Project Title: **Atlas Gauntlets**

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Project Goal

The project aims to give life to a prop in the animation 'Arcane', which is a fist used by a character.

Project Approach

The project will build a pair of mechanical boxing gloves, which are based on a mechanical arm. The project will enable the user to operate and control the boxing gloves through the combination of sensor inputs, focusing on the movement of the user's fingers and control of a robotic actuator(a motor actually). The goal will be successfully motivating the boxing gloves, showing something cool, and expanding the ability of the gloves.

Resources

We plan to use the nRF52DK from NORDIC as the processor core driving a single board to work as a bridge, receiving the input that comes from the sensors and operating the actuators. The first step in the project will be to build a whole 3-D model to help us thoroughly manage the space and the wire, and we need to build the model of the mechanical arm so that we can use it in our future steps. We will use *SolidWorks* to build the 3-D model, which can also export the model to a step document for convenience. The first goal will be to motivate the mechanical arm with the motor. An input will flow into the single board as a command to control the arm as we wish. A pressure sensor will be fixed directly on the mechanical arm to detect the movement of our fingers. According to the input, we plan to use a state machine that will attempt to shift between types of events such as 'make a fist' and 'have a relax'. Besides, there is an accelerometer on the gloves so that it can detect the 'power', i.e. the normal acceleration. The input will cause different kinds of reactions on the gloves through light or movement.

Schedule

- Oct 21: Complete the project proposal
- Oct 30: Build up the 3-D model
- Nov 6: Install the motor and pressure sensors
- Nov 13: Realize the motor motivating function basically
- Nov 20: Modify the sensor and integrate it into the 3-D model
- Nov 27: Add state switch and install the accelerometer
- Dec 2: Design reaction in the response to the accelerometer
- Dec 9: Assess the system and improve its performance
- Dec 15: Prepare for the Demo Expo and make the poster
- Dec 16: Project report and peer evaluation

Risk and Feasibility

There are many unknowns. The development of the codes and the modeling process may occur many bugs. The hardware may perform differently with simulation. The design of the 3d printing shell to make it fit perfectly with the circuits and sensors is challenging. And the most difficult thing is to arrange the time to leave enough time to design, assemble and debug.