Android 2G/3G/4G Network Analyzer Project

American University of Beirut

EECE 451

Fall 2020-2021

Tentative Deadline: Week of December 1, 2020

Introduction

You are asked to develop an android application named as “Network Cell Analyzer”, which will be used to analyze the cell specific data received from the serving base station of the cellular network to which your android device is connected. This would allow to track the history of network operators and cellular network types to which a mobile device gets connected and provide statistics about the experienced link quality and measurements in a distributed manner.

Proposed System

With the need for automated network measurements in all generations of mobile networks, a new approach is to use smartphone’s APIs so that many mobile users can take part in the process of collecting measurements and reporting it to data centers. In this project, you will develop an android application that collects cell info from the actively connected base station. The application should support GSM/GPRS/EDGE (2G/2.5G), UMTS (3G), and LTE (4G) networks. Thanks to the android API, this is enabled using a set of methods that allow the device to acquire cell related information.

In this project, you will store the received cell data in a local file/database inside the mobile phone that is running the android application. The data will be stored on a regular basis (for example, **each 1 minute**). The android app running on the mobile device is expected to store the following cell information regularly with a time stamp inside a local file/database:

1. **Operator**: Alfa
2. **Signal Power**: -11dBm
3. **SINR (Signal to Interference Noise Ratio) or SNR (Signal to Noise Ratio) when applicable**: 5 dB
4. **Network Type**: 4G
5. **Frequency Band** (if available): 20 (800MHz)
6. **Cell ID** (could have different name with different standards): 37100-81937409
7. **Time Stamp**: *25 OCT 2020 11:05 am*

Then the application is expected to provide statistics for the network information it has recorded in the local file/database. The android application is expected to show in

addition to the real-time cell info mentioned above (Operator, Signal Power, Network Type, …), the following statistics (between two specific dates determined by the user) that can be calculated using the information stored in the local file/database:

- Average connectivity time per operator (for example 100% Touch)
- Average connectivity time per network type, for example: 4G (70%), 3G (30%), 2G (0%)
- Average Signal Power per network type
- Average SNR or SINR per network type (when applicable)

Grading Criteria

1. **Design and Functionality**

    a. 2G Cell Information Querying (15%)

    b. 3G Cell Information Querying (15%)

    c. 4G Cell Information Querying (15%)

    d. File/Database design to store Network Statistics (10%)

    e. Realtime & Statistical Services Provided Using the Android App (15%)

    f. User Interface design (10%)

2. **Presentation and Reporting**

    a. Source Code Quality (10%)

    b. Presentation and documentation (10%)