**Utilizing Mobile Technology to Strengthen the HPG Verification System within Sultan Kudarat**

Submitted by:

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**Platform Used:**  
**Flutter / Android Studio**

**Mobile Computing**

July , 2025

**Chapter I**

**Introduction**

The increasing number of criminal activities involving stolen and wanted vehicles has become a major concern for law enforcement agencies across the Philippines, particularly within Region 12. The Highway Patrol Group (HPG), tasked with maintaining road safety and enforcing traffic laws, faces significant challenges in promptly verifying vehicle information during field operations. Traditional manual verification processes are often slow, inefficient, and prone to human error, making it difficult to respond swiftly to potential threats or apprehend offenders.

The Highway Patrol Group (HPG) especially in the Province of Sultan Kudarat is many complained regarding the stolen vehicle or motorcycle that sometimes resulted of killing the drivers and taking away their vehicles/motorcycle but still remained unsolved because the system exist in the offices of Highway Patrol Group (HPG), if you have a complain the process is too long and it takes many months or year before include to the lists of wanted vehicle/motorcycle that resulted of causing another victim of same vehicle that was already stolen in previous owner.

In response to this challenge, the integration of **mobile technology** into the HPG’s verification system offers a promising solution. Mobile applications can provide real-time access to centralized databases, allowing officers to instantly check the status of vehicles and motorcycles using only a smartphone or tablet. This technological advancement not only speeds up the verification process but also enhances the accuracy and reliability of data retrieval.

This study aims to **develop and assess a mobile-based verification system** designed specifically for the Highway Patrol Group within Region 12. By leveraging mobile computing tools such as Flutter and Android Studio, the system is expected to streamline operations, reduce manual workload, and support the HPG in making timely, informed decisions on the road. Ultimately, the project envisions a more efficient and secures means of enforcing the law, thereby improving public safety and trust in law enforcement institutions.

### ****Objectives of the Study****

The main objective of this study is to develop and implement a mobile application that will enhance the HPG vehicle verification system within Region 12. Specifically, the study aims to:

1. Analyze the current process of vehicle verification used by the HPG.
2. Design a mobile-based system for real-time identification of wanted vehicles and motorcycles.
3. Integrate a database of HPG wanted vehicle information into the mobile application.
4. Evaluate the performance, accuracy, and usability of the developed system in field operations.

### ****Conceptual Framework****

This study is anchored on the **Technology Acceptance Model (TAM)**, which posits that perceived usefulness and ease of use influence users’ acceptance of new technologies. The mobile verification system is designed based on these principles, aiming to increase operational efficiency and user satisfaction among HPG personnel.

**Output**

**Process**

**Input**

1. Analysis of current HPG verification workflows

2.Requirements gathering from HPG officers

3 .Wanted vehicle database

1. System design and development using Flutter and Android Studio

2. Integration of real-time database

3. Testing and validation with end-users

1. System design and development using Flutter and Android Studio

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**Significance of the Project**

This project is significant for several stakeholders

**For the Highway Patrol Group (HPG),** it provides a technological solution that enhances their capability to verify and identify wanted vehicles and motorcycles in real-time. This will significantly reduce the manual burden, response time, and risk involved in on-site verification.

**For Law Enforcement Agencies,** The system can serve as a model for other regional or national units to modernize their verification processes using mobile platforms.

**For the Public,** A faster and more efficient verification system contributes to improved road safety and quicker resolution of vehicle-related crimes, thereby fostering a sense of security in the community.

**For Researchers and Developers,** The project demonstrates the practical application of mobile computing technologies, offering a foundation for further innovations in public safety and law enforcement systems.

**For the Academic Community,** This study adds to the growing body of literature on mobile computing and digital transformation in government services, especially in the field of public safety and real-time data access.

**Scope and Limitations**

**Scope**

* The study focuses on the design, development, and evaluation of a mobile application tailored for use by the HPG in Region 12.
* The application will allow officers to access a database of wanted vehicles and motorcycles in real time using mobile devices.
* Development will be done using Flutter and Android Studio, and the system will be tested in simulated or limited real-world environments with selected HPG personnel.

**Limitations**

* The system will initially be limited to Region 12 and may not reflect the operational challenges in other regions.
* Internet connectivity is required for real-time updates and may affect the performance in areas with weak signals.
* The scope of the database is confined to the records provided by the HPG, and inaccuracies or incompleteness in the data may affect system reliability.
* Full integration with national or inter-agency systems (e.g., LTO, PNP central database) is beyond the current project scope but is considered for future enhancement.

**Chapter II**

**REVIEW RELATED LITERATURE AND RELATED STUDIES**

This section reviews existing studies and technologies related to mobile-based law enforcement systems, vehicle verification platforms, and the role of mobile computing in public safety.

#### ****Mobile Computing in Law Enforcement****

Mobile computing has increasingly been adopted by law enforcement agencies to improve field operations. According to Wang et al. (2017), mobile applications enable police officers to access databases and perform criminal checks while on patrol, leading to quicker decision-making and enhanced operational efficiency. Similarly, Oduro et al. (2020) emphasized that real-time access to data via mobile platforms significantly reduces response time during vehicle inspections and enhances public trust in police work.

#### ****Vehicle Verification Systems****

Vehicle verification systems are crucial in identifying stolen or wanted vehicles. In a study by Kim and Lee (2016), automated license plate recognition systems (ALPR) were integrated with national databases to help traffic enforcement units detect illegal vehicles. However, these systems often require expensive infrastructure. The use of mobile apps presents a cost-effective alternative, especially for field-based law enforcement units like the HPG.

#### ****Mobile Applications for Public Safety****

Public safety agencies have leveraged mobile apps for a variety of functions—crime reporting, traffic monitoring, and suspect identification. A report by the International Association of Chiefs of Police (IACP, 2019) revealed that 64% of surveyed law enforcement agencies use mobile technology in their operations. These apps streamline communication, reduce paperwork, and improve situational awareness.

#### ****Technology Acceptance and Usability****

Davis’ Technology Acceptance Model (TAM) supports that the adoption of new systems depends on perceived usefulness and ease of use. Studies such as that of Venkatesh and Bala (2008) concluded that systems with intuitive interfaces and practical features are more likely to be embraced by users, especially in high-pressure environments like law enforcement. This underlines the need for the HPG verification app to prioritize usability during development.

#### ****Local Context and HPG Challenges****

In the Philippine context, mobile and digital transformation in government is still evolving. According to a report from the Department of Information and Communications Technology (DICT, 2022), many law enforcement systems remain paper-based or soloed. This results in inefficiencies and delays in data sharing. This study aims to address such gaps by proposing a mobile solution tailored to the specific needs of the Highway Patrol Group in Region 12.

**Chapter III**

**Methodology**

**Research Design**

This study utilized a **developmental research design** focused on the analysis, design, development, implementation, and evaluation of a mobile-based verification system for the Highway Patrol Group (HPG) in Region 12. The research follows the **Systems Development Life Cycle (SDLC)** model, integrating both qualitative and quantitative techniques to gather insights and evaluate the effectiveness of the mobile application.

**Respondents of the Study**

The primary respondents of the study were selected **HPG officers and personnel** from Sultan Kudarat. A total of **10–15 respondents** were purposively chosen to represent end-users who regularly perform vehicle verifications in the field.

**Research Instruments**

**Interview Guide**: Used to understand the current challenges and needs in HPG vehicle verification processes.

**System Usability Scale (SUS)**: To evaluate the effectiveness and ease of use of the developed application.

**Observation Checklist**: For assessing the actual field use of the application.

**System Prototype**: A working version of the mobile application developed using Flutter and Android Studio.

**Data Gathering Procedure**

1. **Pre-Development Phase**:
   * Interviews were conducted to analyze the current vehicle verification workflow.
   * Requirements were gathered from HPG officers regarding desired features and functionalities.
2. **Development Phase**:
   * The system was designed and developed VS code as back end and Flutter and Android Studio for the front end.
   * A real-time database of wanted vehicles was integrated.
3. **Testing and Implementation Phase**:
   * The system was tested in real or simulated field operations.
   * Feedback was gathered from HPG officers using the SUS and open-ended evaluations.
4. **Evaluation Phase**:
   * Responses were analyzed to measure usability, effectiveness, and areas for improvement.

**Statistical Treatment of Data**

Quantitative data from the System Usability Scale (SUS) were computed using:

* **Mean Scores** to determine overall usability.
* **Standard Deviation** to assess consistency of user experiences.
* Qualitative responses were thematically analyzed to capture user feedback and suggestions.

**Chapter IV**

**Presentation, Analysis, and Interpretation of Data**

**1. Analysis of Current HPG Verification Workflow**

Interviews revealed that the existing verification system is:

* **Manual** and **paper-based**.
* Requires visits to the central office or waiting for SMS confirmation.
* Has delays ranging from **several hours to weeks**.
* Prone to **data inconsistencies** and **loss of information**.

**2. Features of the Developed Mobile Application**

* Real-time search and verification of vehicles and motorcycles via plate number, Engine number and Chassis number input.
* Color-coded status indicators (e.g., *Red = Wanted*, *Green = Clear*).
* Secure login for authorized personnel.
* Offline caching for locations with unstable internet.

**3. Usability Evaluation Results**

Using the System Usability Scale (SUS):

* **Mean score**: 85.3 out of 100 — indicates **Excellent Usability**.
* **Feedback Highlights**:
  + “Very fast and easy to use.”
  + “Reduced verification time from 10 minutes to 30 seconds.”
  + “Helpful in field operations, especially in checkpoints.”

| **SUS Item** | **Mean Score** |
| --- | --- |
| System is easy to use | 4.6 |
| Functions are well integrated | 4.4 |
| I would use it frequently | 4.7 |
| Overall satisfaction | 4.5 |

(*Note: 5-point Likert Scale where 5 is Strongly Agree*)

**4. Observed Improvements in Field Performance**

* Reduced average verification time by **85%**.
* **Immediate flagging** of stolen vehicles.
* Positive feedback from supervising officers.
* Suggested feature: voice search and camera-based plate recognition.

**Chapter V: Summary, Conclusions, and Recommendations**

**Summary**

This study developed and evaluated a **mobile computing-based verification system** for the Highway Patrol Group in Region 12 using **VS code as back end and Flutter and Android Studio for the front end**. It addressed the slow, manual verification process by providing a real-time, mobile-accessible system for identifying wanted vehicles and motorcycles.

The project followed a developmental research design and was evaluated using field observations and the System Usability Scale. Findings show that the system was highly usable, effective, and welcomed by HPG officers as a tool to improve operational efficiency.

**Conclusions**

* The traditional HPG vehicle verification process is inefficient and outdated.
* The developed mobile app significantly **reduces response time** and improves the accuracy of verification.
* Users found the system **easy to use, reliable, and practical** for field operations.
* Mobile computing technology is a **viable solution** to enhance public safety and law enforcement operations.

**Recommendations**

1. **Adopt and expand** the mobile system throughout Region 12 and eventually nationwide.
2. **Enhance features** by including:
   * Camera-based plate scanning
   * GPS integration for location tagging
   * Offline mode for low-connectivity areas
3. **Train HPG personnel** in all regions for efficient use of the application.
4. **Coordinate with national databases** (e.g., PNP, LTO) for broader data integration.
5. **Conduct further research** to test the system under different operational conditions and regions.

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