MEng Design Project Announcement – 2018-19 AY

Project title: Enhanced Animal Simulator - User interface design

Overview: Researchers at the Cornell Veterinary School, under the direction of Dr. Daniel Fletcher, have developed a physical simulator to model canine patients. The open-source simulator architecture includes manager software written in C++ running on a Linux PC, a user interface and simulator patient monitor written using Javascript and HTML 5, and a hardware interface based on a Beaglebone Black microcontroller and several custom PCBs. This animal simulator is used in clinical classes for training veterinary students as well as veterinary technicians and veterinarians. Although the current system has a wide range of functions, including palpable pulses, chest movements, and heart and lung sounds, additional functions would enhance the student experience. The simulators are used extensively for CPR training, an essential skill for veterinarians and veterinary technicians. The current system is controlled using a rudimentary user interface implemented using Javascript and a web page hosted by the simulation manager computer. A more complete user interface with an intuitive, modern design would lower the barrier to entry for new users. In addition, the simulator can be pre-programmed using an XML file that must be written manually. A visual scenario designer using drag and drop components would make the system more accessible.

Specific MEng Contributions:
The current system is in use at the Vet School and the project team must first study the system to learn how to integrate any new functions. Steps in the project process would include:

• Understanding the technology of the current simulation system
• Work with vet school researchers to understand the UI needs for the project
• Develop a UI wireframe in collaboration with the researchers
• Implement the UI and integrate it with the simulator platform
• Design a prototype for testing with the current simulation system

The goal of the project will be to provide the enhanced function within the simulator by the end of the MEng project. This includes documentation for all design elements and an operation/maintenance guide for researchers at the Vet school.

• The team will work closely with researchers at the Vet school.
• The team must take direction from the Vet school researchers as requirements evolve.

Periodic meeting with Vet school colleagues will include updates and demos. Working prototype will be delivered according to the established schedule

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Outside Field Advisor Name (if applicable): Dan Fletcher

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Number of MEng students needed: 2

Related web sites: https://vetsim.org,
These videos contain information about our first generation simulator based on a human patient simulator:
  - https://www.youtube.com/watch?v=1vM71GW_8MA

Required Skills:
Microcontroller programming and system design, sensor development and interfacing, network communication, system integration skills, GUI and web site design

Estimated Project Time Frame: Fall 2017 + Spring 2018 semesters