Ryan Stoltz & Charlotte Fanning

Project Summary

We designed an Arduino controlled piano using a piezo buzzer and a joystick. The piano's notes are controlled by the joystick, which inputs x and y values that are based on the position of the joystick. These coordinates are mapped to a frequency that corresponds to a note. We designed this device with the intention of assisting people with disabilities (ex: have had a stroke, suffer from Parkinson's, amputees) regain the ability to make music. We worked off of the question: how can we design a piano that, without two hands or the ability to apply any pressure, could play at least 8 notes? We also sought to build something that was easy to hold and use as a stimulating toy, where the user's input would produce an interesting result.

In terms of solving the problem to our satisfaction, I think we made a brilliant POC (proof of concept) that, given more time and resources, could become a useful tool. We had a bit of trouble with bounding the frequency ranges. For example, if two ranges were too close together , slight shifts in the joystick would lead to a rapid change in tone from one note to another. This meant that certain directions on the joystick would be far more sensitive than others. We also had an issue where, on different days, the frequency ranges that correspond with the x and y values on the joystick would shift, thus necessitating a recalibration for those values. In terms of solving the problem, I think we created a solution, but not an implementation. As it stands, the device is fully capable of playing 8 notes in rapid succession, thus creating music. In implementation, one would want to consider creating avenues for producing chords, creating mechanisms to shift octaves on the piano, and allowing for some form of recorded playback.

In the future, we would like to see our idea fleshed out into a commercial, yet specialized, product. To do so, we learned some valuable lessons. Firstly, the joystick being used is highly important, especially based on the internal mechanisms. In this use case, a high end joystick with haptic feedback and a high degree of precision would be necessary. Additionally, a larger speaker capable of higher and more complex frequency ranges would be vital to the success of such a product. Finally, I think the biggest component we are missing from the project is a functional GUI. When taking a product, such a piano, and compressing it into another interface, establishing the connection between the original product and the interface is vital. For that reason, I would say there is a lot of potential for a product such as this one, and there are many options and possibilities in this field.