FACULTY OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF COMPUTER ENGINEERING

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

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

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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.
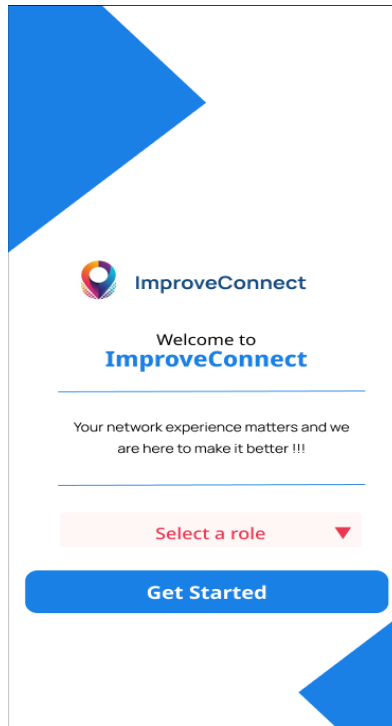
B. Sign Up Page

- 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.

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.

ImproveConnect

Login

Welcome Back Ange !

Please enter your phone number

Mobile 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.

G. Issue Reporting Page

- Collects details of issues through a structured form.

H. Activity Page

- Displays historical logs of user actions.
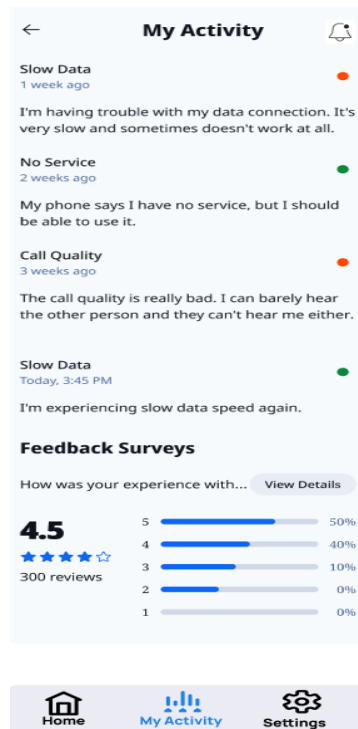
I. Settings and Notifications Page

- Displays user ID and phone number.
- Allows preferences management and help center access.
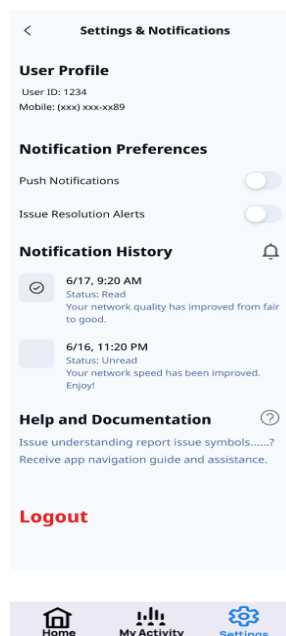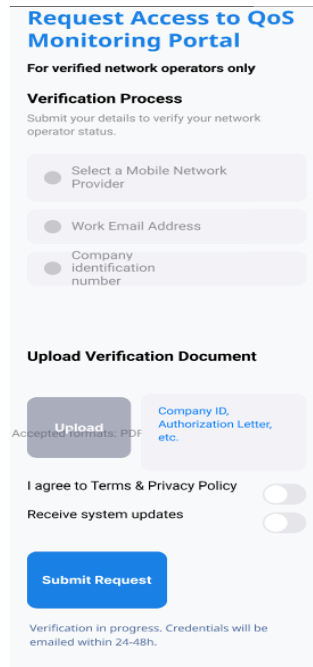
3.3 Design of Mobile Network Operator Pages.

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.
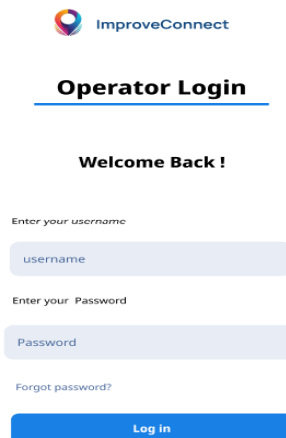
B. Operator Login Page
- Accessible after verification.

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.
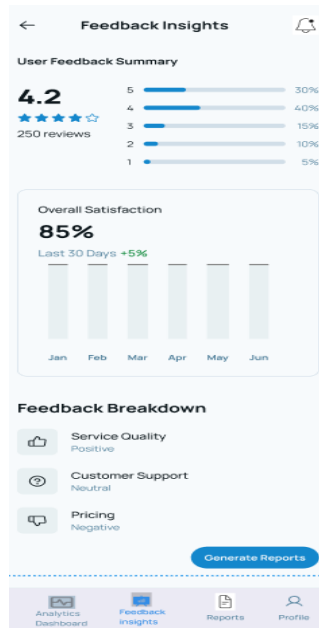
E. Reports Page

- Lists generated reports with view buttons.
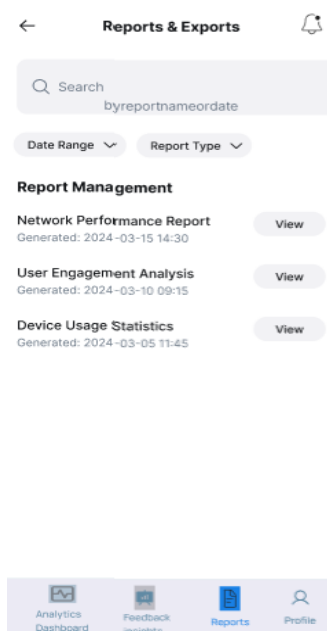
F. View Report Form

- Provides report details with download/export options.
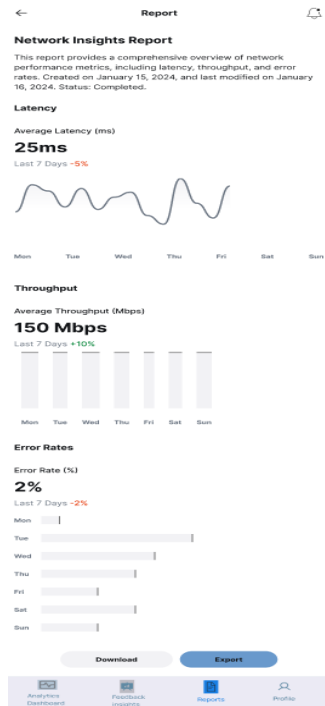
G. Profile Page

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

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.
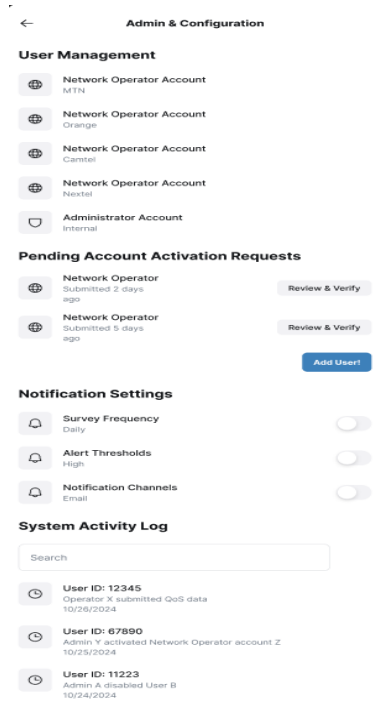
B. Review and Verify Page

- 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