

REPUBLIQUE DU CAMEROUN

PAIX – TRAVAIL – PATRIE

**MINISTERE DE
L'ENSEIGNEMENT SUPERIEURE**

UNIVERSITE DE BUEA



REPUBLIC OF CAMEROON

PEACE – WORK – FATHERLAND

**MINISTRY OF HIGHER
EDUCATION**

UNIVERSITY OF BUEA

FACULTY OF ENGINEERING AND TECHNOLOGY

PO BOX 63

BUEA, SOUTH WEST REGION

DEPARTMENT OF COMPUTER ENGINEERING

COURSE TITLE/CODE: Internet Programming (J2EE) and Mobile Programming – CEF440

COURSE INSTRUCTOR: Dr. NKEMENI Valery

REPORT OF THE DESIGN AND UI IMPLEMENTATION OF A QoE APP FOR NETWORK METRICS AND USER FEEDBACK DATA COLLECTION (TASK 5)

Presented by GROUP 13:

AFAYI MUNSFU OBASE NGALA – FE22A136

ATANKEU TCHAKOUTE ANGE N. – FE22A158

BETNESSI GRACE BLESSING – FE22A446

CHESSEU NJIPDI TERTULLIEN – FE22A181

JAMES ARISTIDE MASSANGO – FE22A226

JUNE 2025

ACADEMIC YEAR: 2024/2025

Table of Contents

1. Introduction.....	3
2. Overview of the QoE Mobile App.....	3
3. Design Phase.....	3
○ 3.1 Design Tools and Technologies.....	3
○ 3.2 Design of Mobile Network Subscriber Pages.....	3
○ 3.3 Design of Mobile Network Operator Pages.....	9
○ 3.4 Design of Admin Pages.....	13
4. Implementation Phase.....	14
○ 4.1 Implementation Tools and Technologies.....	14
○ 4.2 Implemented Pages.....	15
5. Challenges Faced.....	15
○ 5.1 Design Challenges and Solutions.....	15
○ 5.2 Implementation Challenges and Solutions.....	15
6. Conclusion.....	16
7. References.....	16

1. Introduction

This report presents the design and partial implementation of a Quality of Experience (QoE) Mobile App aimed at enabling mobile network subscribers and operators to communicate more efficiently. The application provides a platform for users to report issues, submit feedback, and track network metrics. Operators are equipped with tools to analyze user feedback and reports for improved service delivery.

2. Overview of the QoE Mobile App

The QoE app serves three types of users: Mobile Network Subscribers, Mobile Network Operators, and System Administrators. The app aims to enhance communication between users and operators through real-time feedback, issue reporting, and performance analytics. It also supports admin-level account verification and management.

3. Design Phase

3.1 Design Tools and Technologies

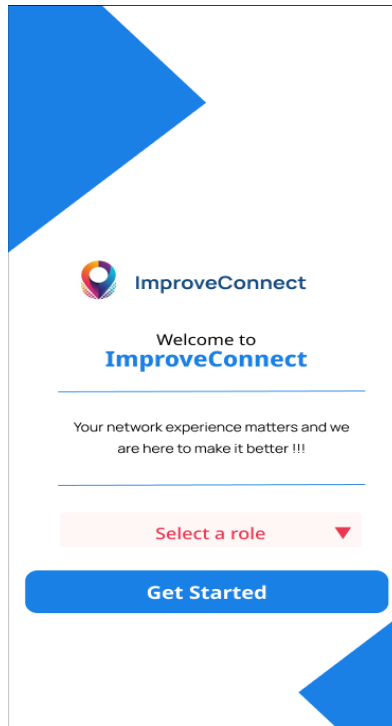
- **Figma:** Used for UI/UX design of all application pages.
- **Stitch:** Employed to create consistent design templates.
- **Poe.com Logo Bot:** Utilized to generate the app logo.

3.2 Design of Mobile Network Subscriber Pages

Nine pages were designed and this includes;

A. Welcome Page

- Onboarding page with role selection.
- Includes a "Get Started" button.



B. Sign Up Page

- Requires a 9-digit phone number with automatic formatting (e.g., 678 75 37 39).
- Sends an OTP via SMS and verifies the 6-digit code.

The image shows a mobile app sign-up page for 'ImproveConnect'. At the top left is the app logo, a colorful circle with a dot in the center, followed by the text 'ImproveConnect'. Below this is the text 'Sign Up' in bold, underlined with a blue line. A horizontal line separates this from the text 'Please fill the following informations'. Below this text are two input fields: the first is labeled 'Mobile Number' and the second is labeled 'Enter OTP code'. Below these fields is a grey button with the text 'Request OTP'. Below that is a large blue button with the text 'Continue'. At the bottom, there is a small text line: 'By clicking on this button, you agree to our privacy terms and conditions'.

C. Permission Page

- Requests for:
 - Location Permission
 - Phone State/Network Info
 - Background Data Collection
 - Storage Access
 - Usage Stats Permission
 - Sound and Notification Access



D. Login Page

- Accessible only after successful sign-up.
- Requires phone number validation.



Login


Welcome Back Ange !

Please enter your phone number







Login

E. Home Page

- Displays network metrics (Jitter, Network Type, Signal Strength, Packet Loss, Bandwidth, Latency).
- Offers options for Issue Reporting and Feedback Submission.
- Prompts for feedback if none has been given in 2 days.

Real-time Network Status 




Network Metrics

	Jitter 5 ms
	Network Type 4G LTE
	Signal Strength -75 dBm
	Packet Loss 0.1%
	Bandwidth 50 Mbps
	Latency 25 ms

Quick Actions

Report an Issue →
Connection issue, speed, call drop, etc

Submit Feedback →
Feedback about the network quality

 Home  My Activity  Settings

F. Feedback Survey Form

- Collects user ratings with star-rating questions.

× **Feedback Survey Form**

Rate your experience

1. What's your overall experience rating ?

★

★

★

★

★

2. How would you rate your internet speed ?

★

★

★

★

★

3. Rate the stability of your connection ?

★

★

★

★

★

4. Rate the quality of calls ?

★

★

★

★

★

5. Got anything else to share ? We're listening !

Share your thoughts ...

Submit

G. Issue Reporting Page

- Collects details of issues through a structured form.

× **Issue Reporting Form**

Report a network quality issue

1. What network operator are you using ?

Select from the list : ▼

MTN

ORANGE

CAMTEL

2. What is the type of your issue ?

Select from the list : ▼

Poor Signal

Slow Internet Sped

Calldrop

Others (Specify) :

3. What activity were you performing ?

Select from the list : ▼

Social Media (Instagram, Facebook, X, ...)

Online Gaming

Messaging / Voice calls (WhatsApp, ...)

Video Streaming (YouTube, Netflix, ...)

Online Work (Zoom, Google Meet, ...)

Others (Specify) :

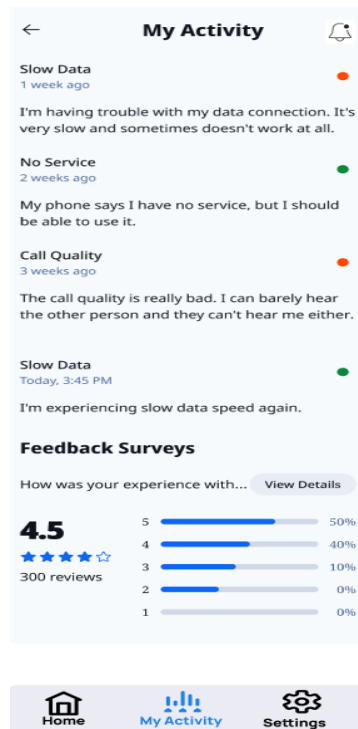
4. Please describe the issue in details.

Enter the issue details ...

Submit

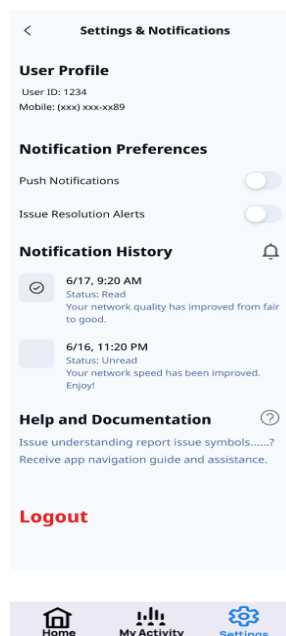
H. Activity Page

- Displays historical logs of user actions.



I. Settings and Notifications Page

- Displays user ID and phone number.
- Allows preferences management and help center access.

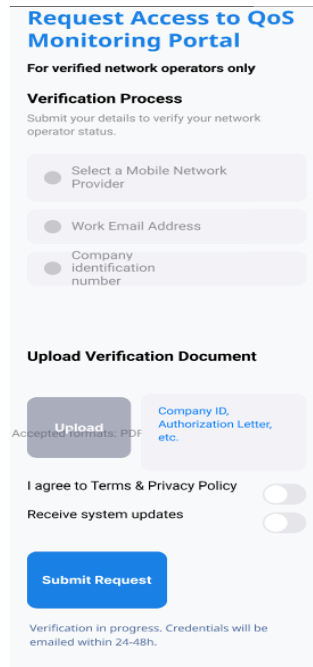


3.3 Design of Mobile Network Operator Pages.

We designed nine (most essential) pages for the network operator. This pages include;

A. Request Access Page

- Collects documents and data for verification.
- Upload feature for company verification documents.



Request Access to QoS Monitoring Portal
For verified network operators only

Verification Process
Submit your details to verify your network operator status.

☐ Select a Mobile Network Provider

☐ Work Email Address

☐ Company identification number

Upload Verification Document

Accepted formats: PDF

Company ID, Authorization Letter, etc.

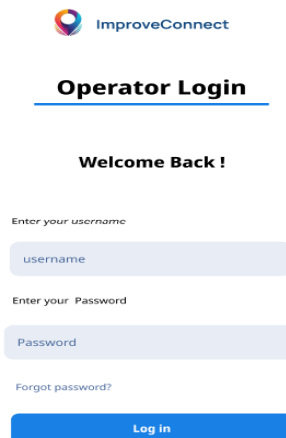
I agree to Terms & Privacy Policy ☐


Receive system updates ☐

Verification in progress. Credentials will be emailed within 24-48h.

B. Operator Login Page

- Accessible after verification.



 ImproveConnect

Operator Login

Welcome Back !

Enter your username

Enter your Password

[Forgot password?](#)

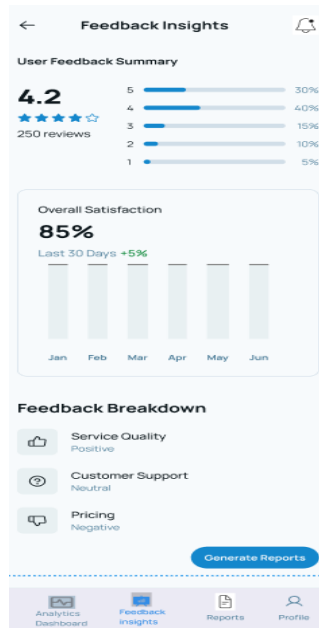
C. Unified Feedback Analytics Page

- Displays grouped user feedback and issues using visual charts.



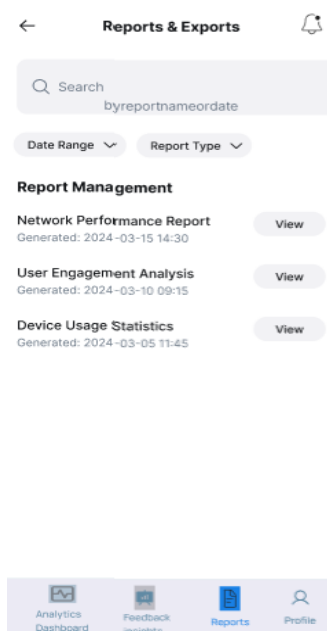
D. Feedback Insights Page

- Summarizes user feedback.
- Includes report generation button.



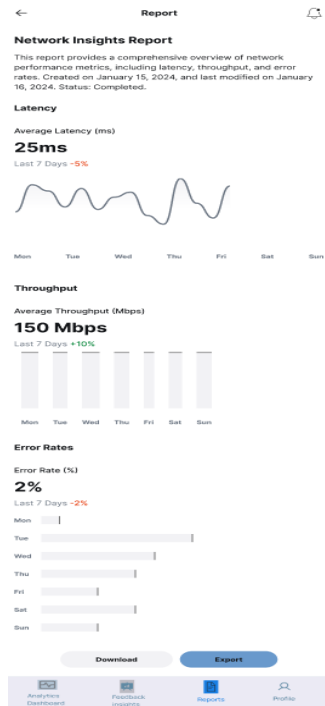
E. Reports Page

- Lists generated reports with view buttons.



F. View Report Form

- Provides report details with download/export options.



G. Profile Page

- Allows profile updates, password changes, and notification settings.

Account Settings

Profile Information

Update Profile

Network Operator

MTN

Email

Save Changes

Security

Change Password →

Notifications

Email Alerts

Receive email alerts for critical network events. ☐

SMS Alerts

Receive SMS alerts for urgent network issues. ☐

Account Status

Permissions

Full access to network management. Operator

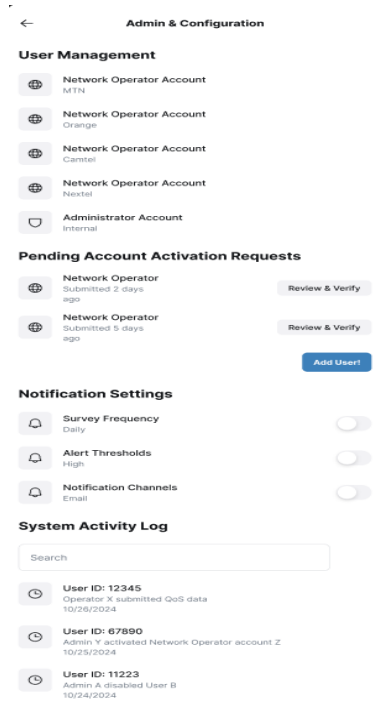
Analytics Dashboard Feedback Insights Reports Profile

3.4 Design of Admin Pages

Three core pages were design for the network operator. Below is a list of these pages;

A. System Admin Page

- Views and verifies operator access requests.
- Contains search and verification tools.



B. Review and Verify Page

- Displays operator info and verification actions.



C. View Document Page

- Provides access to uploaded verification documents.



4. Implementation Phase

4.1 Implementation Tools and Technologies

Software and Platforms:

- Visual Studio Code
- Android Studio
- Emulator
- Chrome

Front-End Development Tools:

- Dart (v3.8.1)
- Flutter (v3.32.1)

Flutter Dependencies:

- charts_flutter
- cupertino_icons
- flutter
- flutter_lints

- flutter_test

4.2 Implemented Pages

Mobile Network Operator

Basically, we were able to implement four network operator pages:

- Operator Login Page
- Request Page
- Unified Feedback Analytics Page
- Reports Page

Mobile Network Subscriber

Five network subscriber pages were implemented (coded) successfully. These pages include:

- Welcome Page
- Sign Up Page
- Login Page
- Permission Page
- Home Page

5. Challenges Faced

5.1 Design Challenges and Solutions

Challenge 2: Selecting the right color palette for MVP.

Solution: User surveys and feedback were conducted to identify appealing and accessible color schemes.

Challenge 1: Difficulty in communicating ideas within the development team.

Solution: Regular meetings were scheduled using visual flowcharts and mockups to align understanding.

5.2 Implementation Challenges and Solutions

Challenge 1: Setting up Android Studio environment.

Solution: Used step-by-step guides and official documentation to properly configure SDKs and emulators.

Challenge 2: Identifying essential dependencies.

Solution: Detailed review and testing of `package_config.json` to ensure compatibility and resolve errors.

Challenge 3: Understanding `analysis_options.yml` file.

Solution: Consulted Flutter community forums and documentation to adjust linting rules and resolve conflicts.

6. Conclusion

The design and partial implementation of the QoE mobile application mark a significant milestone toward enhancing mobile user experience monitoring. With 19 key pages designed and 9 fully implemented, the project sets a solid foundation for continued development. Challenges encountered were addressed using a collaborative and research-driven approach.

The next phase involves completing the remaining UI pages and integrating a robust backend system with secure database implementation. This project has the potential to significantly improve mobile network transparency and customer satisfaction across service providers.

7. References

1. Flutter Documentation. <https://flutter.dev/docs>
 2. Android Studio Setup Guide. <https://developer.android.com/studio>
 3. Dart Language Reference. <https://dart.dev>
 4. Figma for UI Design. <https://www.figma.com>
 5. Stack Overflow and Flutter Community Forums
-