**Assignment 1: Context Awareness for Smart Supermarkets**

### Form a group

Form a multidisciplinary group of 5 members. You will continue to work in the same group for assignment 2 as well. The course teacher can help you with the group formation.

### Problem identification and concept creation

Your task is to identify situations in a supermarket where context awareness creates great value to shoppers and also to the supermarket workers. Visit a supermarket with your group, do observations and interviews. Do a brainstorming session with your group members and come-up to a specification for your concept and how you intend to implement the concept. Note that the focus of this assignment is on concept creation and to build a context aware system using sensors, phidgets interface kit, and smart computing algorithms. It is important that your system actually works during the assignment 1 demo session.

### Submit your assignment 1 specification

The specification should include:

- What problems have you identified in a supermarket today that you want to change using context awareness?
- Conceptual design of your concept and how you intend to implement the system. What sensors will you use, what algorithms will you use, etc. You can discuss with the course teacher to come to an agreement.
- Describe the scenario in which the context aware system will work. Be clear on what is within the scenario and what is outside the scenario. Also, mention any assumptions that you have made in the scenario which is different to the actual scenario you might expect in a supermarket.
- What Phidgets components do you need? If you need other additional sensors or interface boards like raspberry pi, ibeacons, etc. Note that we provide mainly Phidgets components, but discuss with the teacher if you have special requirements.
- You are supposed to use C# as the main programming language. But if you would like to use Android or iOS based systems using Java so that a smartphone or a tablet can be used as the computing device, it is fine with the teacher. Note that you will not be provided with smart phone or tablets and might have to figure out the Java part by yourself.
- What building material do you need to realize your context awareness prototype? Note that there will be some general building materials in the lab. We encourage the groups to find materials that you already have but do not use it in your home, things from the recycle station, etc. You are allowed a budget of 300 SEK for both assignment 1 and 2 to buy specific building material. We have a limited number of Phidgets components and recommend the groups to share the components with other groups.
- Other requirements?

Note that you need to have your specification (2 pages) approved by the course teacher before you can begin with the system implementation. The groups are encouraged to have innovative concepts and to work on creating prototypes that create the smart shopping experience in a supermarket. Send an email with the specification to dipak@cs.umu.se before the 12th November 2014, 23:59 hours.
Assignment requirements for a pass

- The context aware system that you build should be a physical-virtual system that can be deployed in a supermarket. The system should be physically prototyped and a demo should be shown in the Ubicomp lab (MC333). Note that you can play a video clip of your system in action in a real supermarket as an add-on if you are interested. But such a video clip cannot replace for an actual demo in the Ubicomp lab.
- It is recommended to use the physical space for building prototypes that are realistic in terms of the size scale. While it is exciting to maintain a realistic form factor, it can be hard to realize it for some scenarios. So you can feel free to work with miniatures.
- The prototype should include a virtual (computing) part as well. The virtual part is responsible for sensing, modeling and recognizing context. A minimum of 5 different contextual information should be incorporated in your system. Context includes identity of people and objects, their locations and their activities. Note that the context aware system should be realistic and direct coupling of a sensor reading as context is not acceptable. Sensor fusion is a concept that is encouraged. You are expected to fuse information from several sensors if and when required.
- Of the 5 contextual information, it is recommended to have 1 contextual information related to the location and 1 contextual information related to the ongoing shopping activity.
- The 5 contextual information that you generate in this assignment will be used by your group for the 2nd assignment, so make sure that the software module is extensible to your next assignment.
- The system cannot be a purely conceptual one and the functionalities should work. Note that a purely functional system with poor design is also not acceptable. Both the design and the implementation aspects should be given 50-50 priority.
- You are supposed to create a webpage with information about your team, your findings on the difficulties in a supermarket for shoppers and supermarket staff, conceptual design, actual implementation (all the details), a link to your code that can be downloaded, photos and a 3 min video describing your system and its actual working. Have a discussion section where you relate the ubicomp concepts from the lectures and the literature, and how you have explored it in this assignment. Note that your webpage should be alive for a few years, so do not remove the webpage after passing the assignment.
- Good luck! Fun things do happen and looking forward to your interesting demo on assignment 1.
Your group will demo your assignment 1 prototype as in a Ubi-Theater. Your group should take 1 minute to provide an introduction to your work. Then the theater play starts where you group members act as actors using your system and play out the scenarios.

All groups should come up with a good scenario that describe the design and working of your system. Note that solutions without proper usage scenarios will not be accepted.

The demo will be evaluated by considering the following aspects:

- Novelty of your concept or application.
- Physical design and construction of your system.
- Implementation and working of your system.
- Presentation skills and the Ubi-Theater action.
- Proper usage of ubicomp concepts from the course.

Assignment 1 demo will be on the 25th November 2014 between 15:15 and 17:00 hours in MC333 (Ubicomp lab).

Webpage

The webpage should be ready by the 26th November 2014, 23:59 hours.