Exercise 3 – April 27th, 2018
Sensors & Context

Exercise 3: Sensors & Context

Fork the Github repository at https://github.com/mmbuw/mis-2018-exercise-3-sensors-context and use it to submit your work as a pull request afterwards.

3a: Sensor data processing

Create an app with the following features:

- A View component which visualizes live accelerometer data as four lines (red/green/blue lines for each axis + white line for magnitude).
- A second view with live FFT-transformed data (just transforming & displaying the absolute magnitude is sufficient).
- Two `SeekBar` which allows you to modify the sample rate and the FFT window size.

Relevant API documentation:

https://developer.android.com/guide/topics/sensors/sensors_overview.html
https://developer.android.com/reference/android/widget/SeekBar.html
https://developer.android.com/guide/topics/graphics/2d-graphics.html (we recommend the method of drawing on a View object).

An example FFT class is already provided in the repository which you can import into your project. Note that input data is delivered via the x[] array, while the y[] array should be set to zeroes. After running the FFT, x[] and y[] will contain the real and imaginary part of the transformed data; you will have to calculate an absolute value from both to determine the magnitude.

3b: Activity recognition

Implement an activity-dependent music player. As a minimum, this app should play a music file while jogging, another one while riding a bike, and automatically pause itself when the user stops moving.

Use the app from exercise 3a to determine the correct settings for detecting specific motion; you should also use `Location.getSpeed()` to double-check your activity detection (e.g., when the user is sitting in a moving car or bus, no music should play).

Add a README file to your submission in which you briefly explain what thresholds your detection uses, and how you determined them. You can include the music files as assets directly into your app, but please make sure that it is freely licensed music.

Relevant API documentation:

https://developer.android.com/guide/topics/media/mediaplayer.html
https://developer.android.com/guide/topics/location/strategies.html

Deliverable

Submit your pull request on Github by Friday, May 11th, 9:00am. Take care to include a compiled APK file, which we will test the in the Android Emulator. Include a text file or comment with the first name, last name and student number of each team member (up to 2 persons).