

ECE 1778 – Creative Applications for Mobile Devices
October 2016
Specialist Assignment S4

Creativity, Sensors and You

A key outcome of this course, for Specialists, is to become comfortable with brainstorming ideas for mobile/software applications in your field *and to evaluate* these ideas.

In this assignment, I'd like you to come up with a series of ideas within or near to your discipline. These ideas will make use of current and future sensors that are in (or may be present in the future) mobile devices.

To begin and provide context, recall that the basic capability of a mobile device is that it is a powerful computer, capable of deep optimization, signal processing, database storage, and is connected to the Internet. You've discussed at least some of these capabilities with your programming partners in assignment S3. Now that you've listened to the various proposals and some plans from all the projects in the course, I hope that you're getting a sense of different capabilities of mobile devices. Also, if you missed it Lecture #2 described many of the input and output methods possible with mobile devices and wearables.

The main outcome of this assignment is that you will spend time coming up with ideas for interesting apps using the current and future sensors on mobile devices, in your field, and you'll evaluate them. **It is important to recall that you have now clearly delineated what your field of expertise is, and this assignment needs to attach to that field.**

For most of you, I believe your field is broad enough to allow the generation of many ideas. If you feel you need to broaden your field to work in this assignment, please talk to me.

1 Reprise Your Field Description

In Assignment S1, you gave a short description of your field for the lay-person to understand. Create a newer version of this description, again 250 words, that includes some reflection of what you've learned so far in this course and how it relates to your field, and how it is best described.

2 Ideas for Mobile Devices as they are Now

Give one idea for a complete, novel application in your field that *make use of the following sensors, either in combination or separately*:

1. Accelerometer
2. Gyroscope
3. Barometer
4. Camera

5. Light Sensor
6. Proximity Detector
7. Humidity Sensor

What does Novel mean? A simple Google search on the basic idea doesn't yield a bang-on hit as a mobile device app. How do you come up with novelty? I suggest kicking ideas around with people in your field.

For your idea, include an evaluation, from your discipline's perspective, of the strengths and weaknesses of the idea. To do this, I suggest you imagine yourself using the application, and 'seeing' how it helps, but also what might be a barrier.

In addition, in your evaluation of your idea, include some sense of the difficulty of the processing the data. You should consult with your programming partners for some insight on this. As an example, anything requiring computer vision – have a phone recognize objects or people from a video – is considered to be quite difficult. One way you can think about the processing difficulty is to count the number of data samples that must be looked at by the computer. In computer vision, there are many pixels, and they have to be looked at in concert. In speech recognition, there is less; however understanding speech is also difficult, but state-of-the-art speech recognition systems have improved rapidly over the last few years.

Your application idea should be described and evaluated in a maximum of 400 words.

Please review Lecture #2 to see some description of these sensors:

http://www.eecg.utoronto.ca/~jayar/ece1778/ece1778_lecture2.pdf

3 Ideas for Mobile Devices in the Future

Now let's consider the sensors that may come in the future, and to do the same thing – suggest a novel application that make use of one or more of these sensors. Give the function and evaluation, as above, in no more than 400 words each.

You may use one of the following hypothetical sensors, or *one* additional sensor that you conceive of that has some basis in technical feasibility:

1. A three-dimensional gesture sensor that works in front of the phone, in a similar manner to Microsoft's Kinect, if you are familiar with that. If not, this video: <http://www.youtube.com/watch?v=MWILFEFj7J4> shows you a version of it work. (Full disclosure: I am an investor in XYZ Interactive).
2. An ultrasound sensor that can look inside a human body.
3. A mind activity sensor, that tells you how active the brain is from 0 (meaning deep sleep) to 10 (wide awake and running for your life.)
4. A Blood Pressure Sensor

5. An eye tracker, that tells you, every tenth of a second, where on a screen a user is looking (called 'point of gaze' estimation) at the screen.

Due: Thursday November 3rd, at 6pm, 0.5 marks off every hour late.

Submit your PDF document on the Blackboard Course Portal, under Specialist Assignments and the 'S4' Assignment.

Grading Guidelines/Rubric:

Total Marks: 10

Part 1: (5 marks)

- Quality of description of idea – 2 marks
- Novelty – 1 mark
- Evaluation – 2 marks

Part 2 (5 marks)

- Quality of description of idea – 2 marks
- Novelty – 1 mark
- Evaluation – 2 marks