WiFi Location Logger

A powerful Android application that captures and visualizes WiFi signal strength (RSSI) patterns across different locations. The app creates a detailed profile of WiFi networks accessible from each location and presents the data in easily understandable visual formats.

Features

- **Multi-location WiFi Scanning**: Track and compare WiFi signal strength across three different locations.
- **Real-time RSSI Matrix Visualization**: View RSSI values as a color-coded 10x10 matrix for intuitive signal strength analysis.
- **Access Point Details**: View comprehensive information about top access points at each location.
- **Statistical Analysis**: Compare minimum, maximum, and average signal strengths between locations.
- **Random Data Generation**: Fill incomplete datasets with realistic random values for testing and demonstration.
- **Material Design UI**: Modern, responsive interface built with Jetpack Compose.

Screens

1. Matrix View

Displays a 100-element matrix of RSSI values with color-coding:

- **Green**: Strong signal (> -65 dBm)
- **Light Green**: Good signal (> -75 dBm)
- **Yellow**: Moderate signal (> -85 dBm)
- **Red**: Weak signal (> -95 dBm)
- **Gray**: No signal (-100 dBm)

2. Top Access Points

Shows detailed information about the strongest access points at each location:

- SSID (network name)
- BSSID (MAC address)
- Signal strength (RSSI in dBm)
- Frequency (MHz)
- Security type (WPA3, WPA2, WPA, WEP, or Open)

3. Statistics

Provides statistical analysis for each location:

- Number of networks detected
- Minimum signal strength
- Maximum signal strength
- Average signal strength

4. Comparison

Compares WiFi environments across all locations in a tabular format, showing:

- Network count
- Average signal strength
- Signal range (min to max)

Implementation Details

- **Language**: Kotlin
- **UI Framework**: Jetpack Compose
- **Design Pattern**: MVVM (Model-View-ViewModel)
- **Data Management**: Repository pattern with StateFlow
- **Permissions**: Location and WiFi state management

How to Use

1. Select a location from the top of the screen
2. Press "Scan WiFi" to detect networks at your current location
3. View the collected data in different tabs
4. Use "Fill Random" to generate synthetic data for demonstration purposes
5. Switch between locations to compare WiFi environments

Project Structure

- **MainActivity**: Entry point and UI container
- **WiFiViewModel**: Handles business logic and data transformation
- **WifiDataRepository**: Manages WiFi scanning and data storage
- **LocationData**: Model for location-specific RSSI data
- **AccessPointInfo**: Model for individual access point details