Mobile and Ubiquitous Computing: Android Exercise 3

Dr Jo Vermeulen
j.vermeulen@cs.bham.ac.uk

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The Task

Gesture Control

Write an application that recognizes quick gestures by the user to interact with external functions and operations in Android. Your application should recognize two types of gestures: *on-screen gestures* and *physical gestures* (performed by moving the device and detected using the phone's sensors).

Here is a minimal set of gestures and functions that you should support:

- On-Screen Gestures:
  - a circular gesture to increase/decrease volume, similar to turning a knob on a radio (clockwise rotation increases volume, counterclockwise rotation decreases volume)
  - a gesture to quickly launch the camera (any gesture is fine)
  - a gesture to launch the phone application (any gesture)
  - a gesture to call a specific contact (possible gestures: first letter of name or heart symbol)
  - a gesture to launch navigation to a specific address such as the University (any gesture)
  - a gesture to automatically post on Twitter or Swarm where you are (check mark gesture)
- Physical Gestures:
  - turning the phone face down to mute notifications (and vice-versa)
  - shaking the phone to turn the flashlight on and off again

Resources

You will need a working Android development environment. Please target Android SDK 4.0 and above.

Submission

Please use Canvas to submit a `zip` or `tar` of your project source files, project and build files. Make sure it's ready to open and build with Android Studio. We should be able to unpack your submission, and easily run it and try it out. Please include the APK file (typically resides in the app/build directory).

Additionally, please also include a short text description of the supported functionality for your application, and a short video that illustrates what your app can do. It is probably best to film the app using another phone or camera, although you could also record the screen using ADB in Android Studio (or use a combination of both).

Marking

This is assignment is partially open-ended, with the opportunity to earn extra marks by further exploring the Android API on your own and integrating additional functionality. The maximum mark for this assignment is 70.

- 35 marks for basic functionality:
  - 10 marks for an application with a transparent window that supports all listed on-screen gestures to interact with external operations and functionality, and simple on-screen feedback when gestures are (not) detected.
  - 15 marks for detection of the listed physical gestures (shake and face down) regardless of whether the application is currently running and executing the desired outcomes (muting notifications, flashlight).
  - 10 marks for appropriate use of background tasks, sensors, gestures, Intents, etc. to realize this application and ensuring efficient energy usage.
- 5 marks for providing audio feedback when physical and on-screen gestures are recognized.
- 5 marks for supporting an additional sensible physical gesture.
- 5 marks for making on-screen and physical gestures, and their corresponding outcomes configurable by the user by including an intuitive management interface in your application, and adding at least two new on-screen gestures and two new outcomes. It is fine to support a predefined list of gestures and outcomes.

- 10 marks for supporting your on-screen gestures regardless of the application that is currently running. You could use an initial gesture to trigger recognition (e.g., a triple tap), and an overlay that always appears on top of other windows (hint: `Window.LayoutParams.TYPE_SYSTEM_ALERT`).

- 10 marks for listening for and integrating several voice actions (e.g., “call mom”). Listening for these voice commands could be triggered by an initial on-screen or physical gesture.

We will also mark generously if anything else interesting is submitted, such as fully configurable on-screen gestures (e.g., by integrating GestureBuilder or a custom gesture recognizer), continuous updates with the volume up/down gestures, or allowing users to record custom physical gestures. Please contact us first to discuss if you want to include extras besides the ones listed above.

Deadline

Please submit by noon, Thursday 26th March.