### Problem identification and concept creation

Your task is to identify situations in a supermarket where ambient interaction and smart services create great value to shoppers and to the supermarket workers. To provide smart services you make use of your assignment 1 context aware system and an ambient interaction system to be developed as part of assignment 2. You are expected to spend twice as much time that you spent for assignment 1.

**Context aware system + ambient interaction system + smart services = assignment 2 (project).**

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 you are expected to facilitate ambient interaction through physical interfaces, actuators, displays, phidgets interface kit, and computing algorithms. It is important that your system actually works during the assignment 2 demo session.

### Submit your assignment 2 (project) specification

The specification should include:

- What problems have you identified in a supermarket today that you want to change using ambient interaction and smart services?
- Conceptual design of your concept and how you intend to implement the system. What sensors will you use, what physical interfaces will you use, what algorithms will you use, etc. You can discuss with the course teacher to come to an agreement.
- How will you integrate the assignment 1 system with the ambient interaction system to offer smart services.
- Describe the scenario in which the overall 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, interfaces 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 21st November 2014, 23:59 hours.
Assignment requirements

• The overall 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 environment (computing environment) as well. The virtual environment should facilitate novel interaction techniques that are physical, tangible, proxemics, and ambient. Examples include tangible user interface, ambient displays, multimedia, hand gesture input, proxemics input, speech interaction, multi-touch interaction, and more. Augmented reality concepts are also most welcome. Research on the internet for novel ideas that make use of the physical space for interaction.

• Develop at least 2 novel input approaches and 2 novel output approaches. Show how the ambient interaction system is actively engaged in interaction with a human agent for the scenario selected. Solutions lacking good interactive system design is not acceptable.

• Develop smart services that make use of the context-aware system and the ambient interaction system. Note that in assignment 1 you do not actually offer the smart services, but instead build a system that recognizes context. In this assignment you do provide smart services that adds value in a supermarket.

• 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 ambient interaction needs and smart service needs in a supermarket, 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 2.
Your group will demo your assignment 2 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 2 demo will be on the 16th December 2014 between 15:15 and 17:00 hours in MC333 (Ubicomp lab).

Webpage

The webpage should be ready by the 17th December 2014, 23:59 hours.