C-40: SimSYS: A Game Development Platform for SE/Sys Educational Games

Team based research and development of a serious game development platform for software and systems engineering education. The project involves game and software engineering activities including technical (requirements engineering, architecture, OO design, use of patterns, development adhering to coding standards, effective use of components/libraries, testing, documentation, configuration management) and soft-skills (communication, demonstrations /walkthroughs, time management, professional development).

The game development platform is composed of a collection of modules (tools) that include a Game Play Engine, Semi-automated Intelligent Game Generator, as well as an Automated Assessment and Adaptation tool. Teams will extend an existing module with additional features using an agile development methodology.

This is a challenging project that is well-suited for students with a strong interest in game engineering and software engineering; students will learn and apply valuable skills and tools widely used in industry.

C-41: Smartphone-Based Diabetes Monitoring

In Diabetes, the body is unable to regulate the amount of glucose in the blood due to lack of insulin.

If we don’t monitor blood’s sugar level, it can lead to serious conditions including heart attack, stroke, blindness and kidney failure. This project has an ambitious goal to develop a non-invasive smart Phone diabetes monitoring system.

E-50: Rockwell: How many washers/dryers are available?

Several universities provide students with a way to monitor the laundry facilities use through a website providing details on the availability of washers and dryers in university laundry facilities. After surveying students within the dorms at Marquette, there is a strong need for a product like this on the Marquette University campus. With the help of Rockwell Automation, this project provides a proof of concept.

To make this project a success, we need to be able to work with Facilities Services and their partner, WASH Multifamily Laundry Systems. WASH has already provided a dryer unit for the team to do initial testing and design. The design will implement a system that will monitor the
running voltage of the unit using Rockwell Automation programmable logic controllers (PLCs) and sensors. Rockwell Automation has also provided a server that is being hosted in Olin Engineering. This server will monitor the controller and host the web server.

To complete this project, two advisors from Rockwell Automation will ensure that we have all the equipment and support needed to have a successful, completed project.

E-51: Designing and Prototyping a Tri-Copter Drone

E-53: Mobile Device for Education

Recently devices such as the Google Chrome-cast or NETGEAR Push2TV have become commercially available allowing users to wirelessly connect mobile devices such as phones and tablets to an external display. Mobile applications that utilize display mirroring are currently not widely used in academia and education. In the course of the 2013-14 academic year we will design and release an application for mobile devices that will specifically utilize screen mirroring for educational use in a classroom or lecture hall setting.

We have selected Android as the development platform as it is the only mobile operating system that currently supports wireless display mirroring. We will work with students and professors at Marquette to test the application and incorporate the technology into classrooms and curricula in the College of Engineering.

E-55: Antenna Radiation Pattern Facility

The goal of this project is to continue developing the MU Antenna Range. An antenna range is a facility where the radiation pattern and gain of an antenna can be measured. This facility, in conjunction with the MU RF/Wireless Laboratory is capable of building and testing a variety of RF and microwave devices and systems. The facility is described on the internet: http://www.eng.mu.edu/~richiej/AntennaRange/index.html

The MU antenna range presently can transmit, receive, and rotate the antenna (single axis) for measurements. The rotation is coordinated with the receive system, but full automation of the test may not be complete by May 2013. Dedicated space for the project has been identified and the facility has moved to a permanent location.

The antenna range utilizes a spectrum analyzer (SA) for received power measurement and a signal generator (SG) for transmit power generation. The main objectives for this senior design project are to complete the automation of the facility and to develop alternatives to the use of the SA and SG.

Microwave Engineering Seminar can potentially be a valuable resource to the project. The
seminar group meets on Fridays during the academic year. Participants consist of faculty, persons from local industry, and students.

E-56: eLIMO

Over five years, 47 Senior Design students have converted one of the old gasoline-powered LIMO vans to all electric power, and the van has been returned to service in the LIMO fleet. Perhaps you have caught a ride in it? eLIMO has a range of 50+ miles and its cost of operation is estimated to be less than 20% of the cost of operating a conventional gas-powered LIMO. While the eLIMO works quite well, there are many opportunities for improvement including little things such as a charging indicator, to more aggressive subsystems such as full regenerative braking, dashboard control redesign, or data collection and analysis.

This year's team of six engineering students intends to design and implement micro-processors to completely automate several control subsystems of our university's electric shuttle van as well as design a new graphical user interface. Our goal is to refine the shuttle van into a more user-friendly EV that requires less additional training to operate.

See http://muelimo.com/ for more information.

E-61: Cubesat Satellite

The Marquette College of Engineering is building its first satellite. This satellite will be a 10cm square "cubesat" that will be launched into low Earth orbit with the primary mission objectives of collecting and transmitting images from an onboard camera back to Earth, testing the student-designed hardware, and establishing a presence of Marquette University in space.

The cubesat will allow a truly multidisciplinary experience. Electrical aspects include the communication, power, control, and camera payload systems. Mechanically, the satellite requires a lightweight structure and a deployable arm. Computer experience will be needed to implement the onboard software. Senior design students participating in this project will join with the established student satellite team to design a specific element of the overall satellite.

See YouTube and Facebook for more information.
Current Team:
Sponsor: Marquette University, College of Engineering
Faculty Advisor: Dr. Bob Bishop, Dean

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E-64: Emergency Vehicle Warning System

Vehicle manufacturers are putting more effort into reducing the amount of exterior noise entering the passenger area of vehicles. An unfortunate side-effect of this is that it is more difficult to hear the sirens of approaching emergency vehicles. This team will be responsible for designing an in-vehicle system that would monitor exterior sounds, determine if there is a siren, and alert drivers to oncoming emergency vehicles.

Current Team: Bill Kucharski (ELEN)
Sponsor:
Faculty Advisor:
Note: Requires 4-5 COSC/COEN/ELEN students

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E-65: Aquaponics system

The objective of team E65 is to design and implement a system that monitors an aquaponic farm and makes it run automatically. It uses various sensors to monitor the status of the system. The data that is measured by the sensors is sent through a wireless hotspot to a website. The data is presented to the user in a clear and obvious manner. The user will have access to historical measurements of the aquaponic greenhouse. The data is protected by a username and password to keep it secure.
Dr. Jeffrey Berry of Marquette University’s Speech and Swallowing Lab is researching methods to restore speech for individuals who suffer from dysarthria, also known as motor speech disorder. Hundreds of thousands of people deal with this disorder [3]. Current experiments are run using data collected from the NDI Wave Articulography System [1], which measures position data from the jaw, lips and tongue during speech. This data is then processed and made into an audio signal by the Rehabilitative Articulatory Speech Synthesizer (RASS). Speech is corrected by this system and provides auditory feedback to the subject. It is hoped that this feedback will allow for the development of rehabilitation processes. The work for this project will include improving the RASS component of this system.