**Project Name: Animatronic Robotic Hand (Bhuvan Tej Kanigiri, Ramprasad Rajagopalan)**

**Concept proposal:** From teleoperation to prosthetic hand development, animatronic hand serves as a “simple” implementation to mimic human hand movements. This project deals with design, fabrication and control of 3 finger 3 DOF animatronic “hand” mimicking flex sensor glove worn by human operator. The user wears the glove and the amount of bending in thumb, index and middle finger will be captured by the flex sensor attached on each finger. The amount of bending or resistance will be wirelessly transferred using custom build PCB to Arduino either over Wifi/bluetooth. The animatronic hand has fingers driven by strings and rubber band. The strings are attached to the servo motor. Based on the amount of bending, the Arduino will generate corresponding movement in the finger by driving the servo motors.

**System requirements:**

Servo Motors, Flex sensors (2.2”-4”), Arduino, 9v batteries, resistors, connecting pins, glove, thread, rubber band, foam board or cardboard, handbase, spacers and hobby knife.

**Total Budget: USD $95 - (Electronic parts - $70, mechanical parts - $25)**

**Initial project plan:**

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| February | * CAD design of 3 DOF 3 finger animatronics hand and base * Ordering sensor, motors and microcontroller * Working of Flex sensor, servo motors and setting wireless communication using breadboard circuit * Pseudo code and preliminary code for testing * Prototype 1 of hand and glove |
| March | * Refine CAD model * Design PCB and order * Embedded C code and testing * Prototype 2 of hand |

April - Final testing and presentation

**Design incorporation:**

Interaction with the real world (minimum: one sensor & one affecter) - Flex sensor is attached to each finger on the glove worn by human operator. Servo motor is present to pull corresponding fingers. Embedded programming is used to program the Atmega328 microcontroller to read data from flex sensors and input PWM signals to control servo motor position. PCB design is done for incorporating power and wireless transmission from the glove. Final prototype should be able to mimic finger movement and demonstrate wireless transmission between glove and Arduino.