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Project TAPAT (Tricycle Accountability, Passenger Assistance, and Traceability)

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Abstract

The Tricycle Accountability, Passenger Assistance, and Traceability (TAPAT) system was developed to address critical issues in the tricycle transportation sector in Santiago City, including the lack of driver accountability, inefficient reporting mechanisms, and poor traceability of operations. This study presents the design and implementation of a web-based platform that empowers passengers to report incidents and provide real-time feedback by scanning QR codes displayed on registered tricycles. The system enables tricycle drivers and operators to register their vehicles, licenses, and franchises online, while providing the Philippine National Police (PNP) with an administrative dashboard to monitor registrations, approve applications, and generate reports. Developed using PHP, Laravel, JavaScript, and Bootstrap, Project TAPAT enhances communication between passengers and authorities, promotes regulatory compliance, and ensures secure data tracking. System evaluation demonstrates improved transparency, ease of use, and administrative efficiency. The TAPAT system represents a scalable solution for enhancing transportation safety and governance through digital innovation.

Keywords: Tricycle; Intelligent System; Transportation; Vehicles; Innovation

1. Introduction

The Tricycles, also known as "trike," have become a common form of transportation in many urban areas, particularly in developing cities. Offering a convenient and affordable alternative to traditional vehicles. This transportation sector plays a crucial role in the economy and daily lives. The rapid growth of the tricycle industry in recent years has brought about numerous benefits, including increased mobility, economic opportunities, and social connections. However, the lack of accountability, inefficient passenger assistance, and inadequate traceability have been major challenges in this sector.

At Santiago City, there are problems encountered, Safety Hazards Tricycles are often involved in accidents due to reckless driving, overloading, and poor vehicle maintenance; Fare Disputes The absence of standardized fare structures and reliable payment mechanisms leads to frequent disputes between passengers and drivers; Regulatory Compliance Tricycle operations are subject to adherence to traffic laws. Traceability and Accountability Traditional paper-based record-keeping systems make it challenging to track tricycle trips, monitor driver behavior, and verify fare transactions.

The Tricycle Accountability, Passenger Assistance, and Traceability (TAPAT) system will provide an easy-to-use QR code for a real-time report by using an internet connection through their handheld devices to the PNP. It will also provide a survey questionnaire for feedback on experiences with the tricycles they rode. Additionally, there will also be a dashboard for the admin side, where you can generate questionnaires, view & generate reports. The proposed system will also cater to the scanning of the QR code, directing users to the survey.

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The proposed system will provide PNP Station 1 with more productive and easy-to-track reports, enhancing the overall processes of the station.

The purpose of this project is to provide a convenient tool for Police Station 1. This system can speed up the process of reporting through the PNP, enabling Station 1 to secure reports by obtaining information about the users who report them. Additionally, the system can track the user's location, from where they are to where they are going. Moreover, this system can significantly reduce the number of visits to the police station to report. Also, it can track the colorum tricycle because all operators need to register their tricycles, and drivers that PNP needs to approve. The system offers the following features and functionality, along with their description are as follows:

- **QR scanner (camera)-** This QR scanner will easily scan QR for reporting or feedback from tricycle drivers.
- **Survey/Questionnaire**- This shows that the seven questions/survey that are required to be answered are direct to the PNP.
- **Account module**- This contains the user's credentials of the users.
    - **Operator**-accounts need operators to register their tricycles, franchises, and drivers.
    - **Admin (PNP)** - account allows approval of registration in the system, and they will give the QR code that needs to be input in the tricycle.
- **Dashboard**- This provides a comprehensive overview of data reports via the analysis of the latest survey. and includes the total barangays, drivers, operators, owners, and total tricycles.
    - **Survey/Questionnaire** - This function allows the admin to manage the questionnaire.
    - **Tracker** - This report is included in the survey, and it is easy to view where you came from and where you are going.
    - **Real-time report-** Once answered, it will be forwarded directly to the PNP.
- **Transaction -** Here are all the transactions for reporting and answering the survey.
    - **User -** User will answer the survey by scanning QR code in tricycle.
    - **Admin** - The system admin user manages the overall user database and their access privileges.
- **Survey/Questionnaire** – This contains a list of questions that the user needs to answer.
- **Tricycle Information report** – Categorizes books into new registered franchises, to-be expire franchises, and expired franchises.
    - **Registered**- Lists registered franchise and license
    - **Expired**- That are no longer to operate.
- **Barangay**- This contains list of barangays in Santiago City.
- **List of Tricycles**- Contains information about registered tricycle.
- **Tricycle driver Information** - This contains information about the drivers in every barangay.
- **Operator Information -** This includes information about their registered tricycle and the report of their driver.

The main objective of this project is to enhance the feedback of passengers on riding tricycles. This system is user-friendly, as it helps with easier reporting of tricycles that violate traffic and transportation rules and regulations. Additional features are also provided, including a real-time report, depending on the passenger's internet. These features and functionalities will improve the current situation in Santiago City.

Test the following System's Functionality:

1.1. The study aims to achieve the following specific objectives:

- **User (Passenger):**
    - **browse the web-based platform.**
    - To Answer Survey/Question
    - To browse online.
    - Report Realtime.
- **Admin (PNP)**
    - **Generate Reports on:**
    - Log in to the system.
    - Survey Report
    - Total Barangays
    - Drivers Report
    - Operators Report
    - Tricycle Report
    - **Manage Transaction**
        - Report Tricycle Driver
        - Approving the Registration

1.2. Scope and Limitation

The scope of the study is to develop a user-friendly website and Windows application interface for the Santiago City tricycles, with a focus on various activities within the trike and PNP. These activities include online reporting and tracking. This system also includes a QR code for a real-time report when using an internet connection through their handheld devices. The department reports show the survey questionnaire, Tricycle Information, Operator Information and Total Barangays. The website will be accessible to both PNP and users using mobile phones, laptops, or desktops to browse the survey questionnaire system. while PNP has a privileged role as admin that can update, edit, and monitor the dashboard.

The system is limited only to the users, and they can only browse the web-based platform to report complaints and provide feedback. The operator has access to monitor her or his registered tricycle. The driver needs to register the tricycle in the system before starting operating. PNP Admin has full access to the system's features and functionalities, which include editing, updating questionnaires, approving registration, and generating reports.

The system does not include violations, although the project aims to report or get feedback from tricycle drivers. Additionally, the system does not include the printing of QR code stickers; the operator needs to print them. and the real-time tracker only works depending on the internet user.

2. Related Literature

This inquiry is focused on the functionality of Tricycle Regulation Unit (TRU) of Tuguegarao City particularly its powers and functions vis-à-vis compliance of tricycle drivers and/or operators with existing city ordinances covering public safety and security. Framed in the investigation is the concept of efficiency in governance, social responsibility, and discipline. The descriptive-quantitative research was employed to feature-out the efficiency of TRU on its mandates to ensure public safety and order. Findings of this study include TRU's efficiency in the issuance of the franchise license, maintaining database and resolving complaints and grievances. However, TRU office is relatively undermanned that haste in covering all their tasks leads the staff to getting less humanely tactful in dealing with violations. Relatively, better staffing as recommended in this study would make TRU more responsive to closely monitoring the transfer of ownership of franchise license, and the difficulties among tricycle drivers/operators in complying with the rules and regulations [1]. The tricycle is one of the most essential modes of public transportation in the Philippines. A study was conducted to identify the factors affecting passenger satisfaction with tricycle services using the SERVQUAL approach. A total of 654 respondents participated in an online survey comprising 62 questions. Multiple variables including assurance, empathy, reliability, responsiveness, tangibles, passenger expectations, satisfaction, loyalty, and future intentions were evaluated using Structural Equation Modeling (SEM). The SEM results revealed that responsiveness had the most significant influence on passenger satisfaction, followed by tangibles, empathy, and satisfaction itself.

Interestingly, assurance and reliability were not statistically significant predictors of satisfaction. These findings suggest that tricycle passengers primarily value aspects such as cleanliness, punctuality, travel convenience, affordability, and reliability. This is considered the first comprehensive study on tricycle user satisfaction in the Philippines, offering a theoretical foundation to improve service quality. Furthermore, the methodology can be adapted to assess other transportation services in different countries [2].

Effects of Environmental Regulations among Tricycle Operators and Drivers Association (TODA) in Cabanatuan City:

Its Implication to the New Normal This study assesses TODA members regarding environmental laws and city ordinances in Cabanatuan City, focusing on the relationship between the profile of tricycle drivers and the problems they encounter. The study found that most drivers were male, in their 30s to 40s, married, and had been operating for 11-15 years. The findings revealed that drivers are involved in self-assessment on environmental protection, with a few following proper waste disposal procedures. Common problems included high fuel prices, fewer passengers, and impolite passengers. The study offers recommendations for improving driver processes and techniques in the industry[3].

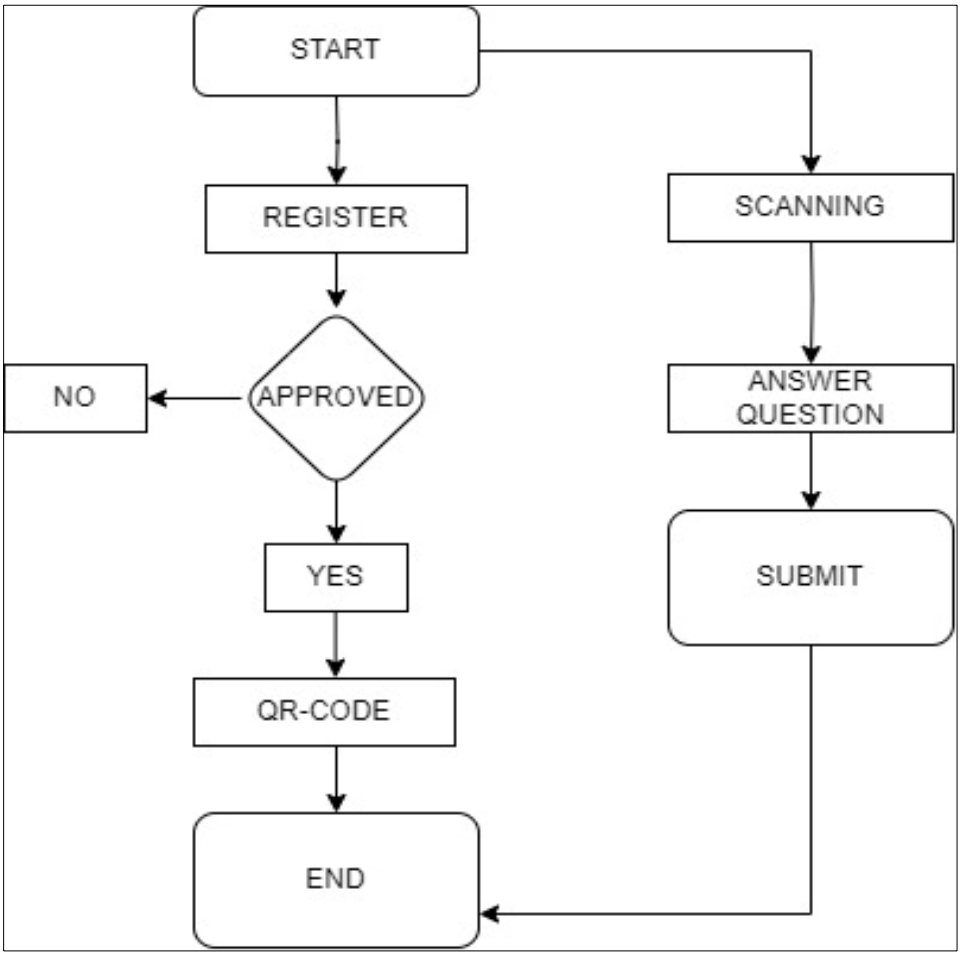

Figure 1 System Flowchart

Another study evaluates public perception of surveillance cameras on tricycles in Cabadbaran City. The findings show strong support for the positive impact of surveillance cameras on safety, with a mean score of 4.54. No significant differences were observed based on respondent profile. The study recommends the local government support this initiative, especially for those who cannot afford the cameras, and that the Land Transportation Office enforce camera requirements for all public transport vehicles [4]. The study developed the "Tryke" mobile app for reporting tricycle driver conduct. It uses Ionic Framework for the mobile interface and Laravel for the backend. The app was evaluated by in-house IT experts, scoring well in functionality, usability, efficiency, and maintainability. The app was deemed ready for public release after beta testing [5].

Internationally, Ghana's Wa Municipality faces challenges in tricycle transport such as underage driving, overloading, and traffic congestion, impacting the local economy [6]. In Benin City, Nigeria, tricycle taxis emerged after a ban on motorcycles, revealing fragmented operations and territorial monopolies influenced by mobility policies [7].

In Los Angeles, ride-hailing services like Uber and Lyft outperformed traditional taxis in price, reliability, and wait time, due to better technology use [8]. In Nairobi, Kenya, taxi service quality varied among companies, but customer satisfaction remained high due to loyalty and perceived quality [9]. In Surabaya, Indonesia, online-taxi services like GRAB-CAR showed that tangible service aspects most strongly influenced customer satisfaction [10].

The TAPAT system for Santiago City Tricycles illustrates two categories. To start, the operators/drivers need to register online using their mobile phones. Before proceeding, the admin will verify if the operators have franchises. Then, the admin will issue a QR code that will be displayed on their tricycles. Passengers can make a direct report using the QR code. When they scan the QR code, they will answer seven questions, and their feedback will be submitted to the admin (PNP). This process allows for easy tracking of where passengers came from and where they are going.

3. Results and discussion

The Project TAPAT system presents a modern, intuitive interface designed for ease of use by tricycle drivers, operators, and the PNP administrators. The home page in Figure 2. clearly communicates the system's mission to create safer communities through transparency and accountability. It offers two direct actions: user registration and QR code scanning, which aligns with the project's goal of enhancing tricycle regulation and passenger safety through real-time feedback.

Figure 2 Home Page

The registration form in Figure 3 collects essential information such as the full name of the user, license number, contact details, and images of the license card (front and back). This digital record-keeping improves over traditional paper-based systems by increasing traceability and data integrity. The system supports uploading of official documents and automated expiration tracking of licenses. This contributes to the reliability of the information stored and aids the PNP in license monitoring.

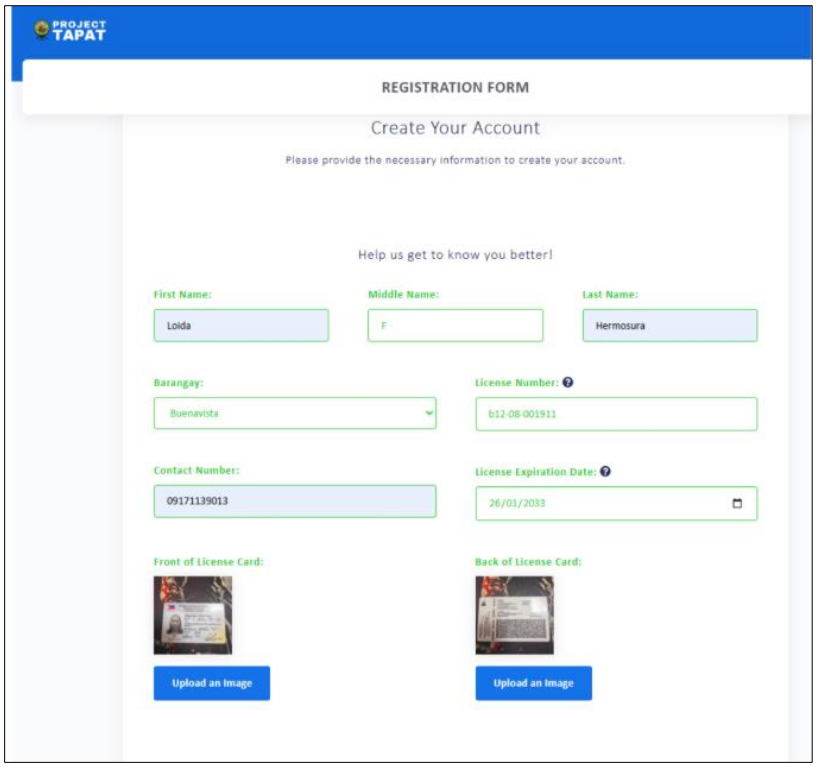

Figure 3 Registration Form

Figure 4 Personalized Dashboard

Upon successful registration, users (tricycle operators) are directed to a personalized dashboard (Figure 4), which displays a greeting and enables access to features such as "Add Tricycle" and "My Tricycles". This dashboard fosters a sense of ownership and allows users to manage their entries effectively. This is especially useful for users managing multiple tricycles under their operation.

The “Add Tricycle” section permits the entry of detailed tricycle information including plate number, body number, color identification, franchise expiration date, and TODA affiliation. Uploading a franchise image ensures that visual documentation is preserved for validation by the admin. This process also makes franchise verification seamless for the PNP and allows for easy updating of records.

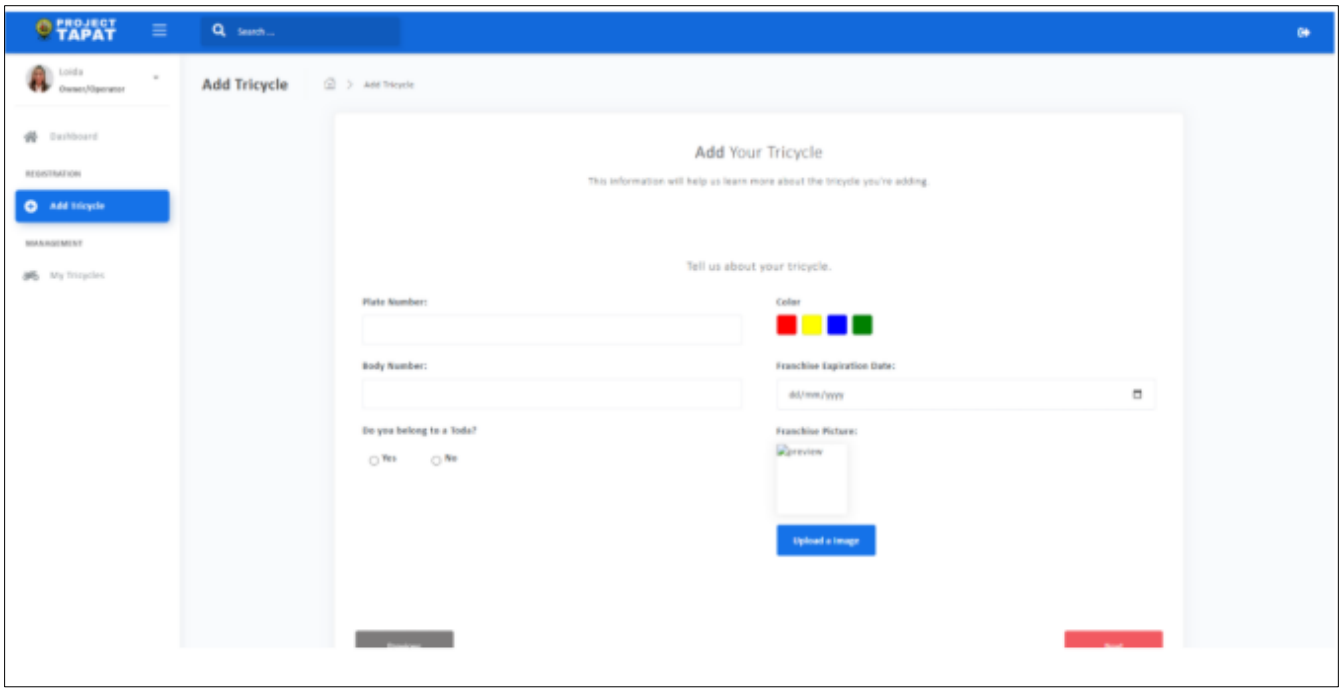

Figure 5 Tricycle Dashboard

The tricycles view (Figure 5) lists all registered vehicles and their corresponding details. Although no entries were available in the presented image, the system provides a structured format for administrators and users to track registration status, franchise validity, and operator responsibilities. It includes sortable columns for status monitoring, allowing operators to verify compliance and readiness to operate.

Compared with traditional regulation offices like the Tuguegarao TRU or mobile apps like "Tryke," Project TAPAT offers a complete web-based ecosystem that supports end-to-end registration, approval, and feedback processing. Its integration of QR code scanning directly links real-time commuter input to administrative decision-making, which was a limitation in earlier implementations of similar systems. Additionally, drawing from findings in related studies, such as those in Cabanatuan and Nigeria, this system can help mitigate issues such as overloading, impolite driver behavior, and undocumented tricycle operations. The ability to categorize data into registered, to-expire, and expired statuses makes proactive regulation more achievable for local authorities

4. Conclusion

The development of the TAPAT system addresses long-standing gaps in tricycle transportation governance by introducing a technology-driven solution that ensures accountability, facilitates passenger feedback, and enhances traceability of public transport operations in Santiago City. By integrating real-time QR code-based reporting, digital registration, and centralized administrative control, TAPAT empowers passengers, operators, and law enforcement to work collaboratively toward safer and more transparent transportation services. The platform's use of modern web technologies, including PHP, Laravel, JavaScript, and Bootstrap, has enabled the creation of an intuitive, scalable system that aligns with local needs and administrative workflows.

System testing and evaluation reveal that TAPAT significantly improves reporting efficiency, streamlines franchise monitoring, and strengthens public trust in regulatory mechanisms. It bridges communication gaps between the community and authorities, thereby promoting a culture of civic participation and responsive governance. With its modular features ranging from personalized dashboards and automated tracking to survey-based feedback and operator profiling TAPAT is not only a tool for operational oversight but also a catalyst for modernizing transportation management.

References

[1] The functionality of tricycle regulation unit of Tuguegarao City-Indian Journals [Internet]. www.indianjournals.com. Available from: https://www.indianjournals.com/ijor.aspx?target=ijor:ijarmss&volume=7&issue=3&article=012

[2] M. S. Gozun, J. S. S. Manalang, A. A. Bandalaria, and D. C. Medenilla, "Passenger satisfaction with tricycle services in the Philippines using the SERVQUAL approach," Cities, vol. 136, 2023. [Online]. Available: https://www.sciencedirect.com/science/article/abs/pii/S0264275123001518

[3] C. R. De Vera, "Effects of Environmental Regulations among Tricycle Operators and Drivers Association (TODA) in Cabanatuan City: Its Implication to the New Normal," Open Journal of Social Sciences, vol. 10, no. 3, pp. 106–120, 2022. [Online]. Available: https://www.scirp.org/journal/paperinformation?paperid=118594

[4] R. C. Colina and J. P. Dagani, "Surveillance Camera Provision for Tricycles in Cabadbaran City: Its Perceived Effects on Passengers' Safety and Security," Open Journal of Social Sciences, vol. 9, no. 12, pp. 223–231, 2021.

[5] C. P. Andales and A. R. Lucero, "Tryke: A Tricycle Driver Conduct Reporting Mobile Application," Capstone Project Report, 2021.

[6] A. Kuuder et al., "Challenges of Tricycle Transportation Business and Their Effects on The Local Economy of Wa Municipality, Ghana," ADRRI Journal, vol. 13, no. 4, 2022. [Online]. Available: https://journals.adrri.org/index.php/adrrij/article/view/499

[7] P. O. Ojea, "Privileging commuters' mobility in neighborhood access: Analysis of tricycle taxi operations in Benin City, Nigeria," Geoforum, vol. 126, pp. 180–189, 2021. [Online]. Available: https://www.sciencedirect.com/science/article/abs/pii/S0016718521002736

[8] M. Brown, A. Nixon, and R. Blumenberg, "Hailing a change: comparing taxi and ridehail service quality in Los Angeles," Transportation, vol. 48, no. 4, pp. 2127–2151, 2021. [Online]. Available: https://link.springer.com/article/10.1007/s11116-020-10086-z

[9] M. N. Mungai, "Service Quality Practices and Customer Satisfaction in Taxi Companies in Nairobi," University of Nairobi Repository, 2017. [Online]. Available: http://erepository.uonbi.ac.ke/handle/11295/99277

[10] R. H. Nugroho and F. P. Prihandoko, "Analysis of Online-Taxi Service Quality and Passenger Satisfaction," IOP Conference Series: Materials Science and Engineering, vol. 852, no. 1, 2020. [Online]. Available: https://iopscience.iop.org/article/10.1088/1757-899X/852/1/012059/meta