Proposal for Lab Tasks Interactive Device

Final Project

Naina Jain & Alan Lambie

HCIN720 Designing UX for Internet-Enabled Devices
Rochester Institute of Technology

Introduction

Administrate the communication and tasks in a collaborative environment present a number of challenges that affect the effectiveness and simplicity of the process to achieve the objectives or in some cases affect drastically the level of performance of the members of the group. This process increases complexity when the numbers of members in that collaborative environment increase or when the members are temporally part of the collaborative process and a changing population of members makes the organization more dynamic. This is the case of laboratories in educational institutions where not only members of the laboratory have access to the resources, also students and other members of the institution. This situation makes the access to the resources more limited and sometimes the schedules simply collapse.

In this project we are proposing a solution to solve the problem of organization and access of information for collaborative environment (university labs). The solution includes building a device able to detect individual IDs (based on RFID technology) and based on these IDs the device will generate personalized content that will be displayed in a centralized display in the laboratory. The device will have three sensors, a RFID reader and two pressure sensors. The RFID reader will identify de user through the ID (containing a RFID) and it will communicate with the content service (web base application) through Internet. The content service will set the content for the specific ID and it will display the content on the screen. The pressure sensors will be in charge to provide navigation functionality. One sensor located on the left of the device intuitive will indicate back navigation (page back) and the second pressure sensor on the right side will indicate forward navigation (page forward). Each page will contain particular information related to the activities in the laboratory from daily communication about specific projects or general information about the lab to the schedules for each resource.

Development Process

This list of activities could change at the time to start the project according to the needs of it.

- Acquire the materials (RFIDs, sensors, microprocessor, etc)
- Design the logic of the content service
- Coding the algorithm of the content service
- Coding the algorithm of the microprocessor
- Design container for the device.
- Build prototype of the device using simply materials (example: cardboard or paper)
- Build a container for the device (3D printed or laser cut)
- Build the circuit connecting the sensors to the microprocessor
- Coding the communication between microprocessor and content service
- Testing individual component and the integration of them
- Generate a demo

Previous work (References)

Want, Fishkin, Gujar and Harrison in Xerox PARC Palo Alto, evaluated the implementation of tags (RFIDs) in an effort to bridge the gap between physical and virtual elements. They demonstrates the invisibly, seamlessly and portability of those tags to connect physical and virtual worlds.

> Want, R., Fishkin, K. P., Gujar, A., & Harrison, B. L. (1999, May). Bridging physical and virtual worlds with electronic tags. In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems* (pp. 370-377). ACM

Roy Want from Intel Research describe in extensive way the characteristics of RFIDs. He explains their principles, radio of action and features between other characteristics.

> Want, R. (2006). An introduction to RFID technology. *Pervasive Computing, IEEE*, *5*(1), 25-33.

Authentication and user recognition through capturing biometrics features in a screen. This work explores the area of transparency of interaction for the user. The researchers implemented a system able to capture unique biometric information from the user at anytime during the interaction allowing the user to navigate without worries about authentication personalizing the scenario of navigation. This work was presented in UIST 2015.

Holz, C., & Knaust, M. (2015, November). Biometric Touch Sensing: Seamlessly Augmenting Each Touch with Continuous Authentication. In*Proceedings of the 28th Annual ACM Symposium on User Interface Software & Technology* (pp. 303-312). ACM.

We believe that our solution is not a novel approach to the interaction between physical elements and virtual representation of elements or information. We are trying here to leverage the previous knowledge on seamlessly interaction provided by the RFIDs and a simplistic but intuitive way of interaction using sensors to solve a particular problem. Previous work describes the easy and unobtrusive interaction provided by the RFIDs (Want, Fishkin, Gujar, & Harrison, 1999; Want, 2006). Also we were inspired by Holz and Knaust in their work “Biometric Touch Sensing: Seamlessly Augmenting Each Touch with Continuous Authentication” where they described a solution able to make invisible the interaction between user and system in terms of authentication and recognition providing a more personalized content environment to the user.