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REPORT: REQUIREMENT GATHERING

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I. INTRODUCTION

Requirement gathering is a fundamental phase in the development of a mobile application, especially one focused on enhancing road safety and traffic efficiency. In the context of Cameroon, where drivers face challenges such as inadequate road signage and limited access to real-time information about road conditions, understanding the needs of various stakeholders is crucial. This report outlines the process of requirement gathering for a mobile application that provides users with access to road sign information and real-time updates on road conditions. By identifying key stakeholders and employing effective gathering techniques, we aim to create a user-centric application that addresses the specific challenges faced by drivers in Cameroon.

II. STAKEHOLDER IDENTIFICATION

Identifying stakeholders is essential for understanding the diverse needs and expectations for the mobile application. Key stakeholders include:

1. Drivers

Description: The primary users of the mobile application. They require accurate information about road signs and real-time updates on road conditions to make informed travel decisions.

Needs:

- Clear, detailed information about road signs.
- Real-time notifications about traffic congestion, accidents, and weather hazards.
- A user-friendly interface for easy navigation.

2. Road Safety Officers

Description: Officials responsible for monitoring and improving road safety standards. They play a crucial role in ensuring compliance with traffic regulations and educating drivers.

Needs:

Data on common road signs and their meanings to educate drivers.
Insights into user behavior and feedback to enhance road safety initiatives. A platform to disseminate safety information and alerts to the public.

3. Ministry of Transport

Description: The government body overseeing transportation policies, road infrastructure, and safety regulations in Cameroon.

Needs:

Comprehensive data on road conditions and traffic patterns to inform policy decisions.
Collaboration opportunities to enhance road safety initiatives.
A tool to communicate updates and regulations effectively to drivers.

API Providers

Description: Companies or organizations that provide access to external data sources, such as traffic data, weather updates, and mapping services.

Needs:

- Clear specifications on the types of data required by the application.
- Collaboration to ensure seamless integration of their APIs into the mobile application.
- Feedback on data usage and performance to improve their services.

The identification of key stakeholders is a vital step in developing a mobile application aimed at improving road safety and efficiency in Cameroon. By understanding the diverse needs of drivers, road safety officers, the Ministry of Transport, and API providers, we can ensure that the application is tailored to effectively meet their requirements.

III. REQUIREMENT GATHERING TECHNIQUES

To effectively gather requirements for the mobile application, a combination of techniques was employed. Each method contributed unique insights that will shape the application's development.

3.1 Surveys

Description: Surveys were distributed to a diverse group of potential users, including drivers from various backgrounds and regions in Cameroon.

Purpose:

To collect quantitative data on user preferences, experiences with existing navigation tools, and specific needs regarding road signage and real-time updates. To identify common challenges faced by drivers on the road.

Implementation:

Online surveys were created using platforms such as Google Forms to facilitate easy distribution and collection of responses.

Questions focused on user demographics, frequency of driving, familiarity with road signs, and desired features in the application.

2.2 Interviews

Description: One-on-one interviews were conducted exclusively with drivers to gather in-depth insights into their experiences and needs.

Purpose:

To gather qualitative data about user expectations, challenges related to road safety, and the importance of having accurate road sign information and real-time alerts.
To understand how drivers interact with existing applications and what improvements they seek.
Implementation:

Semi-structured interviews allowed for open-ended responses while maintaining focus on key topics. Interviews were recorded (with permission) and transcribed for detailed analysis.

2.3 Brainstorming

Description: Collaborative brainstorming sessions were organized among the development team to generate ideas and discuss potential features for the application.

Purpose:

To explore innovative solutions and functionalities that could enhance the user experience and overall effectiveness of the application.
To capitalize on the technical expertise of developers to identify feasible features based on user needs.

Implementation:

Sessions were facilitated in a workshop format, allowing developers to share thoughts freely and build on each other's ideas.
Key themes and features were documented for further analysis and consideration in the development process.

2.4 Reverse Engineering

In this analysis, we will examine existing navigation and road safety applications similar to the one being developed. Key applications include Google Maps, Waze, and HERE WeGo. Each of these applications offers unique features that can inform the design and functionality of our mobile app.

1. Google Maps

Key Features:

Comprehensive Mapping: Offers detailed maps with street views, satellite imagery, and terrain views.
Routing Options: Provides multiple route options (driving, walking, cycling, and public transportation) with estimated travel times.

Real-Time Traffic Data: Integrates live traffic updates and suggests alternative routes based on traffic conditions.

User Reviews and Ratings: Allows users to leave feedback on locations, enhancing the quality of information available.

Implications:

Incorporating detailed maps and various routing options could enhance user experience.

Real-time updates are crucial for keeping drivers informed about traffic conditions.

1. Waze

Key Features:

Community-Driven: Users can report traffic incidents, hazards, and police activity, creating a dynamic and interactive platform.

Real-Time Alerts: Sends notifications about accidents, road closures, and speed traps, allowing for proactive route adjustments.

Gamification Elements: Users earn points for reporting information, promoting engagement and interaction.

Voice Navigation: Provides turn-by-turn voice directions, which can help keep drivers focused on the road.

Implications:

Leveraging user-generated content can improve data accuracy and community engagement. Real-time alerts and gamification can enhance user retention and interaction.

2. HERE WeGo

Key Features:

Offline Maps: Allows users to download maps for offline use, which is beneficial in areas with poor connectivity.

Multi-Modal Navigation: Supports various modes of transport (car, public transit, walking) with tailored routing for each.

Points of Interest (POI): Offers information on nearby attractions, services, and amenities, enhancing the overall user experience.

Traffic Information: Provides real-time traffic updates, including congestion levels and estimated arrival times.

Implications:

Offline functionality can be a significant advantage in areas with limited internet access. Including POIs and multi-modal navigation can attract a broader user base.

IV. DATA GATHERING

Data gathering was conducted to collect relevant information from potential users and stakeholders regarding the use and design of the mobile application. Our goal was to understand real-world road challenges, user expectations, and feature preferences.

1. Sources of Data Collected:

Interviews with Drivers: Over 30 individual interviews were conducted with taxi drivers, private drivers, and public transport users in locations such as Molyko, Mile 17, and Checkpoint in Buea. Questions were asked verbally and responses were documented manually.

Surveys:

Surveys were conducted using Google Forms and distributed to drivers and road users. These digital forms helped collect structured responses quickly and conveniently. Participants answered multiple choice and short-answer questions covering road sign understanding, preferred alert methods, and common road issues. The survey responses provided quantifiable data that complemented the in-person interviews and helped confirm common user preferences and concerns.

Observation: Team members visited road hotspots and bus stations to observe traffic flow, signage visibility, and common road problems.

Online Research: Public resources and websites on road signs in Cameroon, and analysis of user reviews on existing traffic apps.

2. Types of Data Collected:

- **Common road issues:** potholes, congestion, weather effects.
- Preferred methods of receiving alerts (e.g., voice, SMS, in-app pop-ups).
- **Languages understood:** English, French, Pidgin.
- Level of familiarity with road signs.
- Willingness to report issues via mobile apps.

The data collected laid the foundation for identifying user needs and helped validate our app's core features.

V. DATA CLEANING

To ensure high-quality and analyzable results from the data collection process, the following steps were taken to clean and prepare the survey responses:

Unified Input: Responses collected from manual interviews with drivers were transcribed and submitted into the same Google Form used for public digital responses. This created a consistent and centralized dataset.

Required Fields: The form was designed with required fields to avoid incomplete responses, resulting in minimal blank entries.

Duplicate Elimination: The dataset was reviewed to remove any accidental duplicate submissions.

Grouping Similar Responses:

Responses such as "traffic jam," "heavy traffic," and "congestion" were grouped under Traffic Congestion.

"Potholes," "damaged roads," and "bad road conditions" were categorized as Road Surface Issues.

Notification preferences such as "SMS alerts," "pop-up notifications," and "in-app messages" were grouped under Alert Preferences.

Language Responses: Participants who selected multiple languages (e.g., English and French) had those choices preserved as multi-language users for feature planning.

Open-Ended Clarification: Some open-ended entries were reviewed manually and reclassified into predefined categories to ensure consistency.

Google Forms Automation: The platform automatically organized the responses into visual summaries (charts and graphs), making it easier to identify trends and patterns across the dataset.

The final dataset was structured and categorized under the following major themes:

Road Sign Knowledge

Road Condition Challenges

Notification Preferences

Language Accessibility

Reporting Willingness

This thorough data cleaning process enabled effective analysis and supported evidence-based design decisions for the application.

VI. USER RELUCTANCE ASSESSMENT

User Reluctance Assessment

Some users showed hesitation towards using or contributing to the app. During our data collection, we identified several key reasons:

Privacy Concerns: Fear of sharing location or personal data.

Technical Barriers: Limited knowledge on app usage.

Data & Battery Usage: Fear the app will drain phone resources.

Language Barrier: Some drivers preferred to respond in Pidgin or French, which made it necessary to translate and simplify questions for better understanding.

Time Constraints: Many participants were in a hurry or actively working, making them unwilling to spend more than a minute answering questions.

Lack of Road Signs: Several drivers noted that many roads in their area have no visible signs, making them skeptical about the relevance of a road sign-focused app.

Phone Usage Concerns While Driving: Some drivers expressed concern that using a mobile phone while driving could be dangerous or distracting, making them hesitant to use an app that requires manual interaction during trips.

Proposed Solutions:

- Educate users on privacy and security measures.
- Use icons and local language for ease of use.
- Add offline mode or low-data version.
- Reward users for submitting useful reports (e.g., badges, points).

VII. CONCLUSION

The requirement gathering process for the Road Sign and Road Condition Mobile Notification App has successfully identified key stakeholders, employed effective techniques for data collection, and ensured data accuracy through thorough cleaning. By engaging drivers, road safety officers, and relevant authorities, we have gathered valuable insights into user needs and preferences.

The use of surveys, interviews, and brainstorming sessions has provided a comprehensive understanding of the challenges faced by drivers in Cameroon. Data cleaning ensured that the information collected is reliable and ready for analysis. Additionally, assessing user reluctance highlighted potential barriers to app adoption.

Overall, this structured approach has established a solid foundation for developing a user-centric application that aims to enhance road safety and efficiency, ultimately benefiting drivers across the region.