RainCheck: Project Milestone Report 1
15-400: Research Practicum in Computer Science
December 19, 2016

Major Changes, Surprises and Revisions to Milestones: There have not been any major changes in the goals or implementation of my project since my project proposal. As of yet, there have not been any major surprises. At present, I am not revising any of my milestone goals for 15-400 in the Spring. However, since there will be two undergraduates (including myself) and a PhD student all working on RainCheck together next semester, we have set up a meeting over winter break to determine how best to divide up the work. I do not anticipate changes to my first few milestone goals on designing a controlled experiment to collect data on the way the touch screen reacts to different user interactions when the screen is wet, a crucial first step. However, based on our meeting, I will likely revise some of my latter milestone goals accordingly.

What You Have Accomplished So Far: For my first technical milestone, I obtained a Google Nexus 5 phone and a 128 GB USB drive from my mentor, Professor Mayank Goel. I converted the USB drive into a live, bootable Linux drive that I can use to run Ubuntu on my personal machine. Additionally, I set up a Ubuntu virtual machine (through VirtualBox) for running Ubuntu. On the Linux drive, I downloaded the necessary software packages/modules for the project, including Android debugger (adb), Fastboot, Tkinter (Python graphics package), and cloned into the RainCheck Git project repository. I began the process of familiarizing myself with existing RainCheck project code written by students who had worked previously on the project.

I built and downloaded a custom Android kernel onto the phone. I unlocked my Android phone's bootloader using Android debugger. Next, I used the Fastboot program to flash the image file of a custom Android kernel written by Isaac Zinda, a student who had worked on RainCheck previously. The custom Android kernel has been modified to record capacitance values of regions of the touch screen so that we can record user touches as well as the presence of water droplets. My next immediate step is to use the custom kernel to record and view my own touches on the touch screen – to verify that the process of reading/recording capacitance values works on my machine.

Finally, we set up a Google Hangouts meeting to introduce me to the other team members. I met a PhD student, Tony Tung, and an undergraduate, Aishwarya Mandyam, both at the University of Washington, with whom I will be working alongside next semester.

Meeting Your Milestone: I have met the main goal set in my first milestone: to build and download Isaac Zinda's custom Android kernel onto a smartphone and begin to familiarize myself with the kernel code. However, I have not yet finished the "reach goal:" to get Isaac Zinda's algorithm for retrieving the phone's capacitance values running on my machine. I am running into an error while running the Python scripts Isaac wrote for retrieving capacitance data, a problem that I hope to address during the break.

Resources Needed: I have all the resources that I will need to complete my 15-400 project. My mentor, Professor Mayank Goel, presented me with a Google Nexus 5 phone for testing, and a 128 GB USB drive to boot Ubuntu on my personal machine. I also installed a Ubuntu virtual machine through VirtualBox.