Useless Box

ECE 153B Final Project Proposal

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Overview

We propose to create a useless box, that is a box with a toggle switch that when thrown will produce an arm and flip the switch back to its original position. In addition to the basic one switch box we would like to expand functionality to include multiple switches, motorized wheels to propel the box away from the "attacker," and an ultrasonic sensor to detect possible incoming "attacks".

Peripherals

1. Wood box, with a hinged split top
2. Toggle Switch(s)
3. Servo's to control arm
4. Built in power supply
5. Ultrasonic distance sensor

Software Design

An infinite while loop will control the entire program, with GPIO interrupts for when the switches are thrown. Once a switch is thrown the arm will attempt to reset it, and a timer will then activate for a short period where we will then sample from the ultrasonic sensor to try and "see" if another switch will try to be thrown. If an object is detected in the proximity of the switch's, the box will attempt to defend itself in some way; either moving away from the attacker or the arm will move toward the switch to prevent it from being thrown. After the timer ends the box will stop polling the ultrasonic sensor and reset itself.

Goals

The goals of this project is to:

1. Successfully return a toggle switch to its original position after it has been thrown by a user
2. Attempt to "defend" from further attempts to flip the switch from the user

Group Responsibilities

Matt will build the physical box, wire all peripherals and write code to govern the servo's. Kevin oversees code to poll the ultrasonic sensor and design the box's countermeasures (e.g. Box movements and defensive arm movement).