Introduction

- A major problem that many PC players face is having cold hands while gaming.
- The current gaming interface just applies heat to the hands. To improve on the current design, we looked at how temperature affects one’s gaming performance and to see what optimal temperature corresponds to optimal performance.
- This data is implemented in our design for the heated mouse.
- The main objective of this project is to build a heating mouse that senses the user’s hand temperature and automatically turn on/off the heating element to maintain the optimal temperature for optimal performance.

Methods

- www.mouseaccuracy.com is used to collect the click accuracy and target efficiency of the user at temperatures ranging from 50 °F and 70 °F as seen in Figure 1.

![Figure 1: Temperature vs Average Target Efficiency and Click Accuracy](image1)

- The circuit diagram in figure 2 shows the connections to the Arduino.

![Figure 2: Circuit Schematic and final product](image2)

(a) Heating element mounted to the inside top of the mouse.
(b) Temperature sensor being tested.

Function

- The temperature sensor is read about every 0.5 second and the temperature is fed into a PID loop that controls the heater via pulse-width modulation (PWM, basically switches the transistor on and off rapidly)

Heating element

- The heater itself is ten ½ Watt resistors in parallel that dissipate heat as current runs through them.

Timer/ON/OFF Control

- The countdown timer is used to shut the heater off when mouse movement has not been detected.
- The photoresistor detects mouse movement by measuring the average intensity of the mouse optical LED. When the mouse is moving, the timer is reset to 10 minutes. Once the mouse stops moving, the countdown starts but the heat remains on (if necessary) until the timer expires.

Results

- As seen in figure 4, the users click accuracy and target efficiency increased when using the heating mouse. The data suggests that the design was successful in creating a heating mouse to increase user performance.

References