Electronic Component of Touch3D Yearbook

Samantha Scholz, Adam Steinberg
Faculty Advisor: Sinjae Hyun
Mercer University - School of Engineering, Macon, GA

Abstract

The Touch3D Yearbook is a project that allows blind students to feel 3D models of their classmates faces. The Electronic Component of the Touch3D Yearbook is an expansion that adds an audio feature to the project. When a user touches one of the models, a voice clip of the student is played. The project is an embedded system that uses capacitive touch technology to detect when a head is touched. One of the main challenges with this project is determining ways to make the plastic heads conductive in a cost-efficient manner.
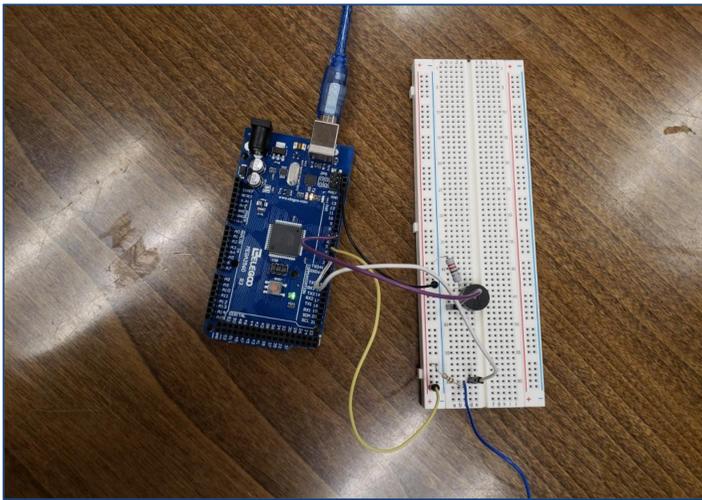
Figure 2. Prototype circuit

Electronics

The centerpiece of the electronic circuit is an Arduino Mega microcontroller to which all sensors and actuators are connected. The microcontroller detects changes in the capacitance of the head due to human touch. When a threshold is reached, the head is considered touched and an audio file plays. The audio file is stored on an SD card and played through a 3 Watt speaker. The speaker is connected through a PAM8302 audio amplifier to limit current and increase sound quality. The SD card is read through an SD card reader using the the SPI protocol.
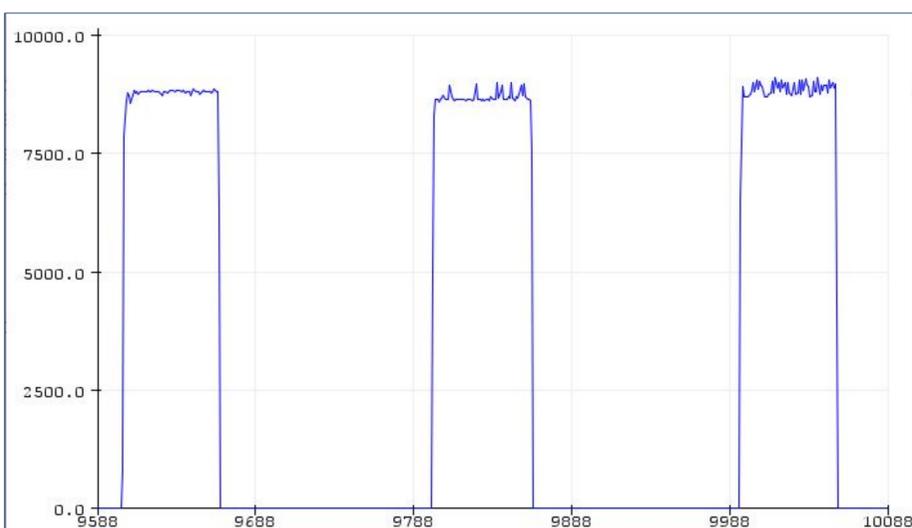

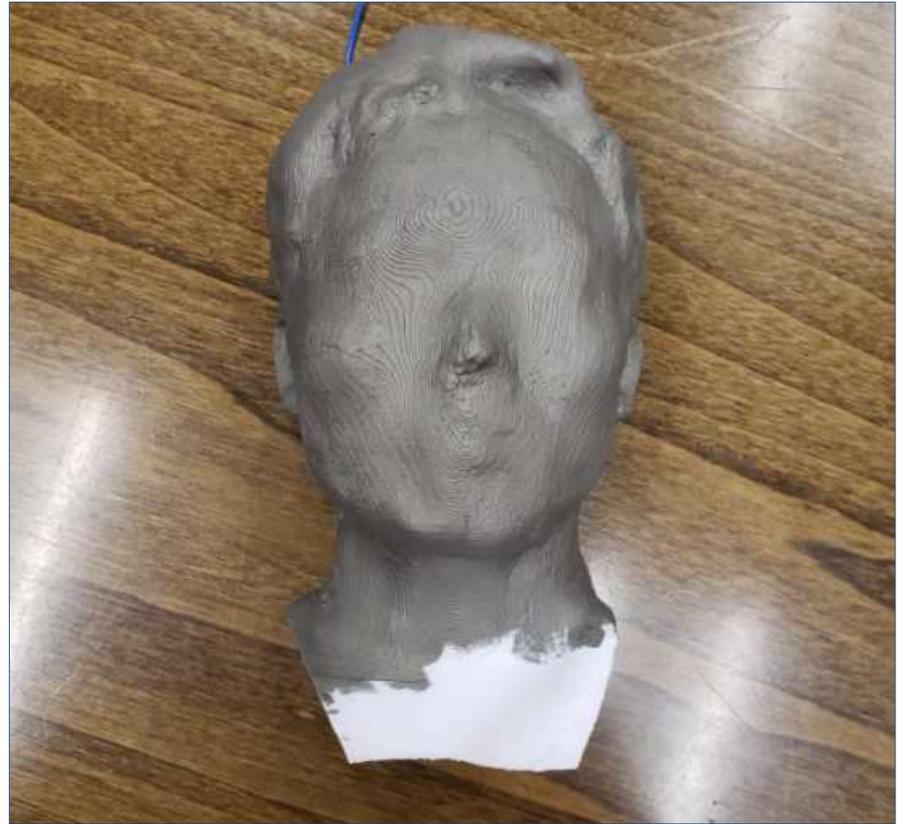*Figure 3. A sample reading of capacitive touch*

Figure 1. A casted head painted with conductive paint.

Conductivity of Head

The ideas for making the model conductive are

- to use 841AR Super Shield Nickel Conductive Coating. The paint is applied evenly across the sides accessible to the yearbook viewer with a strip painted across the back of the model in order to attach a wire from the model to the GPIO pin of the Arduino.
- changing the casting process of the models. The material currently used results in an insulated model, but by adding a metallic component to the casting process such as a metal powder, it may be possible to make the cast itself conductive.
- embedding wires in the model. The wires would provide a stable connection and proven conductibility but may result in dead zones on the face where a signal is not received even when being touched.

In order to decide the best course of action, the ideas will be measured based on cost effectiveness and their ability to produce reliable and effective signals.

Acknowledgements