

ECE 1778 - Creativity and Programming for Mobile Devices
February 2016
Programming Assignment P3

Location, Motion Sensors and Image Capture

The goal of this assignment is to learn the basics the location-based services in phones, the accelerometer motion sensors and to be able to accept and display camera input. It will help to understand the ‘Android Life Cycle’ described in Lecture 4.

Also, please note, that **you will also be asked by your Specialist partners for some instruction** on an aspect of computer engineering or science, relating to one of Search/Indexing, Databases, Digital Signal Processing, Optimization or Internet Communication.

1 Reading & Learning

Read the following sections from the course texts, if you are developing on Android:

- i. The Chapter titled “Accessing Location-Based Services” of the **The Busy Coder's Guide to Android Development** version 6.9. You may also find the next chapter on “The Fused Location Provider” worthwhile as well.
- ii. Read through the Android Developer Reference information on sensors:

http://developer.android.com/guide/topics/sensors/sensors_overview.html

- iii. The chapter titled “Working Directly with the Camera in the **Busy Coder's Guide to Android Development**, version 6.9.

The equivalent from **Beginning iPhone 7 Development Exploring the iOS SDK** by Mark, Nutting, LaMarche and Olsson, can be found in:

- i. Chapter 19, “Where Am I? Finding Your Way with Core Location and Map Kit”
- ii. Chapter 20, “Whee! Gyro and Accelerometer!”
- iii. Chapter 21, “The Camera and Photo Library.”

For the Swift book, Chapter 18 talks about a way to use the camera, but you may need to find more online resources that talk about using the Camera. Similarly for location services, and the accelerometer. I apologize; I did not realize that this book didn't cover these basics. It may be better to learn the APIs from the above book, and just use them in the Swift language, or as I say, look for online examples.

2 Assignment

NOTE: in writing your code for this assignment, please be sure to follow 'Braiden Brousseau's Guide To Quality Apps' that was given as part of Assignment P1. 20% of your grade will be assigned for fulfilling these guidelines.

Write an android application that will allow a user to take, view and delete pictures. The application should have 2 modes; *picture mode* and *gallery mode*. When in *picture mode* the camera should take a picture in response to the phone being shaken. Specifically, it should take a picture 1 second after a shake event and also record the current GPS location. When in *gallery mode* the application should allow the user to quickly view previously taken pictures along with the location they were taken. All photo and location data should be maintained over separate invocations of the app, and it should be easy for a user to delete photo, which would remove the corresponding image from the file system.

To test this application, you will have to use an actual mobile device, as the emulator camera and accelerometer cannot be accessed.

Important note about using the Android camera:

In android there are three ways of interacting with the camera to generate images.

1. Launch the built in (or third party) camera app with an intent, have the user take a picture, then return to your app.
2. Directly access and display the camera preview in your app using the (deprecated but still available) 'camera' API:
<http://developer.android.com/training/camera/cameradirect.html>
3. Directly access and display the camera preview in your app using the new 'camera2' API:
<https://github.com/googleamples/android-Camera2Basic>

The goal of the camera part of this assignment is to learn how to interact with the Camera Preview directly. Generating a camera preview introduces several important Java and Android concepts including interfaces, callbacks, and rendering surfaces - analogous concepts are introduced when doing the iOS equivalent. To do this, **you must use method 2 or 3 in your android app.** (Be clear about this – **you may not use method 1**). While the 'camera' API is deprecated it is significantly less complex than the 'camera2' API and we suggest any programmers who do not expect to make heavy use of the camera in their project application to use method 2. Stronger programmers, or those that expect to make significant use of the camera in their final application may choose to use the new 'camera2' API. A sample project using this API written by google is given in the link above.

There is no specific requirement to use fragments in this exercise.

Due date: Monday February 8^h, 6pm, marked out of 10, 0.5 marks off every hour late. Submit your solution on the Blackboard portal, under the **Programmer Assignments** link and **Assignment P3**.

What to submit:

1. Android developers: a zip file containing your final Android application file (.apk); use your student number as the filename. Also submit the complete eclipse project directory in a separate zip file.
2. iPhone developers: you must submit the complete project directory, including source, in a zip file. Use your student number as the filename. Please do your development on the Version 7.2 of the SDK, and make sure that you haven't included any files by reference. Please test your submitted zip file before sending it in.