Off Target: Improving the Electrical Sabre

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Fencing is an Olympic sport that is heavily reliant on both referee calls and machine scoring to determine if the blade makes contact and if points need to be awarded. There are three fencing disciples, and in this project I focused on sabre. Modern sabre has roots in calvary. Nowadays the sabre blades do not have the ability to register contact made with non-metallic surfaces also called “off targets.” For example, points are only scored if you hit the lamé or torso not the hand. Currently referees have the task of determining whether a hit is off target. I designed a prototype sabre blade that has the ability to register these off targets. There were three main components. First, I used a long force sensitive resistor that could be used on the edge of a sabre blade. Second, I used a raspberry pi to detect if electrical current was flowing through the force sensitive resistor. Finally, I used a servo to apply pressure to the resistor simulating contact during a bout. Compared to the control tests with just the servo hitting the metallic surface, the tests on the prototype were only on average 46 milliseconds slower within a standard deviation of 0.0255 seconds. This timing is within the time allowed for sabre blade scoring systems, so the prototype has the potential to be applied and used in official electrical sabre blades. If this prototype is used in the official sport, it would allow for more strategies to be applied in addition to decreasing the bias in the refereeing.

Awards Won: