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|  | Software Requirement Document |
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**1. Introduction**

**1.1 Purpose**

The purpose of this document is to define the software requirements for **GhostVision**, a real-time vehicle tracking and verification system designed to assist police officers, security companies, and government/private entities in monitoring vehicle registrations and issuing alerts when necessary.

**1.2 Scope**

The system will enable authorized users to access vehicle registration information and track vehicles in real-time using camera data. **GhostVision** will provide different access levels depending on user roles, ensuring privacy and data protection.

**1.3 Definitions, Acronyms, and Abbreviations**

* **LPR**: License Plate Recognition
* **Admin**: Administrator of the system
* **Officer**: Police Officer or Security Official

**1.4 System Overview**

**GhostVision** is designed to pull vehicle registration information from both digital and scanned paper records. The system will integrate with camera systems to perform real-time license plate recognition (LPR). The system will also issue tickets, flag vehicles in specific areas, and support multiple user roles with privacy controls.

**2. Overall Description**

**2.1 Product Perspective**

**GhostVision** will interface with external systems, including vehicle registration databases and real-time camera feeds, to monitor vehicles across Jamaica. The system will consist of the following key components:

* Vehicle Database
* Camera/LPR System
* User Interfaces (Web/Mobile)

**2.2 Product Features**

* **Real-Time Vehicle Tracking**: Use cameras to scan and identify license plates.
* **Vehicle Lookup**: Officers can query vehicle details (owner info, registration status).
* **Area Flagging**: Security companies can flag vehicles in specific areas but won’t access full data.
* **Ticket Issuing**: Government/private entities can issue tickets for speeding or other infractions.
* **Administrative Control**: Admins can add, edit, and manage vehicle records.
* **Privacy Controls**: Layered access, ensuring sensitive data is available only to authorized users.

**2.3 User Characteristics**

* **Police Officers**: Authorized to view vehicle details and receive alerts for flagged vehicles.
* **Security Officials**: Limited access to check if a vehicle is registered and to flag vehicles in protected areas.
* **Government Officials/Private Companies**: Capable of issuing tickets for violations detected via speed cameras.
* **Administrators**: Full access to add, edit, and manage vehicle information.

**3. Functional Requirements**

**3.1 User Authentication**

* All users must log in using secure credentials.
* Role-based access control to enforce different access levels for each user group (Police Officers, Security Officials, Government Officials, and Admins).

**3.2 Vehicle Registration Lookup**

* **Input**: License plate number from LPR system or manual input.
* **Process**: Query the vehicle database for matching records.
* **Output**: Display vehicle registration details, owner information, and any associated flags.

**3.3 Real-Time License Plate Recognition (LPR)**

* **Input**: Camera feed with license plate images.
* **Process**: Use LPR algorithms to identify license plates in real-time.
* **Output**: Trigger vehicle lookup in the database.

**3.4 Area-Based Vehicle Flagging**

* Security companies can flag vehicles within specific areas (e.g., gated communities), but cannot access full vehicle details.
* The system will trigger an alert when flagged vehicles enter restricted areas.

**3.5 Ticket Issuing**

* Government/private companies can issue tickets based on speed camera data or other infractions.
* The system will auto-generate tickets and link them to the vehicle owner.

**3.6 Privacy Controls**

* Private security companies have restricted access to vehicle information.
* Sensitive owner information (e.g., home address, phone number) will only be available to police officers and administrators.
* Data encryption for all sensitive information.

**4. Non-Functional Requirements**

**4.1 Performance**

* The system must handle thousands of concurrent requests and respond to vehicle lookups within **milliseconds**.

**4.2 Scalability**

* The system must be scalable to handle real-time data from hundreds of cameras across Jamaica and millions of vehicles.

**4.3 Security**

* **SSL/TLS encryption** for all data transmission.
* **Role-Based Access Control (RBAC)** to ensure users only access permitted data.
* Audit logs for any data modifications or access events.

**4.4 Data Privacy**

* Ensure compliance with Jamaican privacy laws regarding vehicle and personal information.
* Implement access control mechanisms to prevent unauthorized access to sensitive data.

**4.5 Availability**

* The system should have **99.9% uptime**, with failover mechanisms in place to ensure real-time availability.

**5. Constraints**

* The existing vehicle registrar system may be limited due to paper-based records, which will require a data digitization phase.
* The system must comply with Jamaican data privacy laws, ensuring that personal and vehicle data is handled securely.

**6. External Interface Requirements**

**6.1 Camera Interface**

* **Input**: Video feed from roadside or mobile cameras.
* **Output**: Identified license plates sent to the vehicle database for lookup.

**6.2 External Systems**

* Integration with the **Vehicle Registrar** for updating vehicle registration records.
* Integration with **speed cameras** to issue automatic tickets.

**7. Assumptions and Dependencies**

* The vehicle registrar will transition to a digitized database.
* The cameras used by the system will have high-resolution capabilities to capture clear license plate images.