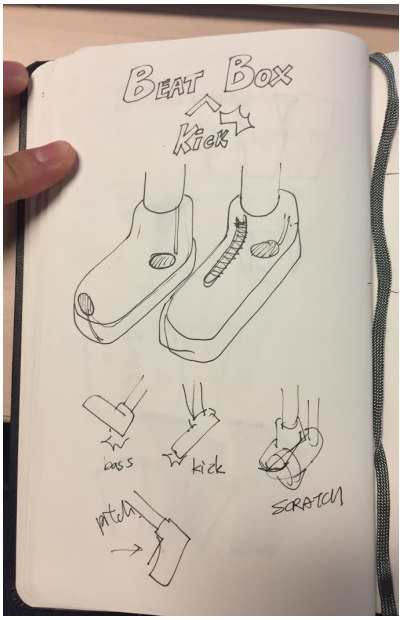
BeatBox Kicks

TUI Lab 10 – Musical Instrument

Alyssa Li, Christian Huelsemeyer, Daniel Lim, Jin Jeon, Malavika Srinivasan

Concept and Description

For our musical instrument, we were inspired by the idea of making music using everyday objects and actions. We were really excited by the idea of turning one's shoes into a beat generator and that's why we built BeatBox Kicks.



We attached four * FSRs to the soles of a pair of shoes (two on each shoe – one in the toe area and other in the heel area) and mapped each FSR to a different kind of sound. Based on the movement of the user's feet and the pressure applied on different parts of the shoe, music is generated. We used four kinds of beats – a kick, snare, hihat and a zing. We used the Minim library in processing to play and control the sounds.

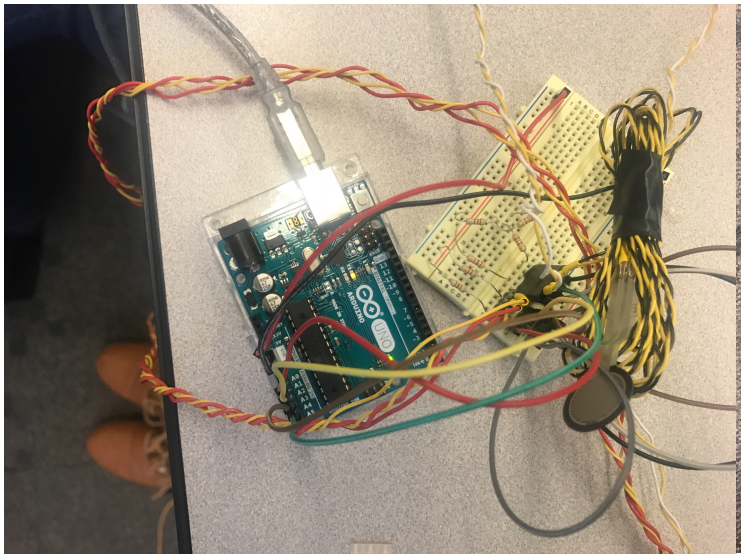
*we were using four, but one of them stopped working

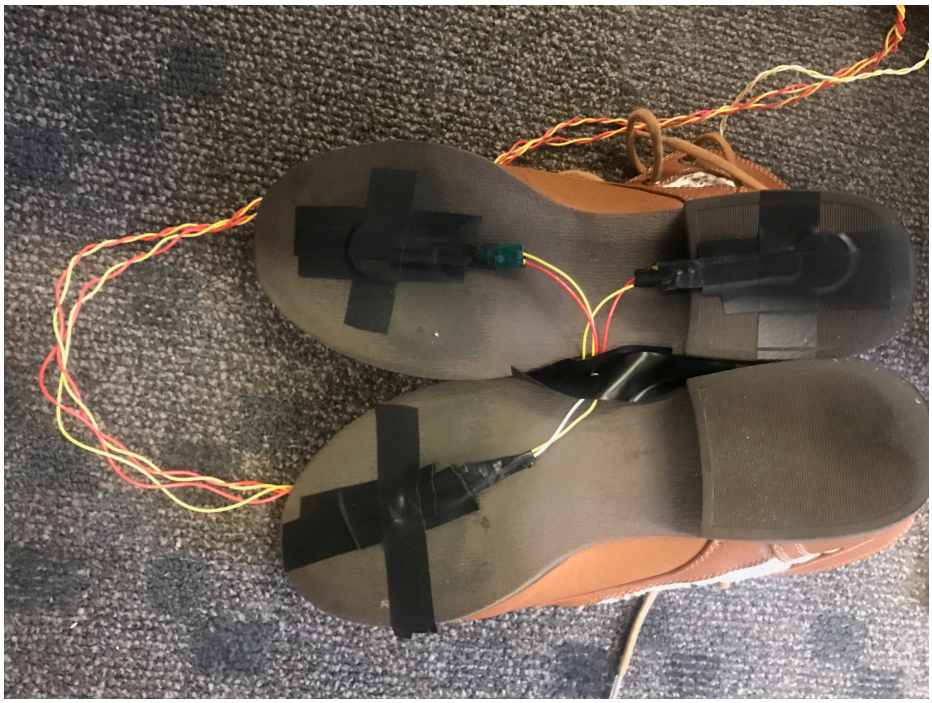
Components

4x Force Sensitive Resistor (FSR)
Arduino
Cables
Shoes

Demo and Photos

Demo - https://youtu.be/sQNVi2aFzew





Processing Code

```
//download minim sound library from processing
import ddf.minim.spi.*;
import ddf.minim.signals.*;
import ddf.minim.*;
import ddf.minim.analysis.*;
import ddf.minim.ugens.*;
import ddf.minim.effects.*;

//code for importing Arduino firmata
import processing.serial.*;
import cc.arduino.*;
import processing.sound.*;

//calling in Minim class
Minim minim;
Arduino arduino;

//audio file variable names
AudioPlayer kick;
AudioPlayer snare;
AudioPlayer hihat;
AudioPlayer zing;

int FSR1 = 0; // pin A0 FSR
int FSR2 = 1; // pin A1 FSR
int FSR3 = 2; // pin A2 FSR
int FSR4 = 3; // pin A3 FSR
int FSRval1 = 0;
int FSRval2 = 0;
int FSRval3 = 0;
int FSRval4 = 0;

int FSRval_flag1 = 0;
int FSRval_flag2 = 0;
int FSRval_flag3 = 0;
int FSRval_flag4 = 0;

void setup(){
```

```
  arduino = new Arduino(this, Arduino.list()[3], 57600);
  arduino.pinMode(FSR1, Arduino.INPUT);
  arduino.pinMode(FSR2, Arduino.INPUT);
  arduino.pinMode(FSR3, Arduino.INPUT);
  arduino.pinMode(FSR4, Arduino.INPUT);
  //println(Arduino.list());

  size(100, 100);
  minim = new Minim(this);

  //calling in audio files. Make sure to change directory to local directory
  kick = minim.loadFile("/Users/christian/CDTMCloud/4. Semester (abroad)/Tangible UI/lab11/1.wav");
  snare = minim.loadFile("/Users/christian/CDTMCloud/4. Semester (abroad)/Tangible UI/lab11/2.wav");
  hihat = minim.loadFile("/Users/christian/CDTMCloud/4. Semester (abroad)/Tangible UI/lab11/3.wav");
  zing = minim.loadFile("/Users/christian/CDTMCloud/4. Semester (abroad)/Tangible UI/lab11/4.wav");
}

void draw() {
  background(0);
  stroke(255);

  FSRval1 = arduino.analogRead(FSR1);
  FSRval2 = arduino.analogRead(FSR2);
  FSRval3 = arduino.analogRead(FSR3);
  FSRval4 = arduino.analogRead(FSR4);

  println("Val1 = " + FSRval1 + " flag: " + FSRval_flag1);
  println("Val2 = " + FSRval2 + " flag: " + FSRval_flag2);
  println("Val3 = " + FSRval3 + " flag: " + FSRval_flag3);
  println("Val4 = " + FSRval4 + " flag: " + FSRval_flag4);

  //need to change below number '300'
  if (FSRval1 < 500 && FSRval_flag1 == 0) {
      kick.rewind();
      kick.play();
      FSRval_flag1 = 1;
  } else if (FSRval1 > 900 && FSRval_flag1 == 1) {
    FSRval_flag1 = 0;
  }

  if (FSRval2 < 600 && FSRval_flag2 == 0) {
      snare.rewind();
      snare.play();
      FSRval_flag2 = 1;
  } else if (FSRval2 > 900 && FSRval_flag2 == 1) {
    FSRval_flag2 = 0;
  }

  if (FSRval3 < 600 && FSRval_flag3 == 0) {
      hihat.rewind();
      hihat.play();
      FSRval_flag3 = 1;
  } else if (FSRval3 > 900 && FSRval_flag3 == 1) {
    FSRval_flag3 = 0;
  }

  if (FSRval4 < 600 && FSRval_flag4 == 0) {
      zing.rewind();
      //zing.play();
      FSRval_flag4 = 1;
  } else if (FSRval4 > 900 && FSRval_flag4 == 1) {
    FSRval_flag4 = 0;
  }
```

```
}


//uncomment below to make keyboard as input
void keyPressed() {
  if (key == '1') {
    kick.rewind();
    kick.play();
  }
  if (key == '2') {
    snare.rewind();
    snare.play();
  }
  if (key == '3') {
    hihat.rewind();
    hihat.play();
  }
  if (key == '4') {
    zing.rewind();
    zing.play();
  }
}
```