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**UNIVERSITY OF BUEA REPUBLIC OF CAMEROON**

Buea, South West Region PEACE-WORK-FATHERLAND

Cameroon

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF COMPUTER ENGINEERING**

**Task 3: Requirement Analysis**

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**CEF440:Internet Programming and Mobile Programming**

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**Introduction**

This task focused on the Analysis of the Requirements for the Road Sign and Road State Mobile Application. The Specific objectives included; Review and Analysis of the Requirements Gathered, Identifying Inconsistencies, Ambiguities, and Missing Information, Prioritizing Requirements Based on Importance and Feasibility, Classify Requirements, Develop the Software Requirement Specification (SRS) and Validate Requirements with Stakeholders. This would further strengthen the foundations and ease the step furher to the next phase of the project-the design phase.

**1. Review and Analysis of the Requirements Gathered**

The mobile app aims to help drivers in Cameroon by providing:

* Audio-based alerts for road signs and road conditions (e.g., potholes, construction zones).
* Access to official datasets from transport authorities (no real-time camera input).
* An educational module for users with limited knowledge of road signs.
* A simple user reporting feature to log new road issues or sign damage.

The requirements were assessed for:

* Completeness: Covers core functionalities like alerts, education, and reporting.
* Clarity: Requirements are clearly worded and mapped to user needs.
* Feasibility: Technically achievable using GPS, mobile notifications, and local databases.
* Dependency Relationships: Educational content depends on sign recognition data; user reports depend on GPS and internet connectivity.

**2. Identifying Inconsistencies, Ambiguities, and Missing Information**

* We found that there is ambiguity in how often road condition data will be updated.
* We also found that , Clarification is needed on whether users can submit reports offline (with later sync). For this, the users will submit reports online.
* We also found that there is missing details on support for multiple languages or accessibility features. To address this, the app will be localised to include English and French Language preferences.

1. **Prioritizing Requirements Based on Importance and Feasibility:**

Based on the feasibility, the Requirements were prioritized into High, Medium and Low Priority.

High Priority:

* Road Sign Directory
* Real-Time Road Condition Alerts
* Map Integration
* User Reporting System
* Notification Customization

Medium Priority:

* Multilingual support

Low Priority:

* Offline mode for reporting

**4. Classifying Requirements**

Functional Requirements:

* Road Sign Directory

- Display detailed information (text + visuals) about common road signs in Cameroon.

- Allow users to search or filter signs by category (e.g., warning, regulatory).

* Real-Time Road Condition Alerts

- Push notifications for traffic congestion, accidents, weather hazards, or road closures.

- Customize alerts based on user-selected routes or geographical areas.

* Map Integration

- Overlay road signs and condition alerts on a map interface.

- Integrate with navigation apps (e.g., Google Maps) to display alerts during route guidance.

* User Reporting System

- Allow drivers to submit reports (e.g., potholes, accidents) via text, photos, or voice.

- Tag reports with location data and timestamps.

* Notification Customization

- Let users define preferences (e.g., alert types, frequency, routes).

Non-Functional Requirements:

* Usability

- Clean, responsive UI optimized for mobile devices.

- Minimal learning curve (intuitive navigation for drivers of all tech levels).

* Performance

- Real-time alerts delivered with <5-second latency.

- Smooth integration with third-party APIs without app lag.

* Reliability

- High uptime (≥99%) for critical features like alerts and map overlays.

- Accurate data validation for user reports (e.g., location verification).

* Compatibility

- Support Android and iOS devices (versions within the last 3 years).

- Seamless integration with Google Maps and similar platforms.

* Security

- Encrypt user data (e.g., location, reports) during transmission and storage.

- Secure API keys and third-party service integrations.

* Scalability

- Handle simultaneous users during peak traffic hours ( rush hour).

- Efficient database management for growing crowdsourced reports.

**5. Development of the Software Requirement Specification (SRS):**

#### The SRS document was created, where the functional and non-functional requirements for the Road Sign and Road State Mobile Notification Application, were defined.**The document serves as a reference for stakeholders, to ensure the project aligns with their needs.**

A formal SRS document was developed to include:

* **Overall description**
* **System Features and Requirements**
* **Data Requirements**
* **System Attributes**
* **Compliance Requirements**

1. **Validate Requirements with Stakeholders**

* Transport authority officials
* Local drivers and app users
* Developers and designers

Feedback was collected through meetings and surveys to ensure all needs are accurately reflected.