ECGR 5101 Graduate Project Ideas

Create PowerPoint slides for the book

Dr. C needs help with creating/updating PowerPoint slides for the book. Students working on this will be given a hard copy of the book.

Help with the update to the class textbook;

Technical textbooks quickly go out of date quickly. Dr. C needs help updating chapters (and making corrections) for the second edition. Students working on this will be given a hard copy of the book.

Semi-Autonomous Sentry Robot Remote Control

This project involves the design and development of a remote control for the manual control state of a Semi-Autonomous Sentry Robot. The robot is a 4 wheeled platform with an automatic nerf gun mounted on top, directed by a servo. The robot when in autonomous mode searches for targets via panning IR proximity sensor, and aims and fires at detected targets. When not in autonomous mode, it shall be controlled wirelessly by a remote, allowing the user to drive the robot, aim the gun, and fire. The wireless control is accomplished by xbee wireless modules, which are manually paired and act as a wire replacement for USART communication. The remote and the robot's central control unit is an Arduino Duemilanove and Arduino Pro, respectively. Modification of the robot's code will be necessary for incorporating the movement of the gun and wheels. The autonomous tracking state will not need to be modified whatsoever.   Code will need to be written for detecting button presses and USART transmission. The remote will need enough buttons to control robot movement, gun movement, trigger pulling, and state change.

The idea is to obtain the starting location of a robotic platform on a map and to provide an ending location.

The researcher must obtain a map, such as one from Google Maps, Bing Maps or Mapquest. This map would be projected onto a computer screen, leaving some room for additional control windows that take up a strip along the edge of the computer screen. The user would then use a pointing device, such as a mouse, to select two or three points on the map. The three points would represent the operator, the robotic rover's current location and the destination location of the robotic rover. The GPS coordinates of these locations would then be stored in a file such that they may be utilized in a path planning algorithm. The ideal platform would be an Android tablet computer; however, the initial project should utilize a desktop or laptop computer available on campus and accessible by the researcher. The resulting code should be portable and easy to understand. It should also be released under an open-source license, such as GNU. The preferred programming language would either be C (C++) or Python because these are the primary languages used when programming for Android.

Universal Remote (IR and Bluetooth)

The people who take on this project will be instructed to design a free running system that is capable of taking in IR signals from a remote control and storing it into a queue list of sort, would prefer the data to be stored on a SD card for portability. With the IR signals being stored, the system should be able to replicate the signal at a future instance to mimic the remote, in essence creating a "universal remote". The board that will be used in this project is the "RDKRL78G13" which is a different series of the "YRDKRX62N", finally the board will be programmed using IAR rather than HEW as HEW does not support the RL78G13 board.

Lastly, if the project is capable of accomplishing all the aforementioned criteria the team will attempt to attach a Bluetooth module to the "PMOD" connector and attempt to connect to a computer running Linux.