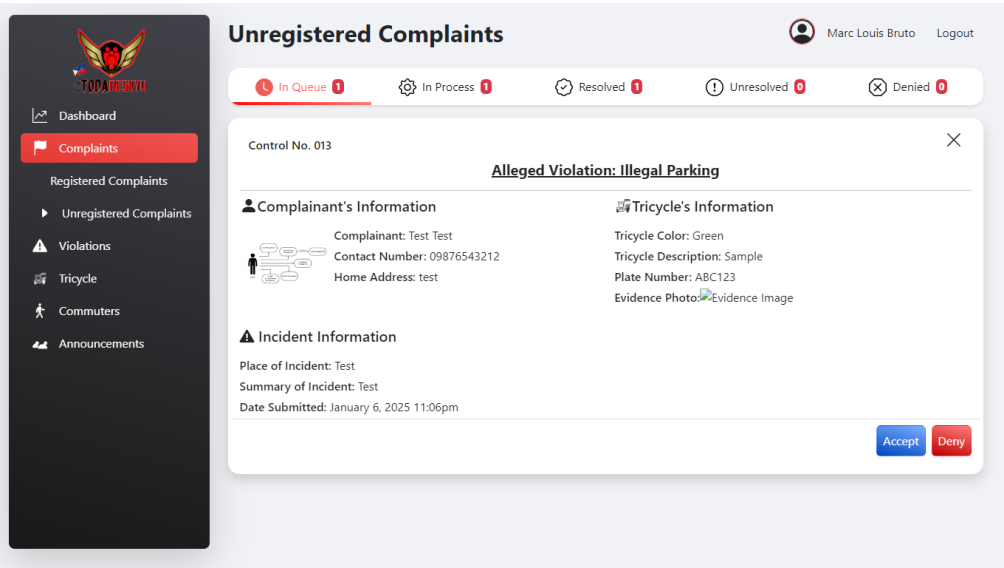

Figure 44. Unregistered Complaints In Queue Details Page of TODAreskyu Website

Figure 44 displays detailed information on the complaint for review. It includes navigation buttons and the full complaint details. Below the complaint, the "Accept" and "Deny" buttons are located. The "Accept" button allows the admin user to set the meeting date for the complainant and driver, while the "Deny" button enables the admin user to provide a reason for the denial.

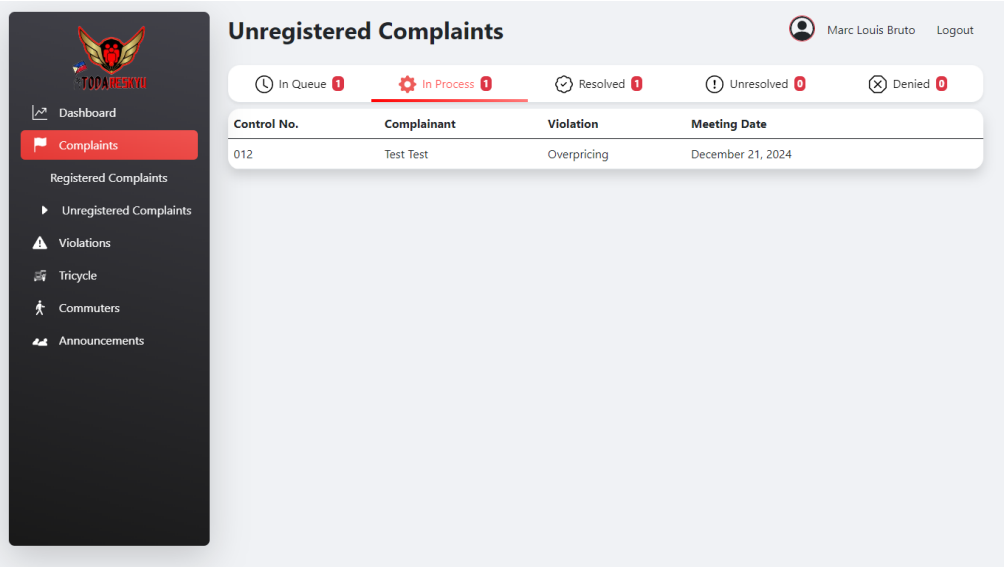

Figure 45. Unregistered Complaints In Process Page of TODAreskyu Website

Figure 45 illustrates the "Unregistered Complaints In Process" status, featuring navigation buttons on the left and complaint items marked with an in-process status on the right. Each complaint item has a control number, the complainant, the committed violation, and the meeting date. Every complaint is clickable, revealing more detailed information for review. Additionally, there are update and delete buttons to allow for editing and removal operations.

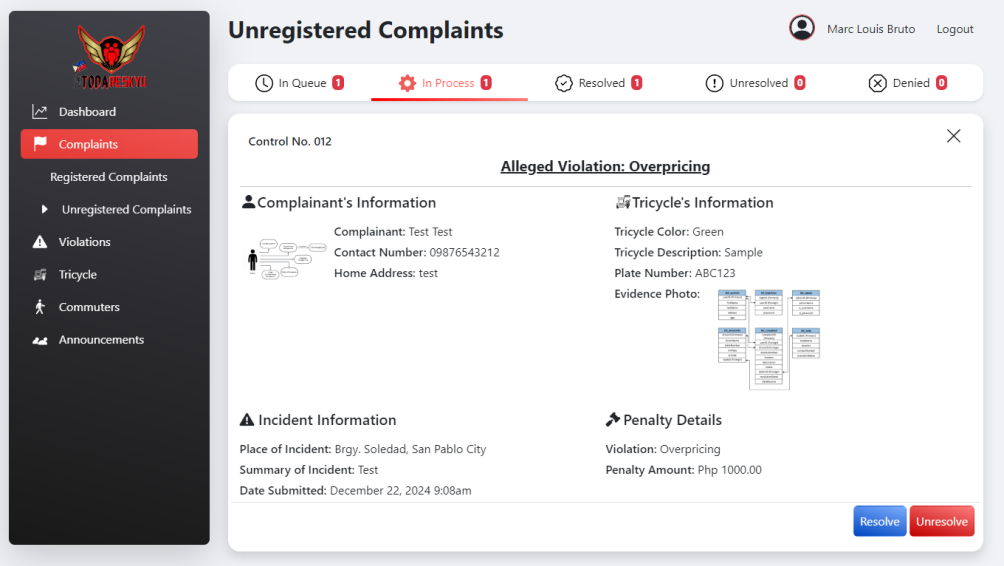

Figure 46. Unregistered Complaints In Process Details Page of TODAreskyu Website

The screen shows the detailed information of the complaint for review. It includes navigation buttons and the complaint's specific details. It contains the complainant's information, the tricycle's information such as color, description, and plate number, incident information, and penalty details. Below the complaint details, the "Resolve" and "Unresolve" buttons are located. The "Resolve" button allows the admin user to set the resolution details for the complainant and driver, while the "Unresolved" button enables the admin user to provide a reason for the unresolved complaint.

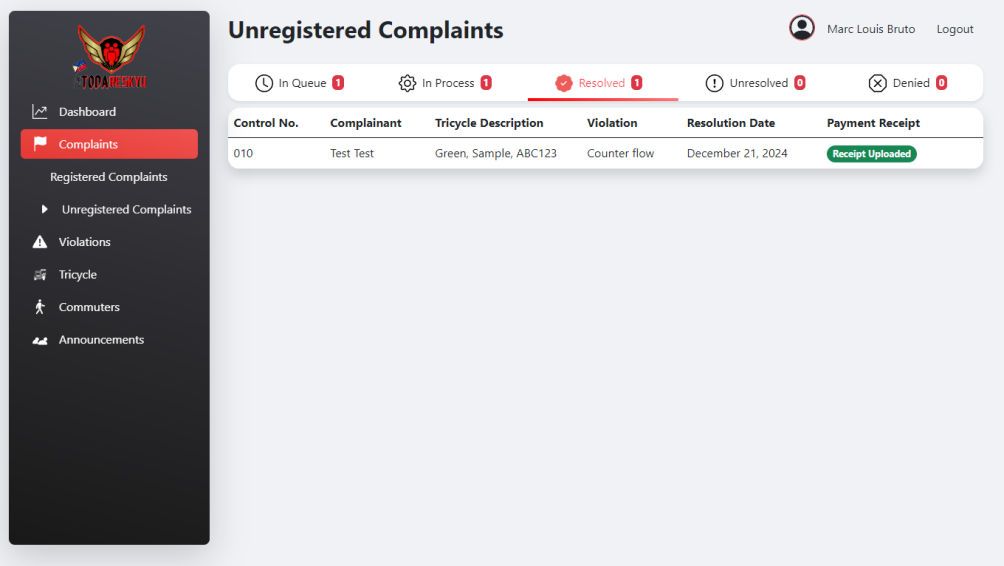

Figure 47. Unregistered Complaints Resolved Page of TODAreskyu Website

The "Registered Complaints Resolved" status is displayed in Figure 47, featuring navigation buttons on the left and complaint items labeled as resolved on the right. Each complaint item includes a control number, the complainant's details, the tricycle description, the violation committed, and the payment receipt related to the complaint. Every complaint is clickable, allowing access to more detailed information for review. Additionally, update and delete buttons are available for editing and removing operations.

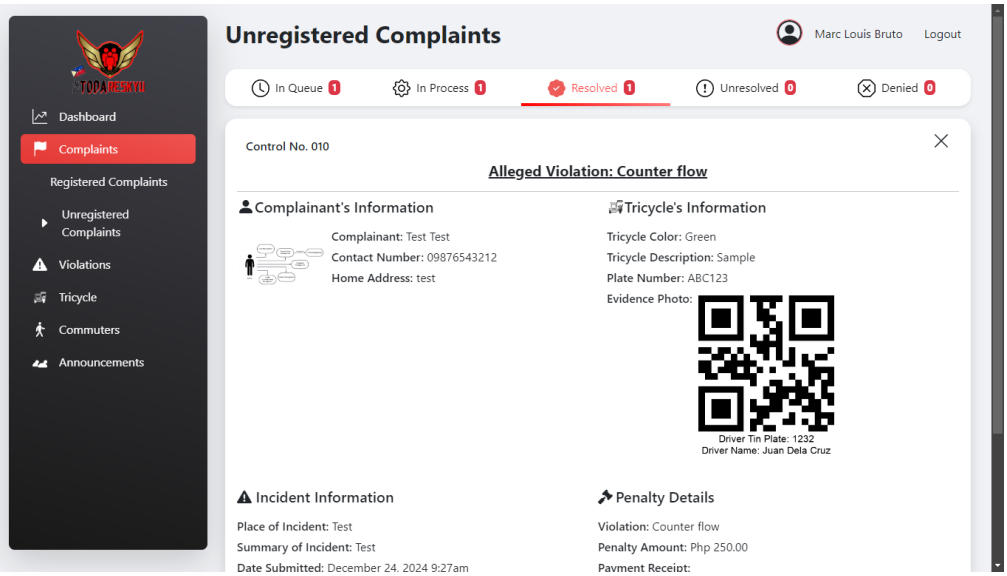

Figure 48. Unregistered Complaints Resolved Details Page of TODAreskyu Website

The "Unregistered Complaints Resolved" status is displayed in Figure 48, featuring navigation buttons on the left and a more detailed complaint marked as resolved on the right. The complaint item contains a control number, details of the alleged violation, the complainant and tricycle's information, incident details, and penalty information. If the payment receipt has not been uploaded, the admin user can submit photo proof to confirm that the complaint has been settled.

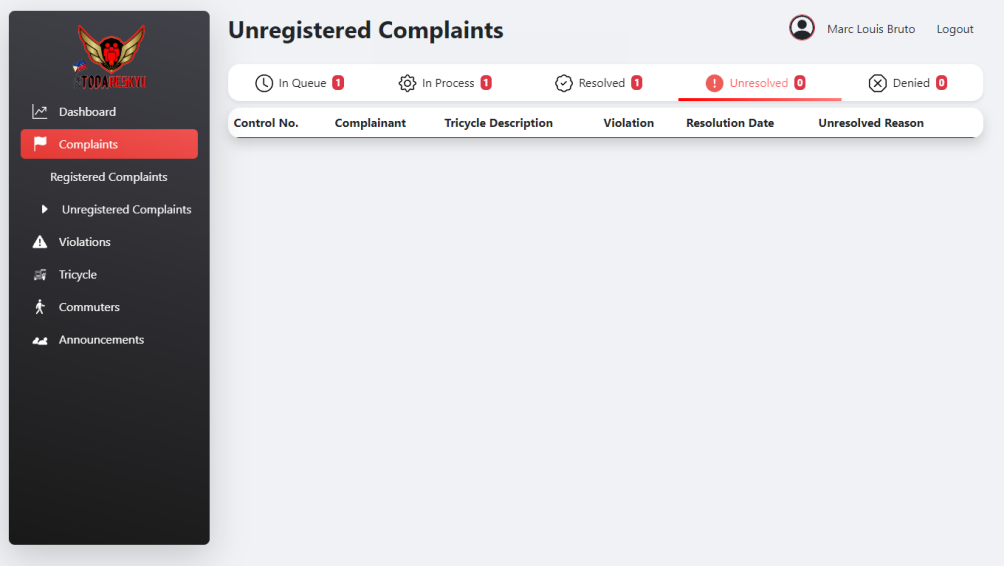

Figure 49. Unregistered Complaints Unresolved Page of TODAreskyu Website

Figure 49 shows the "Unregistered Complaints Unresolved" status, with navigation buttons on the left and complaint items labeled as unresolved on the right. Each complaint item contains a control number, details of the complainant, the tricycle's description, the violation committed, the resolution date, and the reason for the unresolved status. Each complaint is clickable, allowing access to more detailed information for review.

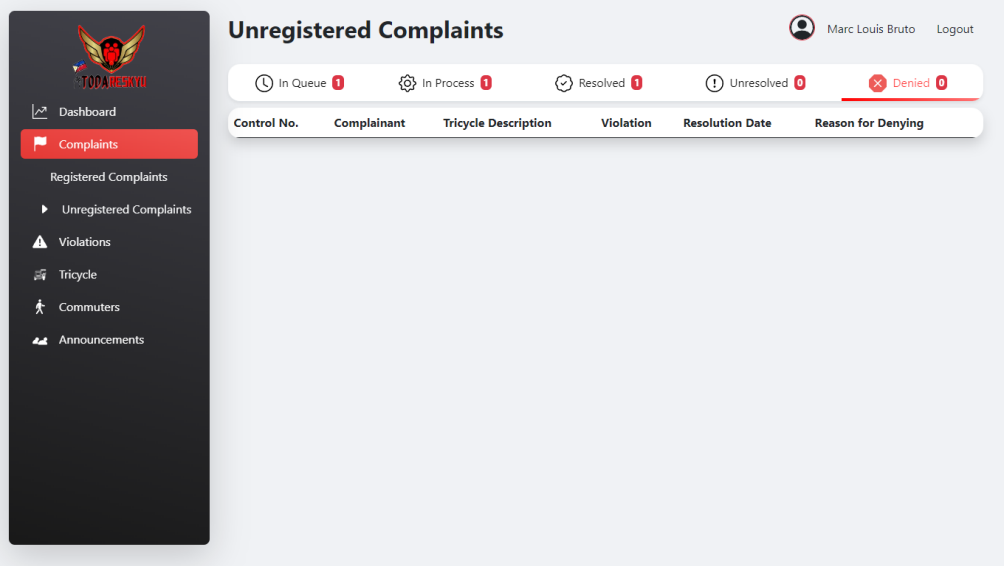

Figure 50. Unregistered Complaints Denied Page of TODAreskyu Website

The status of "Unregistered Complaints Denied" is shown in Figure 50, with navigation buttons located on the left and denied complaint items listed on the right. Each complaint item includes a control number, details of the complainant, description of the tricycle, committed violation, resolution date, and reason for denial. Clicking on each complaint allows access to additional details for review.

Figure 51. File an Unregistered Complaint Page of TODAreskyu Website

The figure displayed depicts the process of submitting an unregistered tricycle complaint, featuring navigation buttons on the left and a form on the right. The form on the TODAreskyu website allows user admins to input details for a new complaint, including the complainant's first name, last name, address, violation, evidence photo, plate number, tricycle color and description, location, and incident summary. After clicking the "Submit Complaint" button, the complaint is placed in the "In Queue" status.

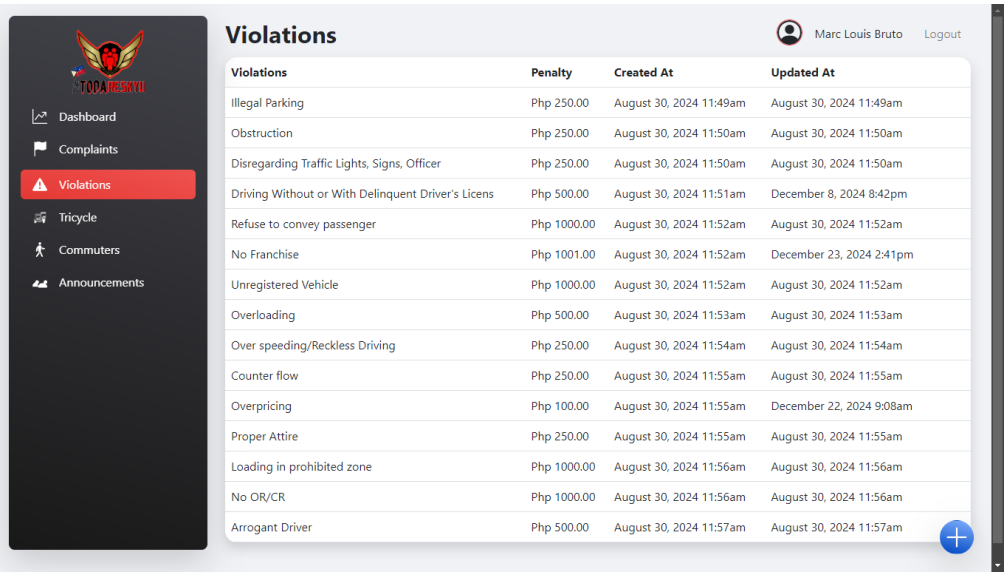

Figure 52. Violation Page of TODAreskyu Website

Figure 52 shows the violation page, with navigation buttons on the left and a list of violations on the right. Each violation contains a name, penalty price, the date of creation, and the update date. Every violation has a delete and edit operations.

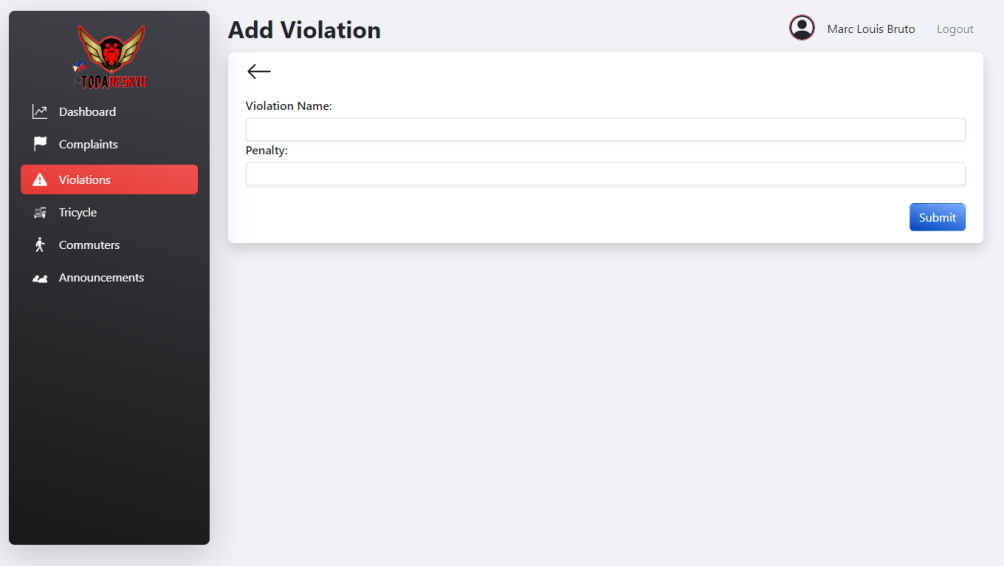

Figure 53. Add Violation Page of TODAreskyu Website

This screen allows user admins to add new violations to the system through a simple form. It consists of two input fields: one for entering the violation name and another for specifying the associated penalty. A "Submit" button is provided to save the entered details. The navigation bar on the left offers quick access to other sections of the system, such as complaints, tricycles, commuters, and announcements.

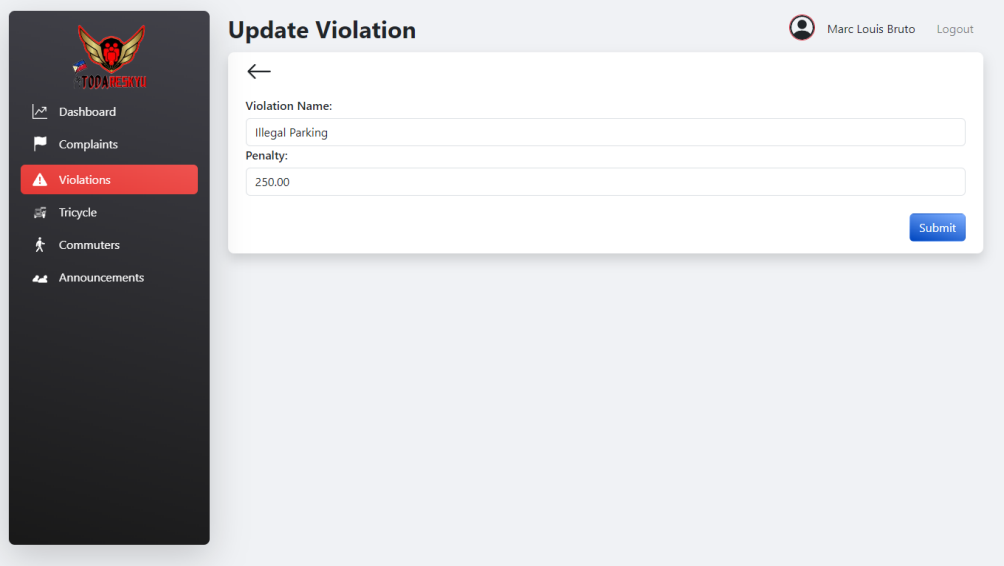

Figure 54. Update Violation Page of TODAreskyu Website

The Figure 54 enables user admins to edit existing violations in the system. It features two input fields pre-filled with the current details of the violation: one for the violation name and another for the associated penalty. Admins can update these values as needed and save the changes by clicking the "Submit" button.

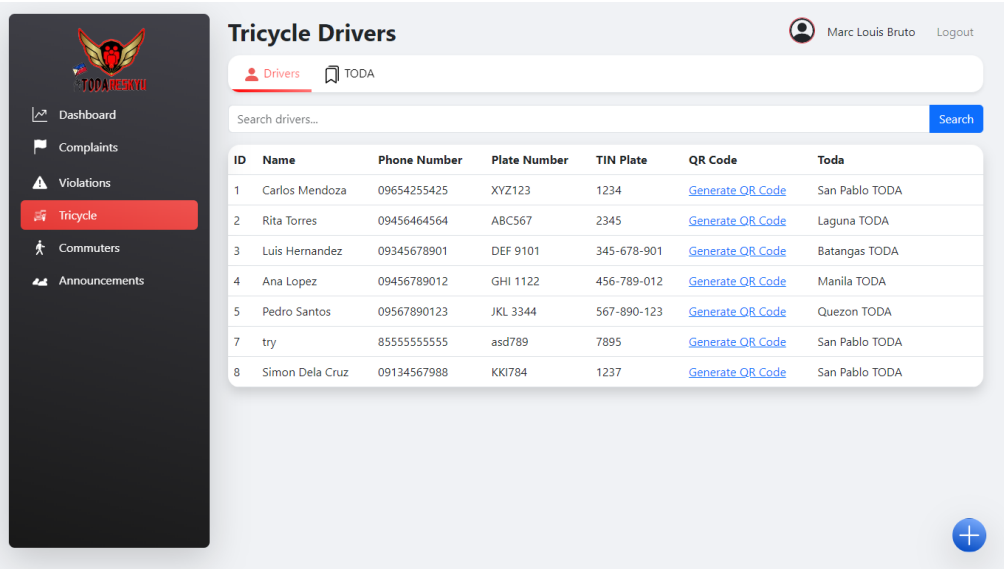

Figure 55. Tricycle Driver Information Page of TODAreskyu Website

This screen allows the user admin to monitor and manage tricycle drivers. It includes a left-side navigation panel and a secondary navigation bar for drivers and their respective TODA. Below this is a search functionality to find drivers based on specific criteria. The page displays a list of drivers with details such as ID, name, phone number, Tin Plate, QR code, and TODA. A plus button is available to add new driver information, which opens a form for the user admin to fill out.

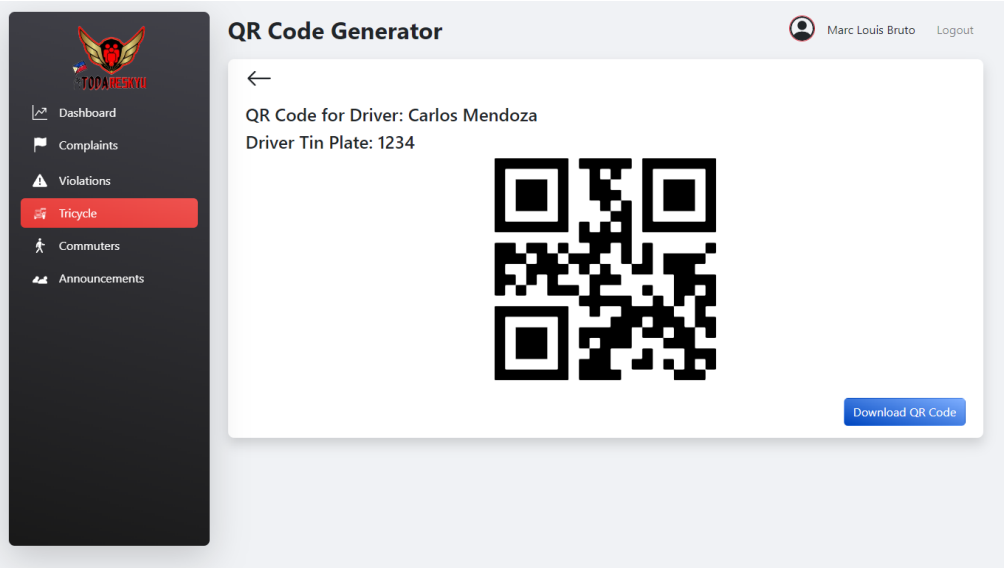

Figure 56. Tricycle QR Code Page of TODAreskyu Website

This screen enables the user admin to generate and download a QR code for a specific tricycle driver. It displays the driver's name and Tin Plate number above the generated QR code. The "Download QR Code" button allows the user admin to save the QR code for future use. Navigation options are available on the left panel for access to other features.

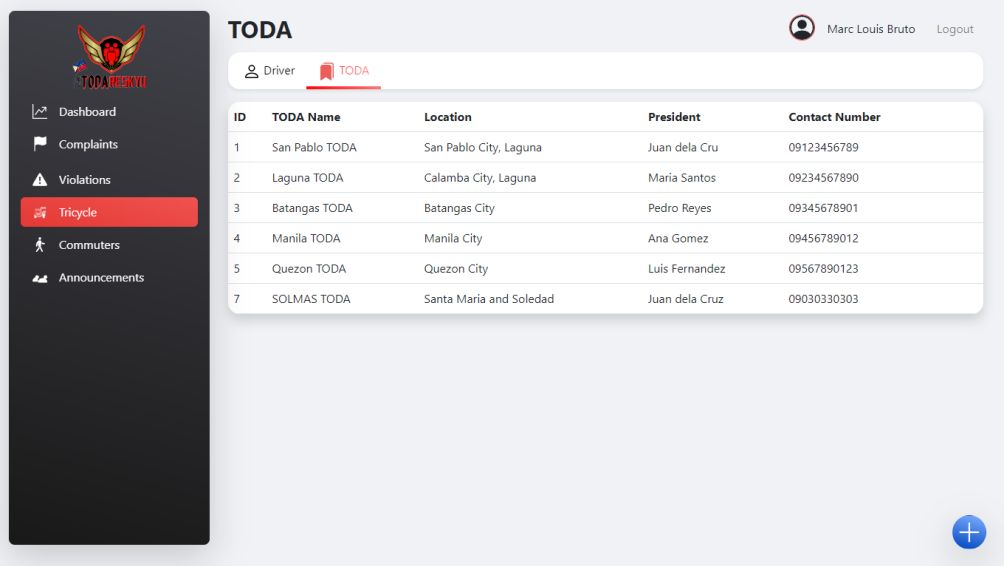

Figure 57. TODA Information Page of TODAreskyu Website

Figure 57 displays the TODA Information page for the TODAreskyu website. This page contains a navigation panel on the left side while list of TODA with ID, TODA name, location, president, and his contact number are present on the other side. The plus icon enables user admin to add new TODA information to the system.

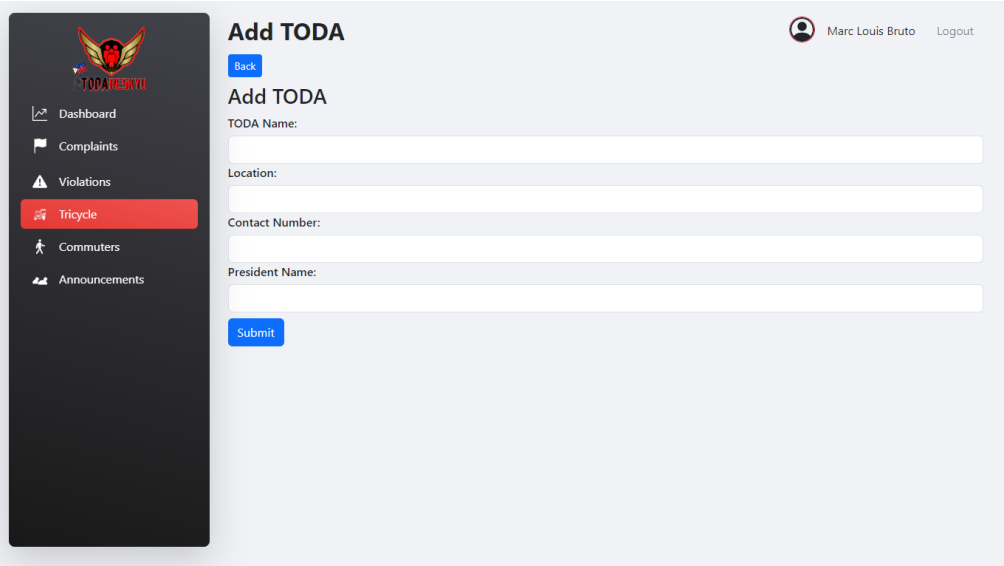

Figure 58. Add TODA Page of TODAreskyu Website

This screen allows the user admin to add new TODA (Tricycle Operators and Drivers Association) information. The form includes input fields for the TODA name, location, contact number, and president's name. A "Submit" button is provided to save the details. The left navigation panel ensures easy access to other system functionalities, while the "Back" button enables returning to the previous page.

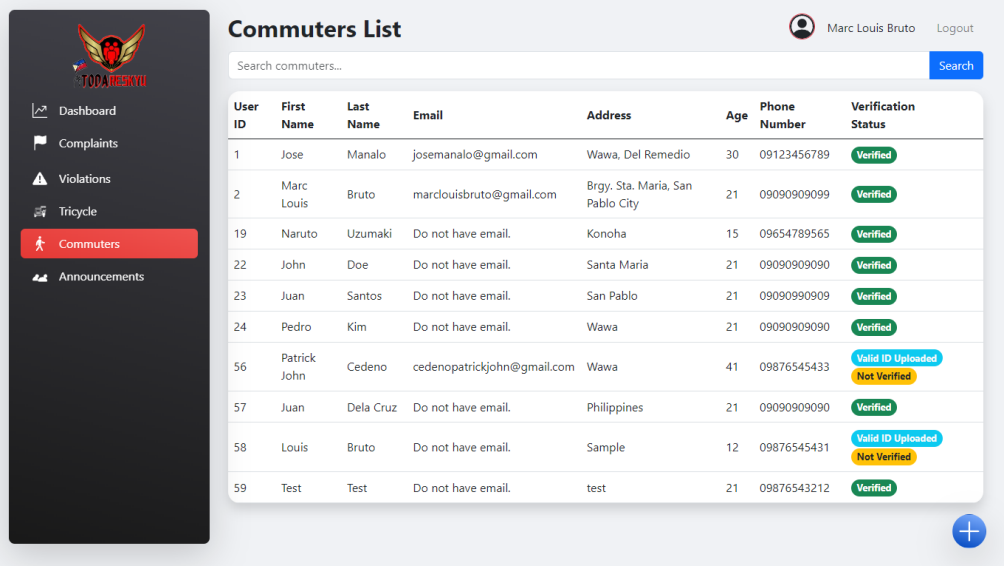

Figure 59. Commuter Page of TODAreskyu Website

This screen provides a list of registered commuters in the system. The page includes a search bar at the top for filtering commuters based on specific parameters. The table displays key commuter information such as User ID, First Name, Last Name, Email, Address, Age, Phone Number, and Verification Status. Verification status is color-coded for clarity, indicating whether a commuter is verified, needs to upload a valid ID, or is not verified. A "+" button at the bottom-

right allows the admin to add a new commuter. The left navigation panel enables access to other system functionalities.

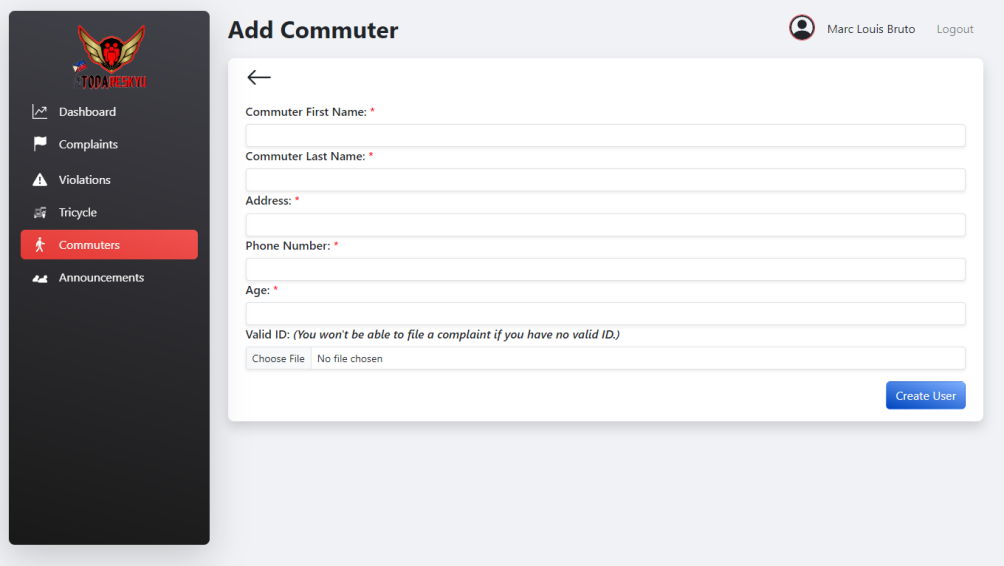

Figure 60. Add Commuter Page of TODAreskyu Website

The Figure 60 screen enables the admin to register a new commuter in the system. The form includes fields for the commuter's first name, last name, address, phone number, age, and an upload option for a valid ID, which is recommended for filing complaints. Each field marked with an asterisk is mandatory, ensuring complete commuter details are recorded. A "Create User" button is provided to submit the form, while a back button at the top-left allows the admin to return to the previous page.

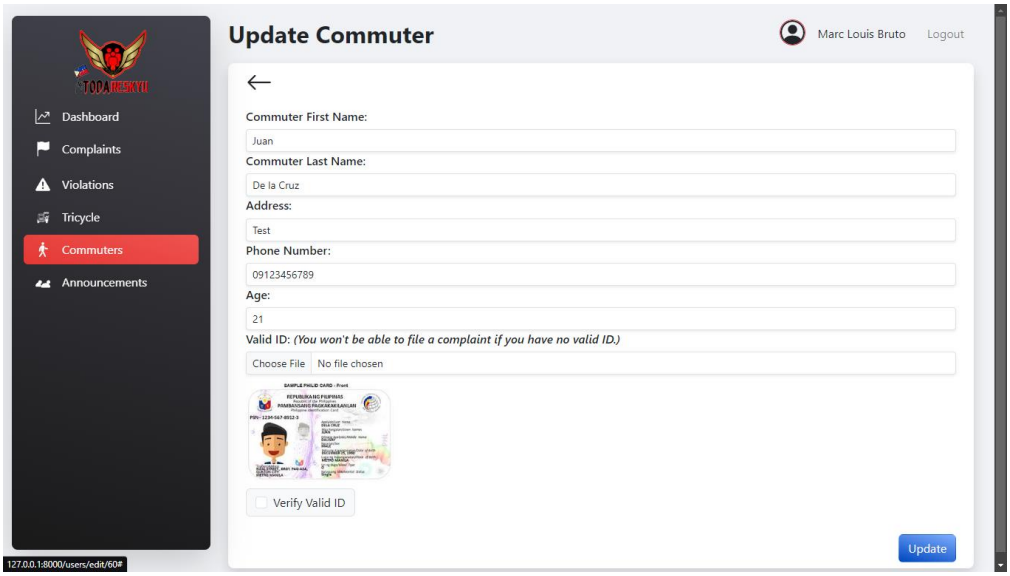

Figure 61. Update Commuter Page of TODAreskyu Website

Figure 61 allows user admins to manage and update commuter details, including name, address, phone number, age, and ID verification status. Administrators can review the valid ID of every user registration to verify the valid IDs of registering commuters. The “Update” button at the bottom allows administrators to save any changes to the database.

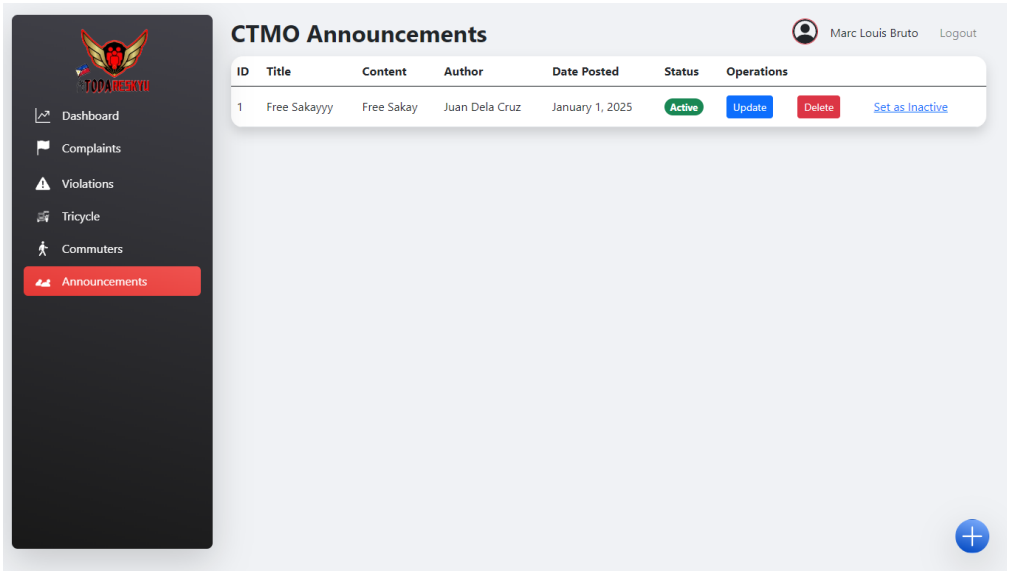

Figure 62. Add CTMO Announcement Page of TODAreskyu Website

The Figure 62 contains the monitor and management of CTMO announcements providing administrators with the ability to create, update, and broadcast important updates to commuters using TODAreskyu app. The page consists of navigation panel to access different pages and on the other section is the list of announcement created by CTMO. The table has the following values including ID, title, content, author, date posted, status, and operations. A link is provided to set the announcement active to mobile users. Status flag can be seen as green when the announcement is active while if the flag is gray, the status is inactive. The plus button below allows users to add new announcement.

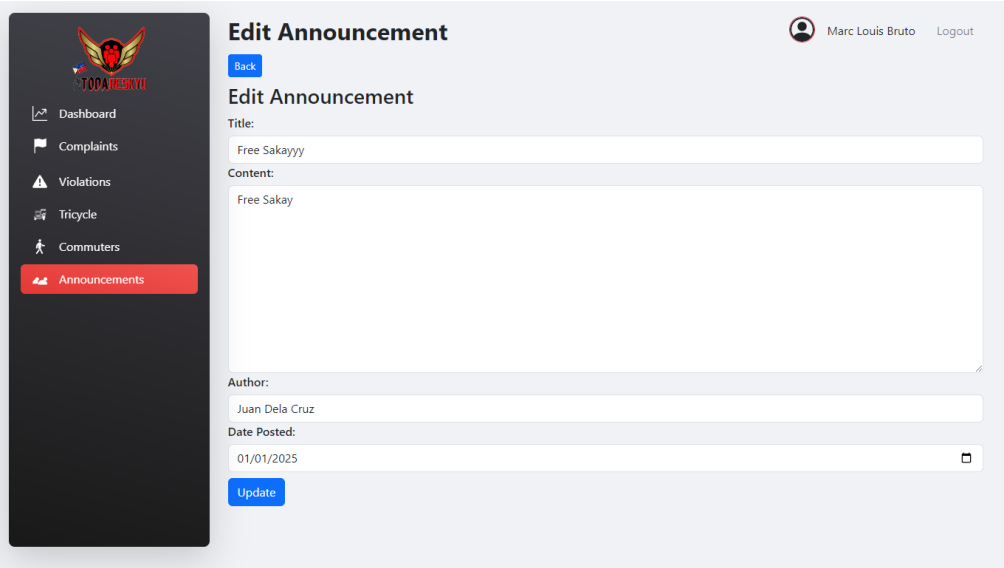

Figure 63. Update Announcement Page of TODAreskyu Website

This screen enables the system admin to edit and save changes to CTMO announcements. The page consists of navigation panel and a form which contains input fields such as title, content, author, and date posted. By clicking “Update”, all

changes will be saved to the database. The “Back” button brings the user to the previous page.

Project Capabilities and Limitations

This section explains the project capabilities and limitations of TODAreskyu: An Integrated Mobile and Web Application for Processing Commuter Complaints on Tricycle Driver Violations.

The developed project has the following capabilities:

- The project allows commuters to file complaints against both registered and unregistered tricycles.
- The system provides a scanning feature for tricycle MTOP identification to streamline the reporting process.
- The system enables users to upload photos as evidence for their complaints.
- The application allows the admin (City Traffic Management Office) to manage and process commuter complaints efficiently.
- The project provides notifications to users on the status of their complaints (e.g., pending, denied, or in process).
- The system integrates a database to store and retrieve complaint information and associated evidence.
- The project can generate meeting schedules for in-process complaints and provide reasons for denied complaints.

- The system includes a feature that allows the admin to view generated data analytics, providing insights into complaint trends, violations, and other relevant information for decision-making.

The following are some of the limitations:

- The system does not include automated actions for resolving complaints; all decisions are made manually by the admin.
- The project requires an internet connection to access the database and process complaints.
- The payment of penalties by tricycle drivers is outside the scope of the system and must be handled separately.

Project Testing and Evaluation Results

Project Testing

Functionality testing was conducted to evaluate the website and application's interface and ensure that all features met the project's goals. The developers performed test scenarios to validate the application's behavior and functionality.

Table 5. Registered Tricycle Complaint Creation Test Case

TEST SCENARIO	Registered Tricycle Complaint Creation	**REMARKS**	PASSED
TEST CASE	Enter Valid Data in All Required Fields and Submit		
TEST STEPS			
1. Click “+” button to create new complaint 2. Enter Complainant First Name 3. Enter Complainant Last Name 4. Enter Address 5. Enter MTOP 6. Select a Violation 7. Enter Place of Incident 8. Enter Summary of Incident 9. Click Submit Complaint			
EXPECTED RESULT	**ACTUAL RESULT**		
Registered Complaint Creation must be successful	Registered Complaint Creation successful		
POSTCONDITION			
Time and Date of Registered Complaint is stored in the database. Display a success message for creating a complaint.			

Table no. 5 presents the test case for Registered Tricycle Complaint Creation, consisting of 9 steps. These include clicking the "+" button, entering the complainant's details (name, address, MTOP), selecting a violation, providing the incident details (location and summary), and submitting the complaint. Valid data inputs are required, and the expected outcome is the successful creation of the complaint. Testing confirmed that the system performed as intended, successfully creating the complaint.

Table 6. Registered Tricycle Complaint Creation Test Case

TEST SCENARIO	Unregistered Tricycle Complaint Creation	**REMARKS**	PASSED
TEST CASE	Enter Valid Data in All Required Fields and Select an Image File with a Valid Format		
TEST STEPS			
1. Click “+” button to create new complaint 2. Enter Complainant First Name 3. Enter Complainant Last Name 4. Enter Address 5. Select a Violation 6. Choose an image to upload as Evidence Photo 7. Enter Plate Number 8. Enter Tricycle Color 9. Enter Tricycle Description 10. Enter Place of Incident 11. Enter Summary of Incident 12. Click Submit Complaint			
EXPECTED RESULT	**ACTUAL RESULT**		
Unregistered Complaint Creation must be successful	Unregistered Complaint Creation successful		
POSTCONDITION			
Time and Date of Registered Complaint is stored in the database. Display a success message for creating a complaint.			

The following section presents the Unregistered Tricycle Complaint Creation, which includes a test case outlined in Table no. 6. It involves a series of 12 test steps, which are clicking the “+” button to create a new complaint, followed by entering the complainant's first and last name, address, MTOP, selecting a violation, uploading an image for evidence photo, entering plate number, tricycle color, and tricycle description. Moreover, place and summary of incident and

submit complaint are the last steps. The test case necessitates the use of valid data in the required fields. The successful creation of the complaint is the expected outcome of this test case. Upon completion of the test phase, the system successfully generates the complaint, indicating that the system functioned as intended

Table 7. Summary of Result of Functionality Test for TODAreskyu Website

FUNCTIONALITY	NUMBER OF TEST CASES	REMARKS
Login / Logout	5	5 passed, 0 failed
Dashboard Complaint Filtering by Date	4	4 passed, 0 failed
Registered Tricycle Complaint Creation	9	9 passed, 0 failed
Accept and Set Meeting Date for Registered Tricycle Complaint	2	2 passed, 0 failed
Deny Registered Tricycle Complaint	2	2 passed, 0 failed
Mark Registered Tricycle Complaint as Resolved	4	4 passed, 0 failed
Handle Unresolved Registered Tricycle Complaint	4	4 passed, 0 failed
Update Registered Tricycle Complaint	5	5 passed, 0 failed
Delete Registered Tricycle Complaint	2	2 passed, 0 failed
Upload Payment Receipt Image (Registered Complaint)	2	2 passed, 0 failed

Unregistered Tricycle Complaint Creation	12	12 passed, 0 failed
Accept and Set Meeting Date for Unregistered Tricycle Complaint	2	2 passed, 0 failed
Deny Unregistered Tricycle Complaint	2	2 passed, 0 failed
Mark Unregistered Tricycle Complaint as Resolved	4	4 passed, 0 failed
Handle Unresolved Unregistered Tricycle Complaint	4	4 passed, 0 failed
Update Unregistered Tricycle Complaint	9	9 passed, 0 failed
Delete Unregistered Tricycle Complaint	2	2 passed, 0 failed
Upload Payment Receipt Image (Unregistered Complaint)	2	2 passed, 0 failed
Add New Violation	4	4 passed, 0 failed
Update Violation Details	4	4 passed, 0 failed
Delete Violation	2	2 passed, 0 failed
Add New Tricycle Driver to the System	7	7 passed, 0 failed
Update Tricycle Driver Information	7	7 passed, 0 failed
Delete Tricycle Driver Data	2	2 passed, 0 failed
Tricycle Driver Search	2	2 passed, 0 failed
Add New TODA to the System	6	6 passed, 0 failed
Update TODA Information	6	6 passed, 0 failed

Delete TODA Data	2	2 passed, 0 failed
Add New Commuter to the System	8	8 passed, 0 failed
Update Commuter Information and Valid ID Verification	8	8 passed, 0 failed
Delete Commuter Data	2	2 passed, 0 failed
Commuter Search	2	2 passed, 0 failed
Add New CTMO Announcement	6	6 passed, 0 failed
Update CTMO Announcement	6	6 passed, 0 failed
Delete CTMO Announcement	2	2 passed, 0 failed
CTMO Announcement Activate or Deactivate	2	2 passed, 0 failed

The table 7 outlines the summary of the functionality testing which consists of 36 test scenarios. Thus, 148 test cases were run in order to assess the system's accuracy and functionality. The primary objective of each test case is to assess the system's functions against the system's objectives and requirements. The "Remarks" column in the table displays the count of test cases that have passed and failed. This evaluation process ensures that the system's functions are aligned with its intended goals and specifications. The "Remarks" column provides a summary of the test case outcomes, highlighting the success and failure rates. This discussion will focus on testing the two primary test scenarios, namely, the registered tricycle complaint creation and unregistered tricycle complaint creation.

Table 8. Manual Reporting of Registered Vehicle Test Case

<table>
<tr><td>TEST SCENARIO</td><td>Manual Reporting of Registered Vehicle</td><td>REMARKS</td><td>PASSED</td></tr>
<tr><td>TEST CASE</td><td colspan="3">Enter valid data in all required fields and submit the report.</td></tr>
<tr><td colspan="4">TEST STEPS</td></tr>
<tr><td colspan="4">1. Open the application and navigate to the Report Registered Vehicle page.
2. Input the MTOP number in the MTOP field.
3. Tap the Check MTOP button.
4. Verify that the application checks the database for the MTOP entry.
a. If the MTOP exists in the database, the application redirects to the Complaint Form page.
b. If the MTOP does not exist, an error message is displayed.
5. On the Complaint Form, select the violation from the Violation dropdown menu.
6. Enter the summary of the complaint details in the Details field.
7. Tap the Submit Complaint button.
8. Verify that the complaint is successfully submitted and a confirmation message is displayed.</td></tr>
<tr><td colspan="2">EXPECTED RESULT</td><td colspan="2">ACTUAL RESULT</td></tr>
<tr><td colspan="2">Complaint must be successfully submitted, and a confirmation must be displayed.</td><td colspan="2">Complaint is successfully submitted, and a confirmation is displayed.</td></tr>
<tr><td colspan="4">POSTCONDITION</td></tr>
<tr><td colspan="4">Complaint is recorded in the system.</td></tr>
</table>

The table 8 evaluates the process of filing a complaint within the application. The user navigates to the "Report Registered Vehicle" page, enters the MTOP (Motorized Tricycle Operator's Permit) number, and taps the "Check MTOP" button to validate it in the database. If the MTOP exists, the user is redirected to the

complaint form page; otherwise, an error message is displayed. On the complaint form, the user selects a violation type from a dropdown menu, provides complaint details, and submits the form. Upon successful submission, the system records the complaint and displays a confirmation message. This ensures the process handles valid and invalid inputs correctly, with the complaint being successfully submitted and recorded in the system as expected.

Table 9. Scan Option for Reporting Registered Vehicle Test Case

<table>
<tr><td>TEST SCENARIO</td><td>Scan Option for Reporting Registered Vehicle</td><td>REMARKS</td><td>PASSED</td></tr>
<tr><td>TEST CASE</td><td colspan="3">Scan the QR code, enter valid data in all required fields, and successfully submit the report.</td></tr>
<tr><td colspan="4">TEST STEPS</td></tr>
<tr><td colspan="4">1. Open the application and Tap the QR Code icon to activate the camera..
2. Scan the QR code of the vehicle.
3. Verify that the system processes the QR code and checks if the vehicle data is available in the system.
a. If the data from the QR code is found in the system, the application redirects to the Complaint Form page.
b. If the data from the QR code is not found, nothing will happen.
4. On the Complaint Form, select the violation from the Violation dropdown menu.
5. Enter the summary of the incident in the Details field.
6. Tap the Submit Complaint button.
7. Verify that the complaint is successfully submitted and a confirmation message is displayed.</td></tr>
<tr><td colspan="2">EXPECTED RESULT</td><td colspan="2">ACTUAL RESULT</td></tr>
</table>

Complaint must be submitted, and the user must receive a confirmation message.	Complaint is submitted, and the user receives a confirmation message.
POSTCONDITION	
Complaint is recorded in the system.	

The table 9 verifies the process of using a QR code to file a complaint. The user opens the application, taps the "QR Code" icon to activate the camera, and scans the vehicle's QR code. The system processes the scanned data and checks the database for the vehicle's information. If the data is found, the user is redirected to the complaint form; if not, no action is taken. On the complaint form, the user selects a violation from the dropdown menu, provides a summary of the incident in the details field, and taps the "Submit Complaint" button. Upon submission, the system records the complaint and displays a confirmation message. The test ensures the scan option functions correctly, with complaints successfully submitted and recorded when valid QR code data is provided.

Table 10. Summary of Result of Functionality Test For TODAreskyu Mobile Application

FUNCTIONALITY	NUMBER OF TEST CASES	REMARKS
User Login	4	4 passed, 0 failed
User Registration / Sign Up	15	15 passed, 0 failed
Manual Reporting of Registered Vehicle	8	8 passed, 0 failed
Scan Option for Reporting Registered Vehicle	7	7 passed, 0 failed

Manual Reporting of Unregistered Vehicle	9	9 passed, 0 failed
Accessing Notification Details	5	5 passed, 0 failed
Viewing Public Announcements	4	4 passed, 0 failed
Viewing Profile Information	4	4 passed, 0 failed
Checking User Complaint History	4	4 passed, 0 failed
Logging Out from the Application	4	4 passed, 0 failed

The table 10 outlines the summary of the functionality testing for the application. It includes a total of 60 test steps across 10 different test scenarios, all of which were executed successfully with no failures. The tested functionalities cover key features such as user login, registration, manual and scan-based complaint reporting for both registered and unregistered vehicles, accessing notifications, viewing public announcements, profile information, checking user complaint history, and logging out. Each feature was tested thoroughly, and all functionalities performed as expected, demonstrating that the application is functioning correctly without any issues across the various use cases.

Cross Browser compatibility testing was conducted using various browser and operating system combinations to evaluate the application's performance, usability, and responsiveness. The testing ensured that the application maintained consistent functionality while adapting to different browser engines and OS environments. The testing was executed using Sauce Labs live Cross Browser

Testing. Test scenarios validated that the application's core features worked successfully, regardless of the platform or browser used.

Table 11. Browser Testing Result Summary

Browser	OS	Status/Result	Actual Result	Recommended
Microsoft Edge 131	Windows 11	Passed	All features operated successfully; no issues identified.	Yes
Google Chrome 131	Windows 11	Passed	All features operated successfully; no issues identified.	Yes
Microsoft Edge 131	Windows 10	Passed	All features operated successfully; no issues identified.	Yes
Google Chrome 131	Windows 10	Passed	All features operated successfully; no issues identified.	Yes
Safari 17	MacOS Ventura-13	Passed	All features operated successfully; no issues identified.	Yes
Microsoft Edge 131	MacOS Ventura-13	Passed	All features operated successfully; no issues identified.	Yes
Google Chrome 131	MacOS Ventura-13	Passed	All features operated successfully; no issues identified.	Yes

The table outlines the results on Cross Browser compatibility tests on Microsoft Edge v.131 and Google Chrome 131 across Windows 11 and Windows

10. All features operated successfully, with no issues identified. On macOS Ventura 13, the application performed flawlessly on Safari 17, Microsoft Edge 131, and Google Chrome 131. All features operated successfully, and no issues were identified across any combination of browsers or operating systems.

All tested browser and OS combinations are fully compatible and recommended for use. Periodic testing is recommended to ensure compatibility with future browser and OS updates, particularly as new versions of macOS, Windows, Edge, Chrome, and Safari are released.

Mobile compatibility testing was conducted using BrowserStack's App Live to evaluate the application's performance and usability across various smartphone devices. This testing ensured that the application maintained consistent functionality while adapting to the unique characteristics of each device, such as screen size, resolution, and operating system. Developers utilized BrowserStack's platform to perform detailed testing on real devices, identifying and addressing any layout or responsiveness issues that might affect the user experience. Test scenarios were executed to validate that the application's core features worked seamlessly, regardless of the device used.

Table 12. Mobile Compatibility Testing Result Summary

Mobile Devices	Status/Result	Actual Result	Recommended
Oppo Reno 6	Passed	Minor layout differences noted (e.g., spacing, font sizes); no functional impact	Yes

Samsung Galaxy S24	Passed	Minor layout differences noted (e.g., button alignment, font sizes); no functional impact	Yes
Google Pixel 8 Pro	Passed	Minor layout differences noted (e.g., padding, element sizes); no functional impact	Yes

The table outlines the results of mobile compatibility testing conducted on three devices: Oppo Reno 6, Samsung Galaxy S24, and Google Pixel 8 Pro. On the Oppo Reno 6, the application passed all tests, with minor layout differences observed, such as variations in spacing and font sizes. These differences, caused by the device's screen resolution and rendering engine, did not impact the application's usability or functionality. The Samsung Galaxy S22 also passed testing, displaying minor layout variations, such as slight misalignment of buttons and font size discrepancies. These were attributed to the device's aspect ratio and screen dimensions but did not hinder the seamless operation of the application's core features. Similarly, the Huawei P30 passed testing with minor layout issues, including differences in padding and element sizes, likely due to its older hardware and screen resolution. Despite these visual inconsistencies, the application functioned flawlessly across all devices, with features like login, reporting, and notifications operating as intended. All three devices are fully compatible and recommended for use, ensuring a reliable user experience.

Project Evaluation Results

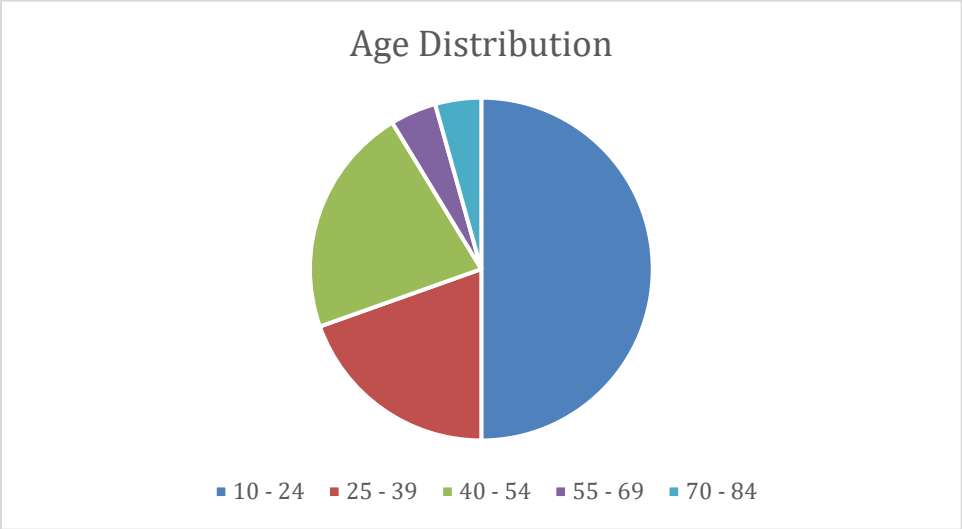

Figure 64. Age Distribution

Out of the forty-six (46) respondents, fifty percent (50%) are between the ages of ten (10) to twenty-four (24), making this the most represented age group. Nineteen point six percent (19.6%) of respondents fall within the age range of twenty-five (25) to thirty-nine (39). Additionally, twenty-one point seven percent (21.7%) are between the ages of forty (40) and fifty-four (54). The remaining eight point seven percent (8.7%) are evenly distributed across the age ranges of fifty-five (55) to sixty-nine (69) and seventy (70) to eighty-four (84), with two (2) respondents in each group. This distribution highlights that the majority of respondents are younger individuals, which may provide insights into the perspectives of a more youthful demographic.

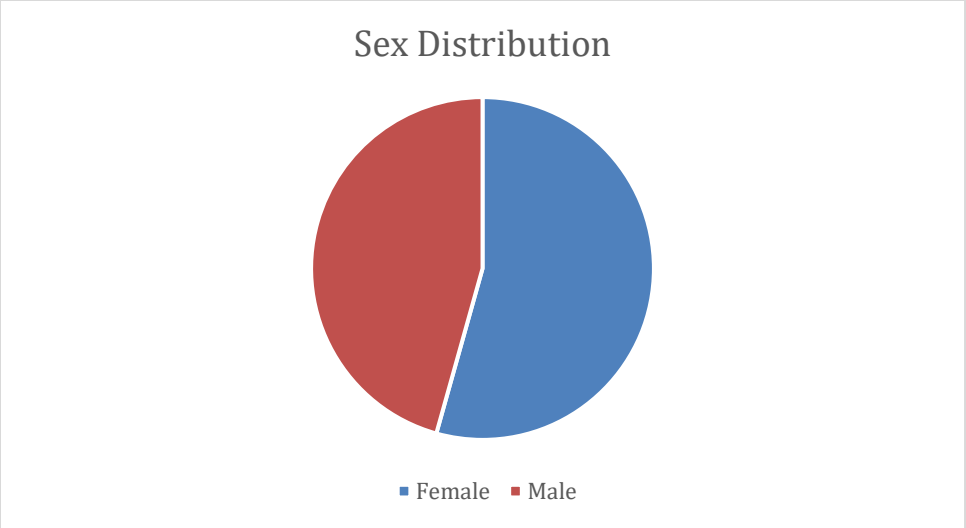

Figure 65. Sex Distribution

In terms of sex, the respondents comprise twenty-five (25) males and twenty-one (21) females. This translates to a male majority of fifty-four point three percent (54.3%) and a female minority of forty-five point seven percent (45.7%). While the difference is relatively small, this distribution indicates a fairly balanced representation of sexes among the respondents.

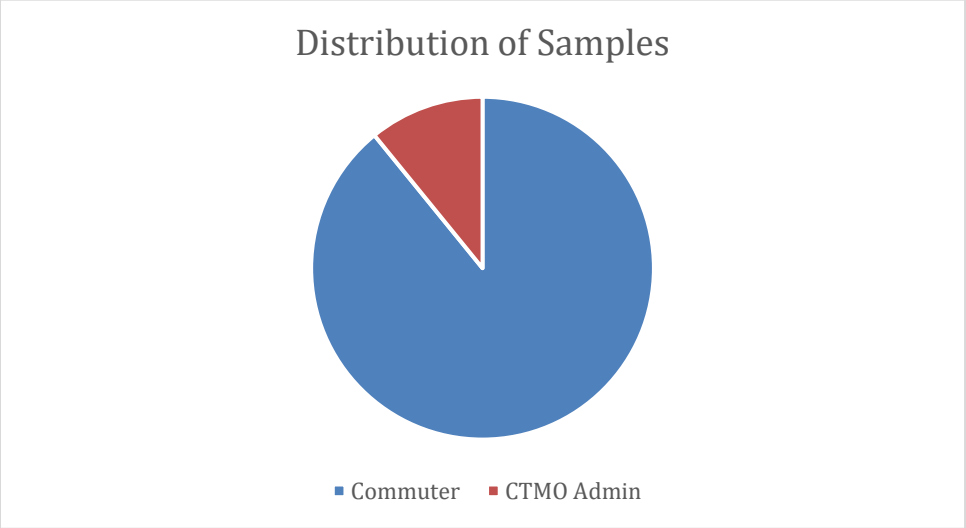

Figure 66. Sample Distribution: CTMO Admins and Commuters

Among the respondents, forty-one (41) are commuters, accounting for eighty-nine point one percent (89.1%) of the total, while five (5) are CTMO admins, making up ten point nine percent (10.9%). This suggests that the majority of feedback was provided by commuters, which is significant as they are the primary users of the system. However, the inclusion of CTMO admins ensures that the system's evaluation also considers the administrative perspective.

User Experience Questionnaire (UEQ)

The User Experience Questionnaire (UEQ) was used to assess the overall user experience of the TODAreskyu mobile and web application, focusing on factors like attractiveness, efficiency, and usability. The survey was completed by 46 participants, including 41 commuters and 5 CTMO admins. Responses were collected using a scale from Strongly Agree to Strongly Disagree to gauge user satisfaction and system effectiveness.

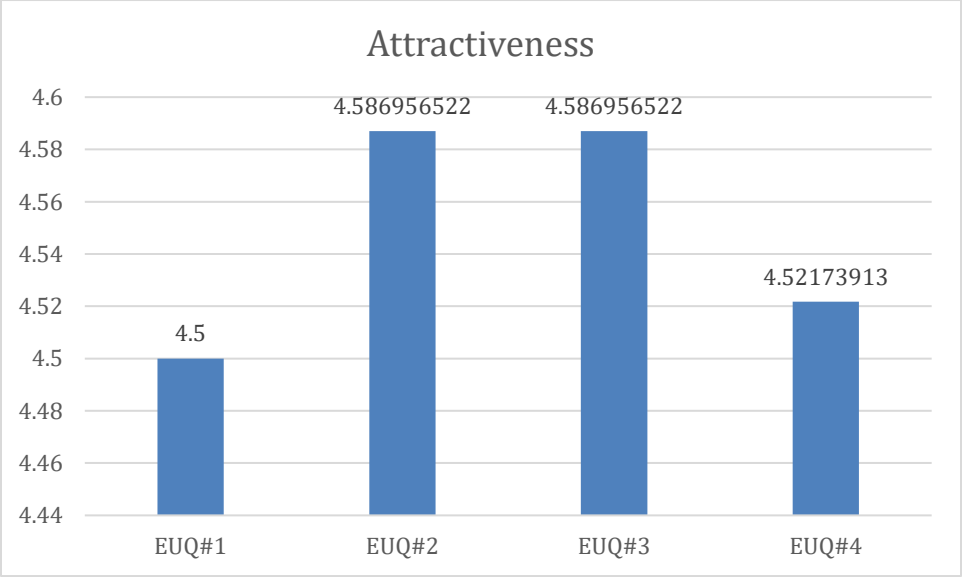

Figure 67. Attractiveness Ratings from UEQ Survey

The results of the survey show that the users generally have a positive perception of the TODAreskyu application in terms of its attractiveness and user experience. For EUQ#1, which assesses the enjoyment of using the application, the average rating was 4.5, indicating that most users find the app enjoyable. Similarly, EUQ#2, evaluating the visual appeal of the design, received an average rating of 4.59, reflecting that users find the design pleasing. EUQ#3, which measures the overall user experience, also scored an average of 4.59, suggesting that the experience is generally pleasant. Lastly, EUQ#4, concerning the visual attractiveness of the layout and interface, received a rating of 4.52, demonstrating that users perceive the layout as visually appealing. These results indicate that the application is well-received in terms of its aesthetics and overall user satisfaction.

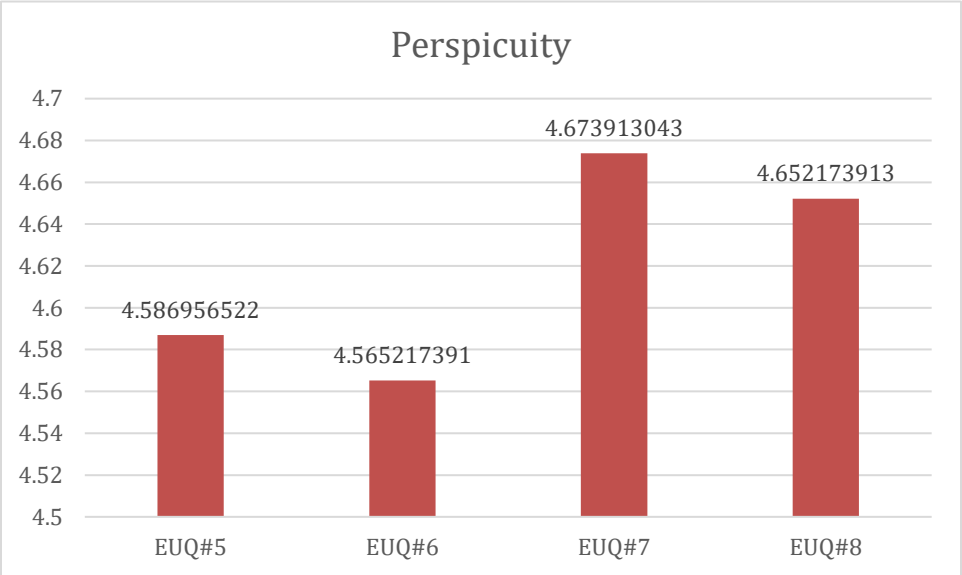

Figure 68. Perspicuity Ratings from UEQ Survey

The survey results for perspicuity indicate that users find the TODAreskyu application clear and easy to use. EUQ#5, which examines the clarity of

instructions, received an average rating of 4.59, suggesting that most users find the instructions easy to understand. EUQ#6, assessing how easy the application is to learn, had a rating of 4.57, showing that users find the app straightforward to pick up. The highest score was for EUQ#7, with a rating of 4.67, indicating that navigation through the application is perceived as simple and intuitive. Lastly, EUQ#8, evaluating the understandability of instructions and functionalities, received a rating of 4.65, further affirming that users find both the instructions and features clear. These results highlight that the application is user-friendly and easy to navigate, contributing to a smooth and intuitive user experience.

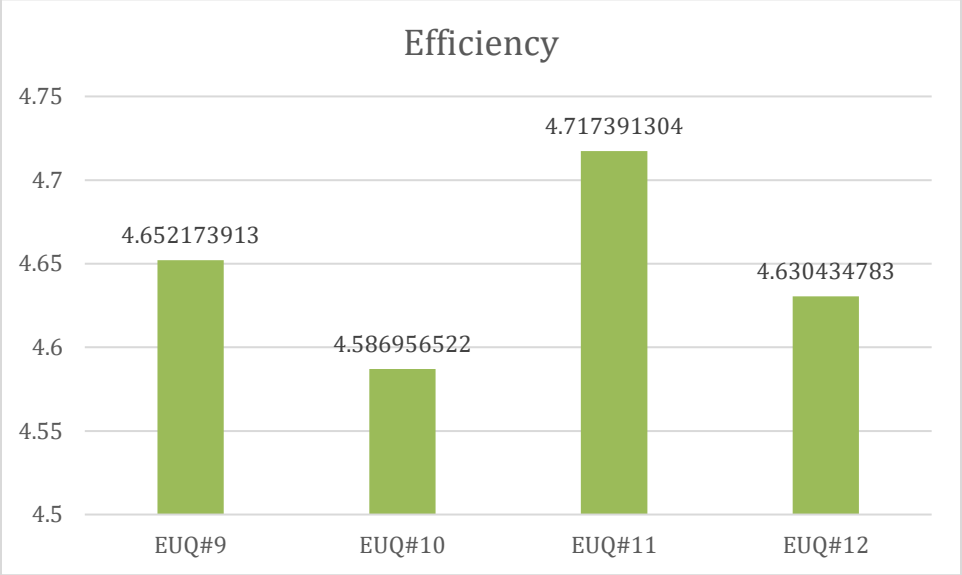

Figure 69. Efficiency Ratings from UEQ Survey

The survey results for efficiency reflect that users are generally satisfied with the application's performance and task execution. EUQ#9, which evaluates task efficiency, received a strong average rating of 4.65, indicating that users feel tasks can be completed efficiently. EUQ#10, assessing the speed of the

application, scored 4.59, suggesting that the app performs tasks quickly and without significant delays. EUQ#11, which measures the practicality of the application's features, had the highest score of 4.72, indicating that users find the features highly practical for their intended purposes. Lastly, EUQ#12, evaluating the organization of the application and its impact on usage, received a rating of 4.63, showing that users find the app well-organized and conducive to smooth operation. These results demonstrate that the TODAreskyu application is effective, efficient, and optimized for user tasks.

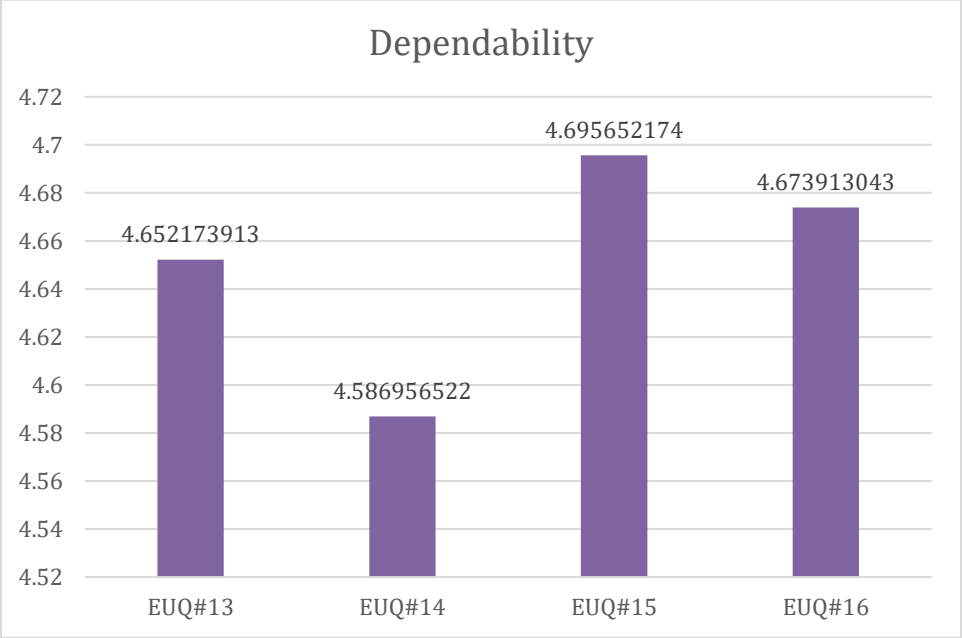

Figure 70. Dependability Ratings from UEQ Survey

The survey results for dependability show that users have a high level of trust in the TODAreskyu application regarding its reliability and security. EUQ#13, which assesses whether the app operates reliably and as intended, received an average rating of 4.63, indicating that users find the application predictable and

dependable. EUQ#14, evaluating data security and the protection of user information, scored 4.70, suggesting that users feel confident in the app's ability to secure their data. EUQ#15, which measures how supportive the system is in assisting users with their tasks, received a rating of 4.65, showing that users perceive the system as helpful and not obstructive. Lastly, EUQ#16, evaluating whether the application consistently meets user expectations, had a score of 4.63, confirming that the app generally fulfills user expectations. These results demonstrate that the TODAreskyu application is reliable, secure, and consistently meets the needs of its users.

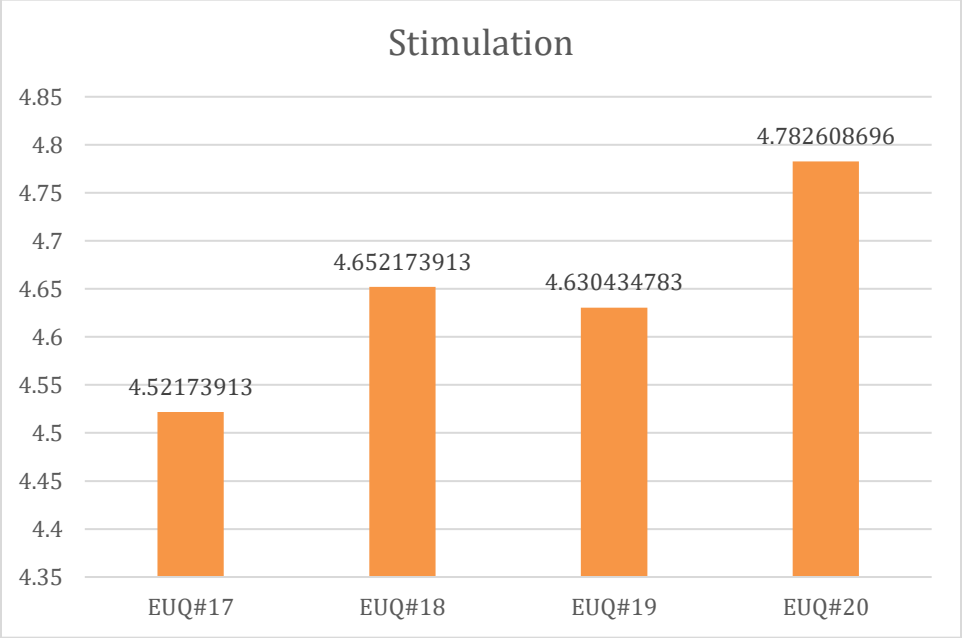

Figure 71. Stimulation Ratings from UEQ Survey

The survey results for stimulation indicate that the TODAreskyu application successfully engages and motivates users. EUQ#17, which assesses whether using the application is exciting and engaging, received an average rating of 4.52,

suggesting that most users find the app moderately exciting. EUQ#18, evaluating the motivational aspect of the application in encouraging users to report violations, scored 4.65, reflecting that users feel motivated to use the app for reporting violations. EUQ#19, which measures how interesting and attention-capturing the application is, received a rating of 4.63, indicating that the app holds users' attention well. The highest score was for EUQ#20, with a rating of 4.78, showing that users find the features valuable for both commuters and staff. These results suggest that the application is not only functional but also engaging, motivating, and offers features that users find beneficial.

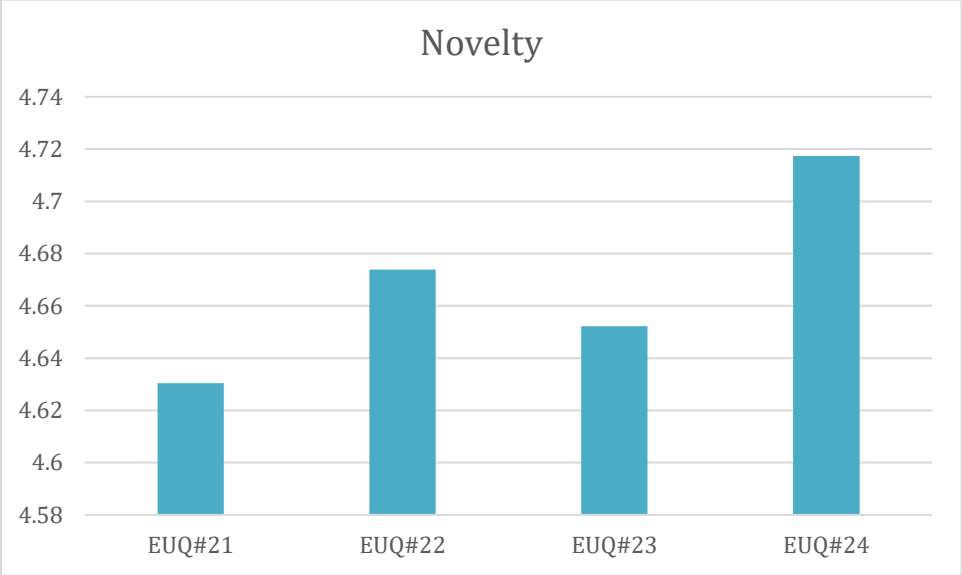

Figure 72. Novelty Ratings from UEQ Survey

The survey results for novelty show that users recognize the creativity and innovation behind the TODAreskyu application. EUQ#21, which evaluates the creativity of the app's features, received an average rating of 4.63, indicating that users find the features creatively designed. EUQ#22, assessing whether the

application introduces inventive solutions for reporting and managing complaints, scored 4.67, suggesting that users view the app as offering innovative approaches to handling complaints. EUQ#23, which measures the incorporation of innovative ideas in design and functionality, received a rating of 4.65, indicating that the app's design is perceived as forward-thinking. The highest score was for EUQ#24, with a rating of 4.72, showing that users believe the application's features represent cutting-edge solutions for complaint management. These results demonstrate that users appreciate the novel and inventive aspects of the TODAreskyu application.

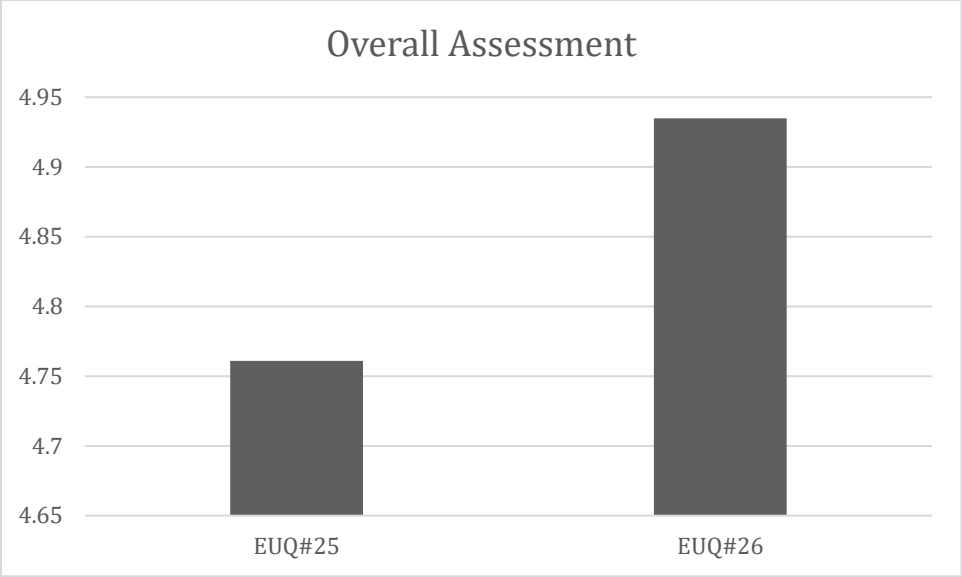

Figure 73. Overall Assessment Ratings from UEQ Survey

The overall assessment results indicate that users are highly satisfied with the TODAreskyu application. EUQ#25, which measures the overall user experience, received an impressive average rating of 4.76, suggesting that users find the app provides a very good user experience. EUQ#26, which evaluates how welcoming and user-friendly the application feels, received the highest score of

4.93, reflecting that the application is perceived as extremely friendly and easy to use. These results demonstrate that the TODAreskyu application excels in providing a positive, user-centered experience.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary of the findings and presents conclusions based on the evaluator's observations. It also offers recommendations for the project's developers on potential improvements for future development.

Summary of Findings

The TODAreskyu: An Integrated Mobile and Web Application for Managing Commuter Complaints Regarding Tricycle Driver Infractions was made to improve the effectiveness of the complaint process for commuters as well as for the City Traffic Management Office. This application provides commuters with a platform to file complaints against registered and unregistered tricycles, and monitor the status of their complaints. The mobile application is built using React Native, integrated with the Expo framework, while the web platform is developed with the full-stack framework of Laravel. The goal of this project is to enhance complaint resolution efficiency and interaction between commuters and the CTMO.

Testing the application involved an all-embracing user experience survey of several usability dimensions, such as attractiveness, clarity, efficiency, reliability, stimulation, and novelty. According to the results, there are positive ratings for the application in all categories applied. The research indicated that the application is aesthetically pleasing, friendly in use, and efficient in executing tasks. Its characteristics were also found to be useful, innovative, and engaging, from which users appreciated the ability of the application to provide timely and clear advice.

The factors of reliability and security in the system were also ranked highly, coupled with the fact that users' data were safe.

The assessment shows that the TODAreskyu application successfully meets user needs and promotes a positive user experience.

Conclusion

The developers successfully designed an integrated mobile and web application for managing commuter complaints on the violation committed by tricycle drivers, which ensures an effective complaint management system for commuters and the CTMO. The implemented project includes the following features:

Mobile Application

Complaint Reporting Interface

- **Registered Tricycles**: Users can report complaints by providing the MTOP number or scanning the QR code of the tricycle.
- **Unregistered Tricycles**: Users can report complaints by providing the plate number, tricycle description, tricycle color, and uploading an evidence photo.

Complaint Tracking System

- A dashboard allows users to track the status of their complaints (pending, in process, rejected, etc.) with clear updates.

User-Friendly Interface

- Simple navigation and accessible forms optimized for mobile and web use, ensuring easy interaction.

Notification System

- Notifications are provided within the application itself to inform users about updates on their complaint status.

Complaint Submission Feature

- A reliable and guided process for submitting complaints, with validation checks to ensure accurate data submission.

Website

Complaint Management System

- **Comprehensive Complaint Records:** Admins can view detailed records of all complaints, including the complainant's information, the driver's details, and the reported violations.
- **Status Updates:** The system allows admins to change complaint statuses (e.g., Pending, In Process, Resolved, Declined) and provide resolution details for transparency.
- **Filtering and Search Options:** Admins can filter complaints by status, date, location, or violation type to organize complaint handling.

Data Analytics and Reports

- **Violation Trends Analysis:** Dynamic charts display trends in violations by day, month, location, or violation type to help CTMO officials identify hotspots and plan interventions.
- **Frequency Ranking:** A ranking system shows the most common violations and frequently reported drivers to prioritize enforcement efforts.

User and System Management

- **Admin Dashboard:** A user-friendly interface with clear navigation for managing complaints, drivers, violations, TODAs, and announcements.

The system was rigorously tested after its completion to ascertain that every button and functionality was working as expected. The usability, speed, and functionality of the application and website were tested on various devices and browsers with satisfactory results. In general, overall user satisfaction for the application improved, and the users gave great reviews over the usability, reliability, and attractiveness of the application. Developers documented details of the specifications of the system and rich instructions regarding the potential use of further development of the system.

Recommendations

The developed application should be built upon and advanced for future purposes, as suggested below:

1. The developers recommend adding the following features, which will allow for better management of complaints and include payment facilities for fines and penalties.
2. Further improvements may include the development of a feedback system to gather users' suggestions for the application on how it could be improved.

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