E-drums with Arduino

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The idea of my project is to make a programmable electronic drum using MIDI and Arduino.It is not particularly a new idea but I thought it will be really nice to have a electronic drum as a result of this project. I went a little too ambitious with the project though.

1 Components

→ Arduino Uno
→ Piezoelectric sensors
→ Resistors (1k Ohm)
→ Jumper wires

2 External software Used

LoopMIDI : This software can be used to create virtual MIDI-ports to interconnect applications that want to open hardware-MIDI-ports for communication.

Hairless-MIDI : Application to connect MIDI ports to Arduino

Addictive Drums : Application to convert MIDI signals to audio. Any digital audio workstation works. You can use any MIDI compatible application like FL Studio, EZ Drums, Audacity etc

3 How it works

The piezoelectric sensors act as a drum head and when hit over a certain threshold, they output a value. That value is then converted into MIDI signals and sent to a MIDI to Serial Bridge (Hairless) which then passes it on to a virtual midi port (opened by LoopMIDI) , which passes the data onto a Digital Audio Workstation (Addictive drums / FL Studio etc). The DAW then converts the MIDI signals to audio and plays it through speakers.

Signal from piezo → Arduino → Hairless-MIDI → MIDI port → Addictive drums (DAW)

4 Difficulties faced

I really struggled (and still struggling at the time of writing this) with finding the appropriate softwares (that work) for the functions above. After failing A LOT on Linux, I moved to Windows. On windows I could use Hairless-MIDI and LoopMIDI but didnt get how to add multiple piezoelectric sensors. To add multiple piezos, I had to switch to a fancy MIDI library instead of using Serial.write() to send signals.
I read the documentation of MIDI library which makes sending signals for specific instrument a whole lot easier. (Earlier all my pads were giving the same sound)

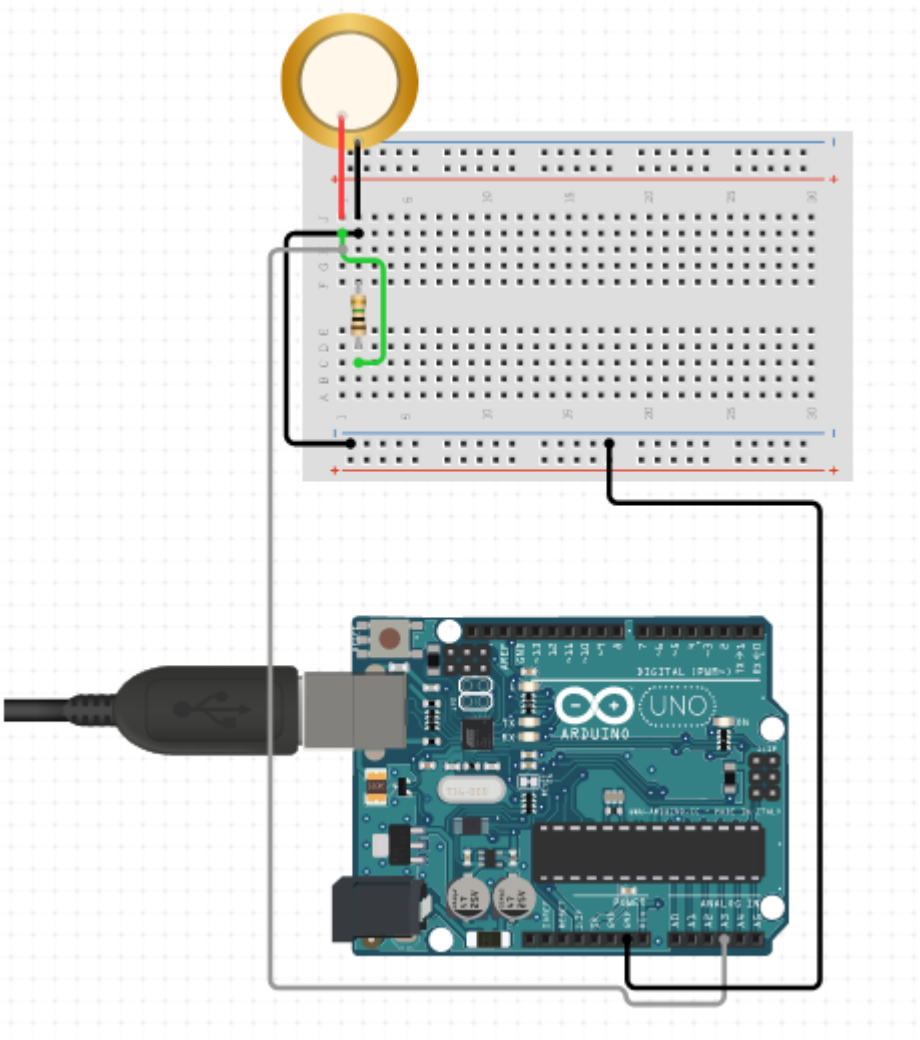
5 Possible Developments

In the original conception of the project, I thought I will make a full drum kit with a Snare, Hi-Hat, Bass drum, and Crash but as mentioned I could not figure out how to specify specific sound to a particular piezo sensor. Currently I only have one configured sensor. However with some research I am sure you can configure multiple sensors and make a full fledged drum kit.

6 Why I chose this

I wanted to learn drumming and I thought this just might be a bit better than a practice pad.

7 Circuit



Note : This circuit diagram is for 4 piezo sensors. You can add more sensors and expand the code accordingly.

8 Sources

1. https://www.instructables.com/MIDI-Arduino-Drums/
2. https://github.com/rhargreaves/hairless-midiserial
3. https://www.tobias-erichsen.de/software/loopmidi.html
4. https://github.com/mslys/arduino_electornicdrum