Subject: Plans for Continuation

07 December 2012

Our system has been developed around a three-semester sequence, consisting of two 1-year courses in Senior Design, overlapped by 1 semester.

The first of the one-year sequences addressed Planning, and Hardware Development, as seen in Illustration 1. This sequence has been successful, and concludes May 2013. The team members involved in this sequence are Luke Engelbert-Fenton, and C. Melissa Vetterling.

The second of the one-year sequences addresses Software Development. This stage is still underway, and is being handled by Justin Fritzler.

Software for this project includes four parts: (1) an application for reading and managing RFID tags, (2) a cage card association service installed on the Granite server, (3) a check-in/out application to be installed on a workstation or later as a web interface, and (4) a new custom database that can perform billing operations. (The fourth step is a possible addendum to the project, it's status will be evaluated at a later date.) This parts collectively implement data collection, filtering, processing, and storage.

Software was written using Visual Studio 2008 in C#. Mobile software used .NET Compact Framework 3.5 and Motorola EMDK v2.5. The EMDK (Enterprise Mobility Development Kit) includes libraries for making calls to Motorola hardware. Development of the RFID census application composed the primary software focus for this semester.

Initial releases of the RFID reader application, the association service, and check-in/out application will be released for the proof-of-concept demonstration. However, this software has limited features, and only preliminary alpha testing has occurred. As of May 2013, all hardware components of the system have been identified, though, so the remainder of the project can focus on increasing the robustness and features of the software.

The web interface will be implemented fall semester ’13. In addition, released software will be improved by including additional features, error-handling, and addressing user feedback. Pending progress, the new custom database may be started but would need much further development if attempted. The scope of continuation on the database element will be addressed Fall 2013.

As the project moves into the second half of “Software Development,” testing and development will improve the features and reliability of the software elements. The tasks involved include:

- Improve error-handling for census application and server service
  - Extensive testing to ensure all errors identified
• Provide support and maintenance while system is implemented
  ◦ Implement code repository for ongoing support
  ◦ Update all software based on user feedback
• Add useful features to reader software
  ◦ Add program installer
  ◦ Add tag locate feature
  ◦ Add configuration file for saving settings
  ◦ Add software for writing room tags
  ◦ Possibly add login screen for reader
  ◦ Possibly add tag kill/checkout app for reader
• Create web service to handle check-in/out process
  ◦ If login screen added, and account management feature here
• Associate billing process with Granite or check-in/out process

The use of a code repository should be strongly considered for the ongoing success of this project, since it is likely that development will outlast the presence of the three aforementioned team-members.

To improve the software development process, the team is working with Dr. Lon Kendall to find an independent-study student to expand the resources for developing the database features. The desired skills of such a student are:

Junior or senior standing in Computer Science related degree (CS, CpE, CIS, etc).
Knowledge of database systems.
Able to work both independently and with teammate.
Willing to rigorously test software.

*Desired Specific Knowledge:*
Oracle Databases or MySQL
Web Development
Java, C++, or C#

Justin Fritzler is also working with Tyler Wilson on incorporating server-side elements efficiently. The development schedule for software involves an iterative approach to expanding on and improving the elements that have been introduced thus far. Pending adequate access to campus resources and assistance, several iterations can be addressed in the coming months. This recursive approach will conclude in December 2013 with software parts (1) to (3) (mentioned above), at the beta-testing stage of development. Because the workload of developing the desired database features exceeds the availability of any one student, the decision to develop – and progress on – part (4) will depend on feedback from Laboratory Animal Resources, as well as the ability to find an individual satisfying the above mentioned criteria.

With or without part (4) of the software package, the next stage of this project will allow Laboratory Animal Resources to make full use of the hardware system arranged in the first two semesters. It will allow for the addition and removal of cages, maintain the associations between RFID tags and cage cards, process the incoming data from census reads (including filtering), and offer a GUI through which Laboratory Animal Resources can make use of the above.