

ANDROID COMPUTER MOUSE APP

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BACKGROUND

Many of today's computer programs---for example, PC games, CAD software, and digital art tools---nearly require the use of a separate computer mouse for greater control over the cursor on the screen. However, having to carry around a separate computer mouse limits the portability of the software to be used. Because of this, it would be more efficient if mobile phones (which most people tend to carry around with themselves everywhere) could be used as computer mice. Thus, the objective of this research project is to create an Android mobile app that gives a cellphone the capabilities of a computer mouse. More specifically, this project will entail modifying and adding to the Android SDK code written for a basic Android app, which will be provided.

GOALS

The goals of this project are as follows:

- To have a correctly functioning Android mobile app at the end of the project
- For the aforementioned app to make significant use of the corresponding phone's accelerometer (and gyroscope, if there is ample time to implement this extension)
- To implement bluetooth functionality, so that the phone may be used as a computer mouse for a laptop
- To have a detailed IEEE-style research paper and poster that accurately depict the work done to complete the app

Furthermore, while carrying out this project, it will be necessary to gauge how accurate the data of the accelerometer and/or gyroscope from a phone is. Ideally, the phone's accelerometer and/or gyroscope MEMS will be both accurate and decently sensitive to change, such that the hand motion necessary to use the phone as a mouse will be comparable to that applied when using an actual computer mouse. This, however, is not a significant end-goal of this project, but rather a noteworthy area for improvement if there is enough time leftover for further modifications.

An additional aspect of the app that can be improved given enough extra time is the user-interface (UI) of the app. For the most part, the app's function takes higher priority than how the app appears to the user, but it is important that the app still have the basic appearance of an actual computer mouse (i.e. the left mouse "button" is displayed on the upper-left side of the phone screen, and likewise for the right mouse "button") for greater ease-of-use of the app.

Finally, in general, having a correctly functioning product in the end will be prioritized over giving the phone app the full functionality of a computer mouse.

TO-DO WORK

One of the most important, if not the most important task is to learn how to code in Android SDK. The provided app template is in Android SDK, so it is necessary to learn the language---not only to be able to modify and add to the given code, but also to be able to read and understand the original code in the first place.

It should also be necessary to research the accelerometer and gyroscope MEMS used in phones running on the Android operating system (OS). This will be useful in determining what to do with the specific data received from these inertial sensors. For example, if the accelerometer is discovered to be not very sensitive, then the code should be written so that less physical motion of the phone is needed to translate to a corresponding amount of cursor movement on the computer screen. Likewise, if the accelerometer is extremely sensitive, then the code should be written so that more physical motion of the phone is needed to translate to a corresponding amount of cursor movement on the computer screen.

Once the above tasks are completed, the first step will be to develop a general layout for the code---in other words, to determine how the different parts of the code for the app will be organized. From there, all of the remaining work for the app itself will be to fill out the template for the code as desired. Testing the code will involve running some sort of simulator on the computer, as it is not possible to obtain a "throwaway" Android-based phone for the purposes of testing.

Finally, the remainder of the project will be an IEEE-style research paper and poster detailing the design, implementation, and eventual end-product of the phone app. Parts of the paper and poster should be completed concurrently with the app itself, as this will be more efficient than finishing the entire app before starting on the paper and poster.

SCHEDULE

For optimal feedback on the current progress of the project, a partly-working version of the app and the first draft of the research paper should be (at minimum) close to completion by the dates assigned for one-to-one meetings with the professor and/or TA (i.e. April 25-27). By the end of the same week, the app should be half completed and the first draft of the paper fully completed. By the end of the next week (i.e. the week of May 5), the app should be mostly completed and should function as expected, and the second and final draft of the research paper---as well as the poster---should be started. Then, the remaining days (i.e. up to May 10, which is the deadline for the entire project), can be focused on adding minor adjustments and/or extensions to the app and finishing the paper and poster.