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Requirement Gathering And User Needs Analysis For A Mobile Network Monitoring Application In Cameroon

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GROUP 23

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ABSTRACT

Persistent fluctuations in mobile network performance across Cameroon significantly impair user experience and productivity – particularly for students, professionals, and rural communities. This report aims to elicit and analyze user requirements for a bespoke mobile network monitoring application tailored to Cameroonian contexts using a mixed-methods approach (online surveys, open-ended feedback, and competitive analysis) to capture both quantitative and qualitative insights Writing Center. Survey data from 65 respondents across Buea, Yaoundé, and Douala were rigorously cleaned, coded, and thematically analyzed to uncover core pain points: signal variability, bandwidth constraints, and privacy concerns Writing Center UNC. Findings indicate strong demand for real-time signal visualization, manual issue reporting, and low battery/data footprint features Purdue OWL. By aligning functional and non-functional requirements with user expectations and regional network characteristics, the proposed solution seeks to enhance transparency, empower end users, and support telecommunications stakeholders in infrastructure planning and service improvement UTEP. Ultimately, this user-centered requirements output will guide subsequent design and development phases, ensuring the application is both practical and aligned with real-world needs.

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I. Introduction

Cameroon's mobile networks—dominated by MTN, Orange, and Camtel—exhibit pronounced inconsistencies in signal strength and bandwidth across urban and rural areas. Such variability undermines communication, disrupts access to online services, and fuels user frustration libguides.westminster.ac.uk. Existing diagnostic tools are often generic, lack localization, and overlook user privacy concerns, leaving a gap for an application that not only monitors performance but also empowers users to report and compare their experiences in real time Wikipedia.

To address these challenges, this report gathers comprehensive user requirements through stakeholder identification, surveys, open-ended feedback, and reverse engineering of competitor apps. The aim is to derive both functional (e.g., real-time signal mapping) and non-functional (e.g., data anonymization) requirements rooted in actual user experiences.

Scope & Objectives:

This study focuses on Cameroonian mobile users aged 18–50 in major cities, aiming to:

1. To identify key pain points and feature preferences for a mobile monitoring application.

2. Ascertain desired monitoring and reporting features.

3. To assess user reluctance concerning privacy, data usage, and feedback frequency.

II. Methodology

This project follows an I**terative and user-centered software development methodology** to ensure alignment with the user needs and continous improvement

1. Stakeholder Identification

To effectively gather and implement the requirements for a mobile app that monitors and reports mobile network experience, it is crucial to identify all stakeholders involved:

- **Mobile Network Users**: The primary stakeholders who will use the app to report and monitor their network performance. Their feedback, experiences, and preferences are central to the development of the application.

- **Telecommunication Providers (MTN, Orange, Camtel)**: Secondary stakeholders whose service quality is evaluated. They can potentially use this data to improve their network infrastructure and service.

- **App Developers and UX Designers**: Responsible for transforming user needs into a working, intuitive mobile application. Their role includes feature development, UI/UX optimization, and maintenance.

- **Data Analysts**: Tasked with interpreting collected data to understand user behavior, satisfaction, and network performance trends.

- **Project Sponsors/Investors**: Entities that fund the project and are interested in its commercial viability and user adoption.

2. Requirement Gathering Techniques

A variety of techniques were used to ensure a holistic understanding of user needs:

2.1 Surveys

A structured survey was administered to gather user demographics, network usage patterns, issues encountered, satisfaction levels, and interest in a potential app. The data was collected from 65 respondents across different age groups and cities.

2.2 Interviews and Open-Ended Feedback

Though primarily survey-based, a section of the survey allowed for open-ended responses. These qualitative responses provided insights into specific pain points and user suggestions.

2.3 Brainstorming

Internal brainstorming sessions were conducted among the research and development team to hypothesize potential features and analyze feasibility based on the feedback collected.

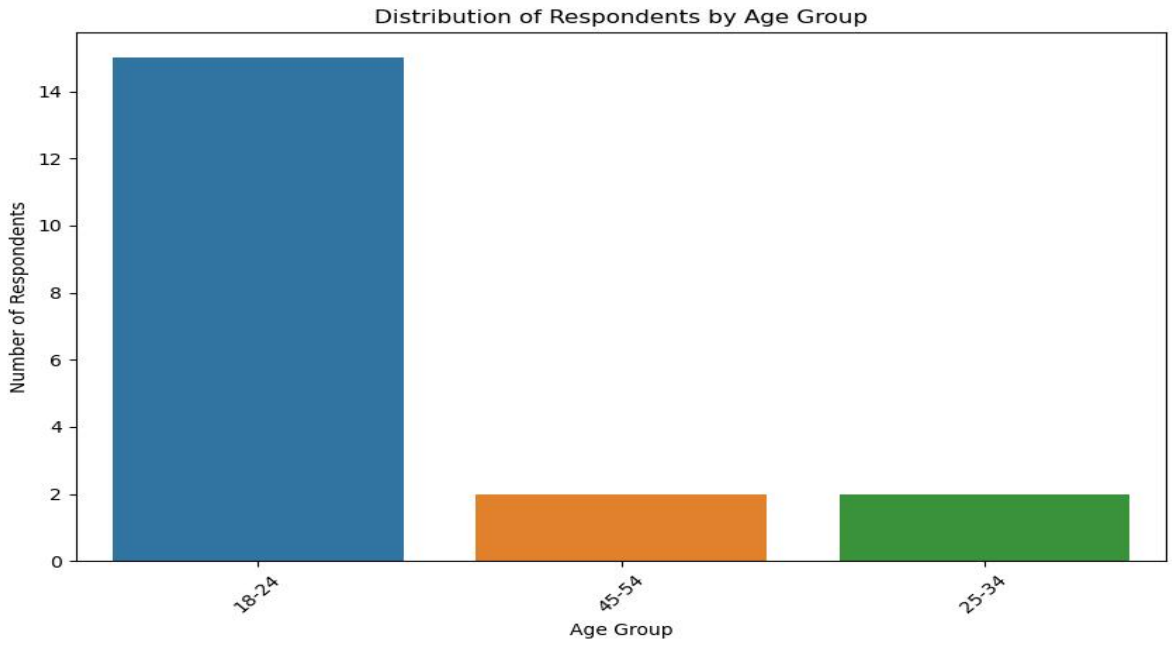
2.4 Reverse Engineering

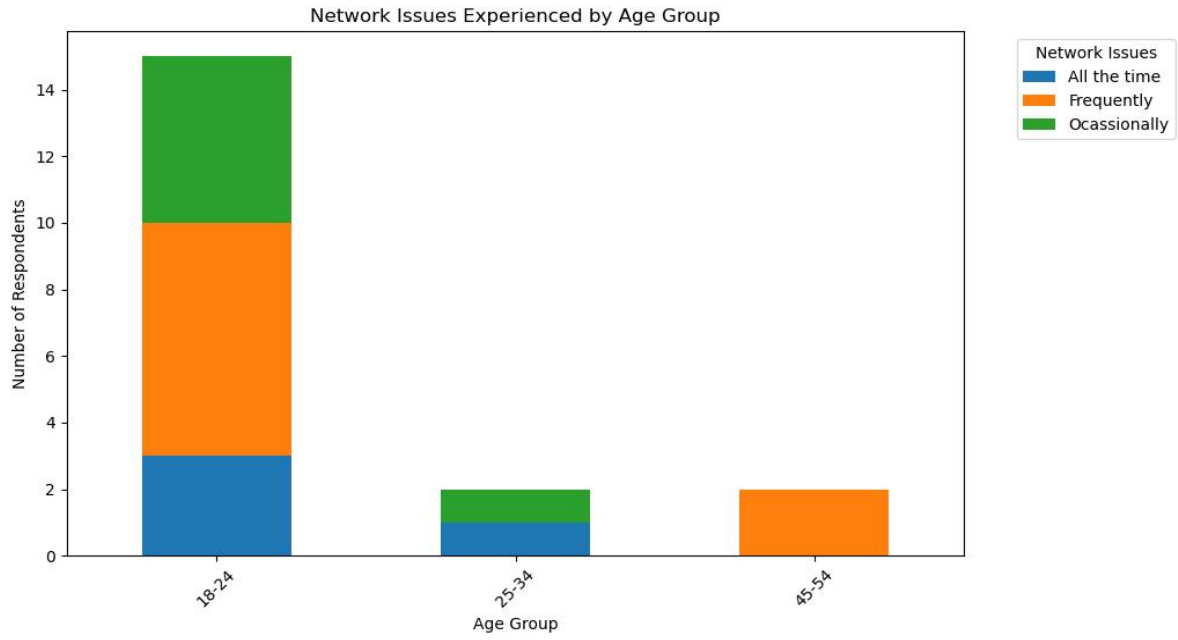
By analyzing existing apps in the network diagnostics space, competitive features and market gaps were identified to ensure a value-added offering.

3. Data Gathering

Survey data was collected through an online form(google docs) that included both multiple-choice and open-ended questions. Key aspects covered include:

- **Demographics:** Age, gender, and location.
- **Mobile Network Usage:** Preferred networks (MTN, Orange, Camtel), type of phone, and internet connection (predominantly 4G).
- **Perfomance Metrics:** Frequency of network issues such as fluctuating signal strength, slow internet speeds, and dropped calls.
- **User Preferences:** Interest in the app, desired features, and privacy concerns.





Highlights from the data:

- Majority of respondents use MTN and Orange.
- Camtel is used by fewer people and is often described as cheap but unreliable.
- Users report frequent network issues, especially fluctuating signal strength, slow internet, and dropped calls.

- Orange is considered more stable, though it has weekend disruptions.
- MTN is inconsistent and bandwidth-constrained in several regions.
- A majority expressed interest in an app to monitor/report network performance.

4. Data Cleaning

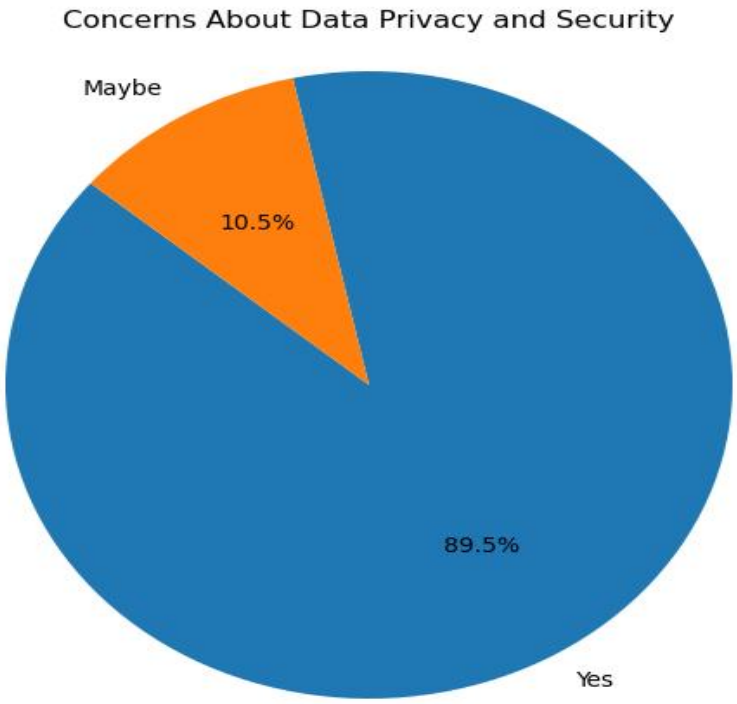
- The raw survey data was cleaned and processed using the following steps:
- Removal of incomplete or inconsistent entries.
- Standardization of categorical responses (e.g., converting variants of "Camtel" or "MTN" into uniform terms).
- Grouping similar open-text answers for qualitative analysis.
- Transformation of check-all-that-apply responses into binary indicators for analysis.
- This ensured the integrity and consistency of the data before deeper analysis.

5. User Reluctance Assessment

To assess potential user reluctance, we analyzed responses around privacy, feedback frequency, and concerns with the proposed app:

- **Privacy Concerns**: A significant number of users are concerned about data privacy. They are willing to share data only if it's anonymous or with permission.
- **Feedback Fatigue**: Many users prefer to give feedback only when they encounter issues, rather than on a regular basis.
- **Battery/Data Usage**: Some expressed concerns about the app consuming battery and mobile data.

These insights indicate that while there is substantial interest in the app, transparency about data usage and offering opt-in mechanisms will be critical to driving adoption.



6. Insights from Frequency Analysis and Qualitative Data

Observation	Frequency	Summary
Network strength varies across locations	2	Users compared network strengths across different providers and locations.
Bandwidth concerns, Camtel slow but cheap, Orange more stable	5	Bandwidth is a primary concern. MTN is inconsistent, Camtel cheap but slow, Orange stable.
MTN and Camtel fluctuate; bandwidth critical	4	Users rely on both networks but experience fluctuating quality.
Camtel unusable; Orange better than MTN	20	Camtel not dependable. Orange offers better consistency.
Network switching common; Orange worse on weekends	25	Users frequently switch networks; Orange degrades on weekends.
MTN best in some areas; still disturbances daily	4	Even the best networks are unreliable across different areas.

7. Survey-Based Conclusions

General Conclusion:

Most users face recurring issues with mobile network reliability, especially fluctuations in signal strength and bandwidth. MTN, though widely used, is inconsistent. Camtel is considered fast but expensive and often unusable. Orange is the most stable but has disruptions, particularly on weekends. Users often switch between networks to find the best performance based on location and time.

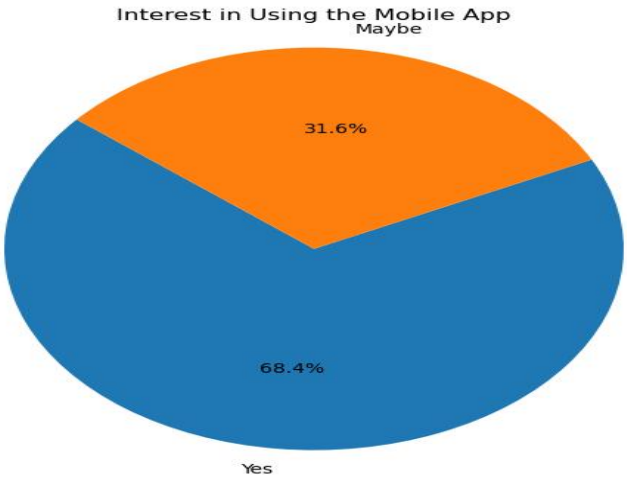
Specific Network-Based Findings

- **MTN**: Widely used but suffers from inconsistency and fluctuating signal strength. Users often use it in combination with other networks.
- **Camtel**: Seen as cheap but usually slow. Limited trust in its reliability.
- **Orange**: Regarded as the most stable overall. However, weekend service interruptions are a recurring issue.
- **Network Switching**: A common user behavior due to inconsistent service across providers and regions.

8. Application Interest and Feature Preferences

- **Interest In The Mobile App:**

A majority of users expressed interest in using an app that monitors and reports network performance.



- **Demographics**

The majority of respondents fall in the 18–34 age range, primarily male, and located in cities like Buea, Yaounde, and Douala.

- **Satisfaction Levels**

Satisfaction varies by age group, with many younger users showing dissatisfaction, likely due to higher dependency on stable internet for education, work, or entertainment.

- **Common Problems Identified**

✧ Slow internet speed

✧ Dropped calls

✧ Poor voice quality

✧ Apps/websites not loading

- **Feature Requests**

✧ Top requested features include:

✧ Manual issue reporting

✧ Signal strength monitoring

✧ Speed test

✧ Network rating

- **Privacy Concerns**

Users are concerned with data privacy, especially regarding location tracking. Transparent policies and data anonymization are necessary.

III. Recommendations

Targeted Marketing:

Focus outreach on highly affected cities and demographics, especially young adults.

Feature Prioritization:

- Develop core features such as real-time signal monitoring and manual reporting.
- Incorporate a user-friendly network performance map.
- Ensure minimal impact on battery and data consumption.

Trust And Transparency:

- Implement strict privacy measures, including anonymous data collection.
- Clearly communicate data usage policies within the app.

Feedback Options:

Allow flexible feedback mechanisms—event-triggered reporting over fixed schedules.

User Education:

- Educate users about how their feedback will drive improvements.
- Consider partnerships with network providers for greater impact.

Network Performance Mapping:

Include a map view that lets users see network performance in real-time across different locations.

Implementation Roadmap:

- Short-Term: Prototype development with core features and basic data privacy protocols.
- Long-Term: Expand functionalities, integrate user feedback loops, and refine performance analytics.

IV. Conclusion

This requirement gathering process reveals high user demand for a mobile network monitoring application tailored to the realities of Cameroon's network environment. Addressing the identified issues—ranging from fluctuating signal

strengths to privacy concerns—will not only improve user satisfaction but also pave the way for enhanced service quality. Future development efforts should focus on iterative testing, close collaboration with stakeholders, and continuous refinement of both functionality and user experience..