Designing a Digital, Interactive Music Experience

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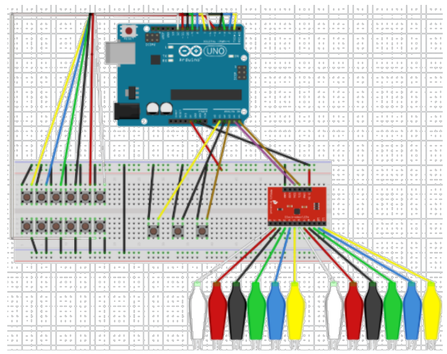
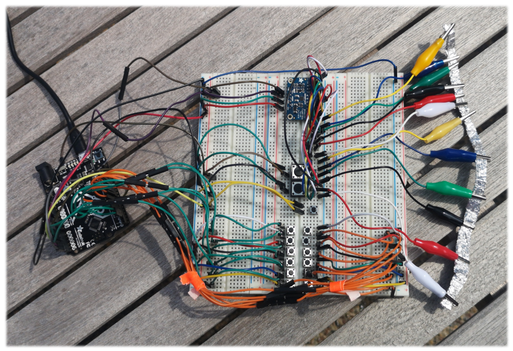
Digital Violin

The goal of this project is to create an instrument that would allow its users to create unique rhythms. It has 12 clips; each of them plays a beat when it touches a conductor. Buttons are used to change the delay between sounds, as well as how many times the sound will play in a row.



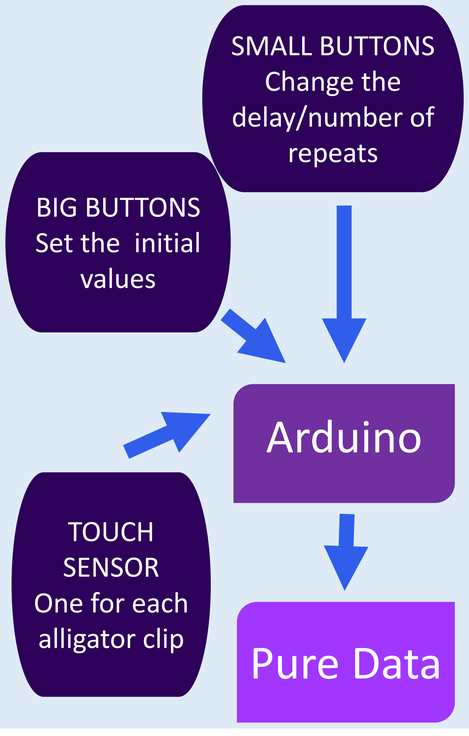


Challenges

- Implementing repeats – Pure Data doesn't have an object for that, and we had to design it ourselves;
- Hardware optimization – to arrange sufficient button ports for 18 buttons
- Not getting confused in the wiring

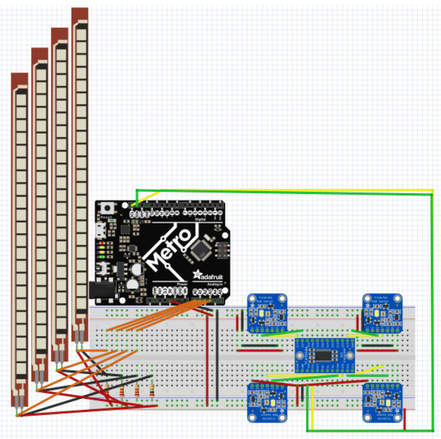
Future Design Ideas: Add pre-made background music;
Improve user interface, make the controls more intuitive.

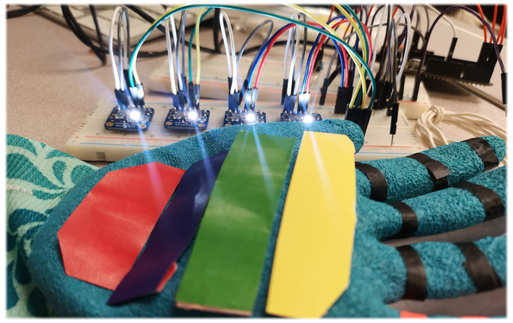
How it Works



Digital Violin

Designed to simulate a violin, the digital violin uses both flex and color sensors to optimize violin like positions and sounds. A glove is used to mount the sensors, and create a wearable interface for the user. In pure data, the numbers sent from the sensor are sent through a logic flow.



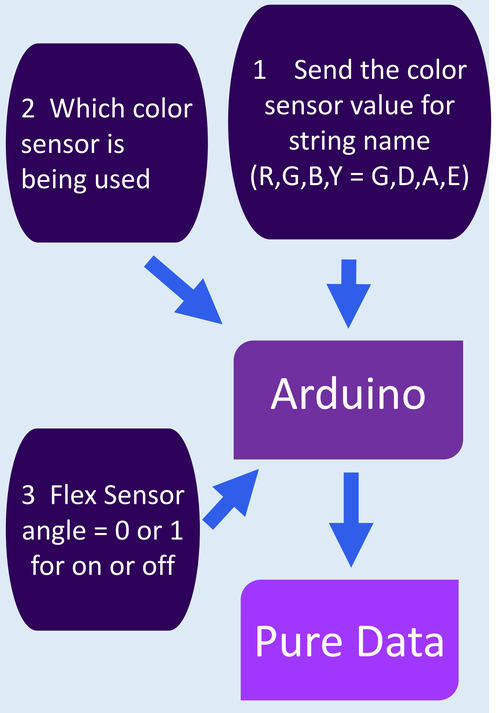


Challenges

- Mounting hardware to the user interface
- Controlling 4 color sensors
- Calibrating the color sensors
- Calibrating the flex sensors
- Color coding

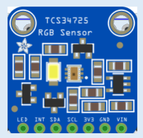
Future Design Ideas: Include the possibility to shift for a more realistic experience; arrange a more comfortable experience for violin players.

How it Works



Software & Hardware

TCA9548A multiplexer



TCS34725 RGB color measurement

Flex sensor
Measures bend angle

Adafruit MPR121 touch sensor

Arduino – an open-source electronics platform

Pure Data – visual programming language for creating computer music

VMPK – virtual MIDI keyboard

References

Professor: Chris Johnson
Website: https://twodee.org/blog/
Research Assistant: Sam "Bob" Wiseman
Hardware tutorials: https://www.adafruit.com
Software tips: https://forum.arduino.cc
Inspiration: https://www.instructables.com/id/ANDI-Random-Rhythm-Generator-Electronics/