

Between the rhythm of changing tasks, locations and interactions, moments of waiting and presence often get lost in translation between the upbeat of the future and replaying the past. Überhört aims to make the mind and body explore those in between moments, gain attentive perception of the now, and meditate on the experience of chaos until stillness arises. We created a non-descript, knitted, gray pullover with discreetly incorporated piezoresistive yarn. It is simple and easy fitting. The color is the metaphorical translation of the play on words of the gray mouse (graue Maus) - of something that is rather standing back than standing out - so is the silhouette of the sweater in interplay with its material use and grayish color.

After getting familiar with sensors (p.1, p.2), the Arduino Uno (p. 2-4) and Max MSP (p. 4), different concepts were discussed. First, the focus laid on the interaction between two humans, and then settled on the interaction with oneself (p. 5). What evolved was the aim of sound guiding the body through movements, and in turn nudging the mind to focus on one thing at a time (p.5). The pullover therefore works like a second layer of skin, made of soft, thin double-thread yarn, with incorporated piezoresistive yarn at the elbows, hands, neckline and upper back (p.6-11, p.15). It detects the movements of the body and allows to translate the experience into sensual, immersive moments. Self-made cables, made of conductive thread and covered by paracord, transmitted the data from the piezoresistive, pressure and stretch sensitive, areas to the Arduino Uno and Max msp software (p.10, p.12-14).

Just like the pullover, the trained movements (e.g. stretching the arms up high, grabbing one's elbows or the neckline; sound 1) and the recorded sounds (e.g. turning on a gas stove, the jingling of keys, or subway doors closing; sound 2) were of everyday quality. All usually get lost in the daily. Likewise, a sequence of conscious waiting was recorded (sound 3).

The sounds were embedded in three phases (p.16). Phase one, the still standing body creates an uncontrolled chaos sound, a mixtape from the simple sound and other recordings (p. 17; patch #4, sound 1). If the upper body moves deliberately in one position, one simple sound can be clearly identified (p. 18; patch #9 sound 2). If one gets back to and remains in the standing position for 60 seconds or more, one reaches the meditative state - the sound of waiting (sound 3) is played, and the chaos is stopped (p.19; patch #7; sound 3), whereby each interruption causes the sound to swing back into chaos.

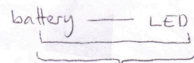
In total, data from six sensor areas was incorporated in a max patch that connected the Gimlet Machine learning patch with a combination of value threshold measurement and movement detection (patch #1-9).

In learning about the material, recording the sounds ourselves and connecting the seemingly normal, but invisibly different pullover to the act of observation and stillness, associative moments were created and captured in the process (p. 21-23). The act of creating überhört shaped, for a brief moment, our own perception of the in between.

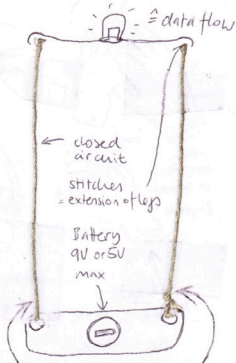
1	sensing pressure
2	playground
3	connection
4	connection
5	concept sketches
6	getting there
7	knit
8	yarns
9	swatches
10	swatches on prototype
11	knitted surface
12	try outs with garment/1
13	try outs with garment/2
14	connecting the garment
15	garment
16	sound/1
17	sound/2
18	sound/3
19	sound/4
20	sound/5
21	sound/6
22	image/1
23	image/2
24	image/3
sounds	
1	sound of everyday.wav
2	sound of chaos.wav
3	waiting.wav
max	
1	patch 1

WEARING SOUND II | 04.11.2021

Basics



you can put all sorts of modulators in between which change the amount of current going through, as long as it's a circuit

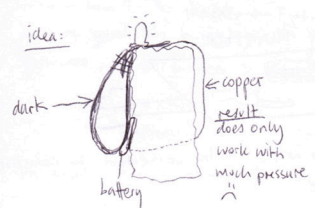


Circuit = two different pathways that shouldn't touch EXCEPT for if you want a switch



also... whenever something works

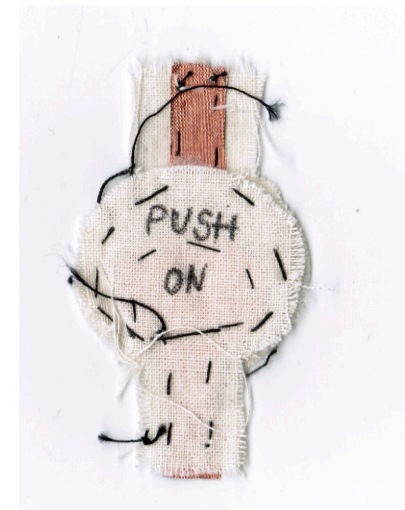
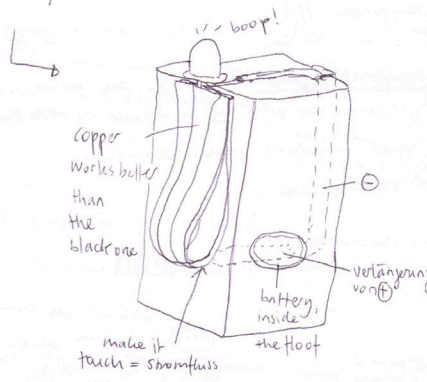
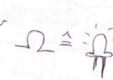
DOCUMENT IT!



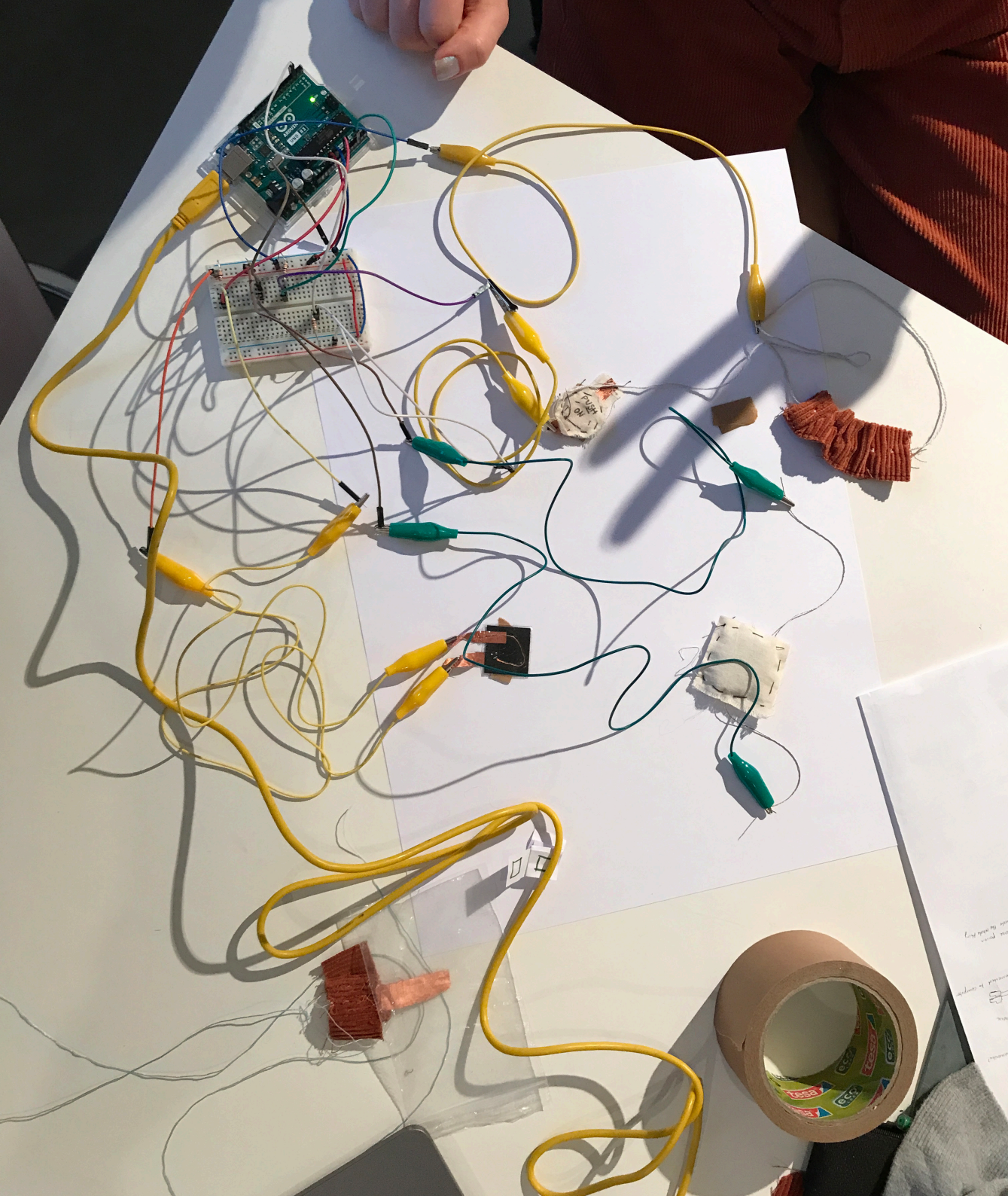
note: pressure-sensitive is much more sensitive when placed directly onto the battery rather than somewhere in the circuit.



the wider the range of Ω the wider the range of dim/bright (or data flow range, later on)

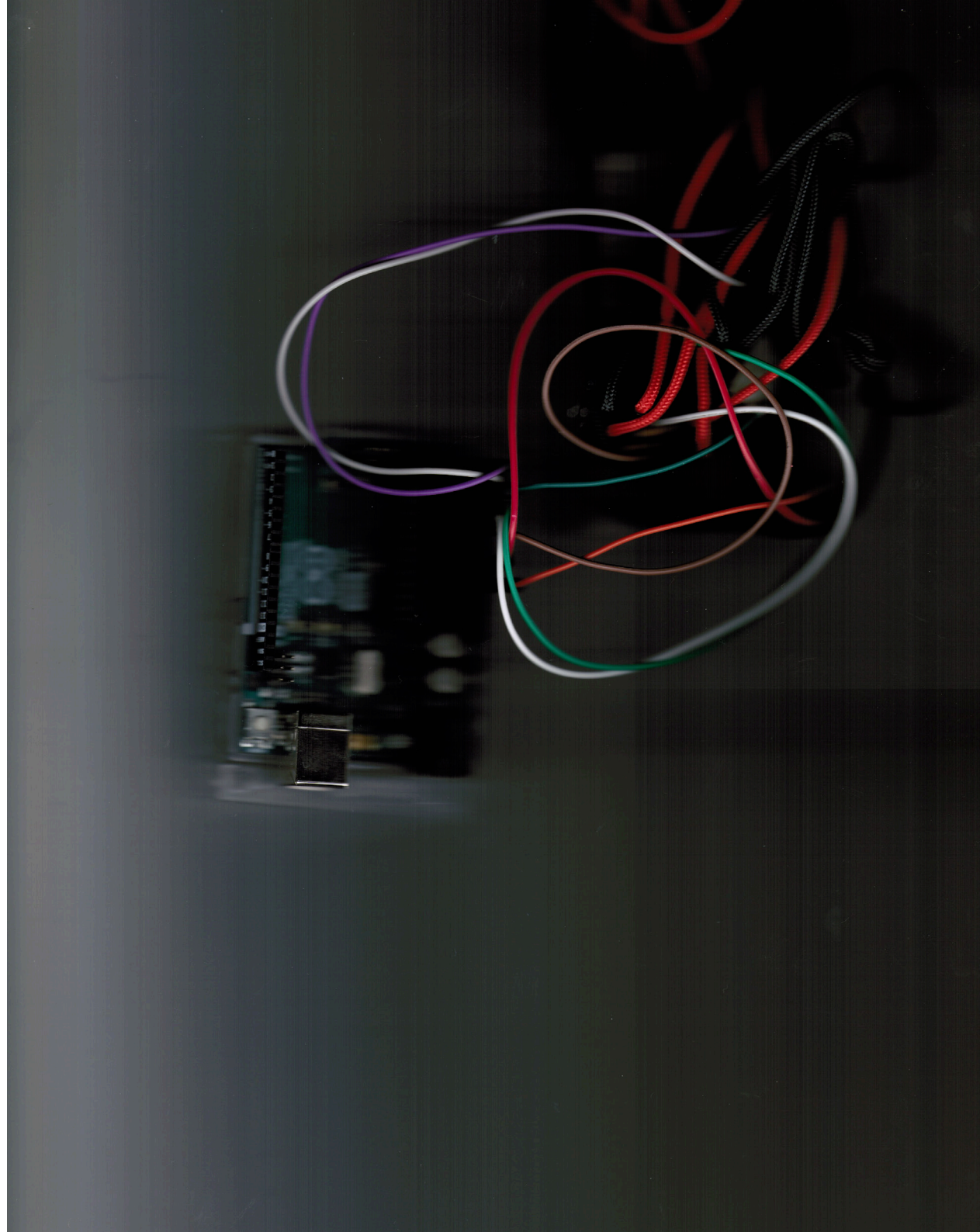


examples of first sensors which can be triggered by pushing, resulting in on/off switches. in the further work, the focus was put on tracing body movements and positions via stretching and squeezing the material, rather than direct touch and closing circuits.



connection

the arduino uno forms the communicative bridge between the knitted pullover and the computer, where max msp interprets and translates the input into sounds.



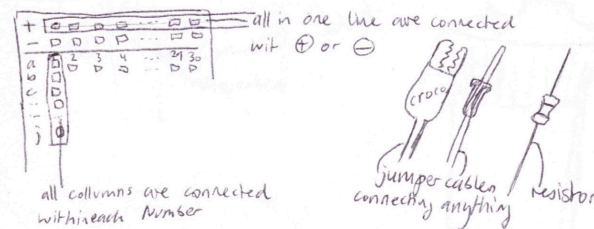
GIT HUB & MAX

- get & share, change code
- commit → local copy → needs to be pushed to make changes in the shared thing
- fetch / → pull → commit → push

UNPLUG BEFORE CHANGING

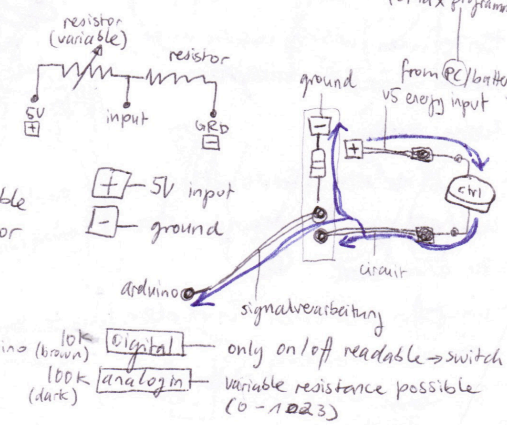
- I** - integer **F** - floats **A** → interaction **E** → create new elements (string E) **1** → one file
 - B** - button (single event "do xy") **Strg** **M** - print (monitor what's going on) **kick** → "playlist" can connect multiple files **M** message box
- Max: drag & drop sound samples → plug into audio output (l and r)
 - play every time that the input matches argument ("set 1")

Arduino



3 wires + 1 resistor = 1 circuit
 modulatable by the properties of the material
 control mechanism } variable resistor

Arduino makes voltage useable for PC
 resistors → divide signal between PC & Arduino
 → MAPPING is key



Q what kind of movement could be captured with sensor-type xyz (bending / stretching / tapping...)

BODY / MOVEMENTS

would need soft sound? *hair?*

eye movement?

stretch & bend incl. breath

neck

stretch

knick

stretch

float / pressure

grid

fold / touch

pendulum

how sensitive are sensors? can you turn them off in between? if you can't measure sth directly (eg walking) how indirectly?

maybe materials that fall apart? change with use? with sweat?

mechanika?

twister? → sensual experience

patches that work within themselves, so are just modulators, not switches between foot & ground

needs to be connected to computer

cooperative game? e.g. one person has to stand on patch xy to activate the whole thing

instead of light = good, make individual "code" / combination

circuit bleibt auf 1-sensor klebungsschicht

hands kinda fascinate me... also: touch

maybe: breath / feet? → dancing

emotions, social connections

presence / happiness

front back

which areas touch? -pressure- sensitive!

sliding surface of humming organ

small music → big music

hands

ax vs. Zmap: scale can go beyond defined scale, zmap stops; scale can be inverted

ax [lowest input/output, $\frac{min}{max}$ / $\frac{max}{min}$ output] } rescaling sensor-range to midi pitch-range

ake-note [loudness & duration in ms]

sk: activated: max shows last value that passed a choice

ilator:

message box "m" → convenient way of putting things/values

print & nothing gets out

replace this element with the input you get

object → "help" → see all functions etc.

makes list out of input-numbers

Scale numbers dot converts numbers to integers (decimals)

notwendigkeit wegnah → schnitt

Digital inputs

er sich nicht im Weg sein

reiner wissen, wie sie mit im Körper umgehen

zu sein?

sind als mess / feedback, in der eigenen Bewegungspraxis

erkennen

offensichtlich / nicht den / un-tech

catchworky

was hand leitend?

stretch movement

laying on point interaction with objects

front chest back shoulders

side

neck shoulders / back

thumb hole

= 6 parameter

exploring materials, body parts, movements and interactions. learning about max msp. recording thoughts and dialogues during conceptual work. shift from interactions with other humans to interaction with oneself. notion of how body and mind are connected through movement.



exploring the role of movement in triggering sound. observable shift from forcing and challenging body positions to embracing movements that are just as overlooked as our sounds are.



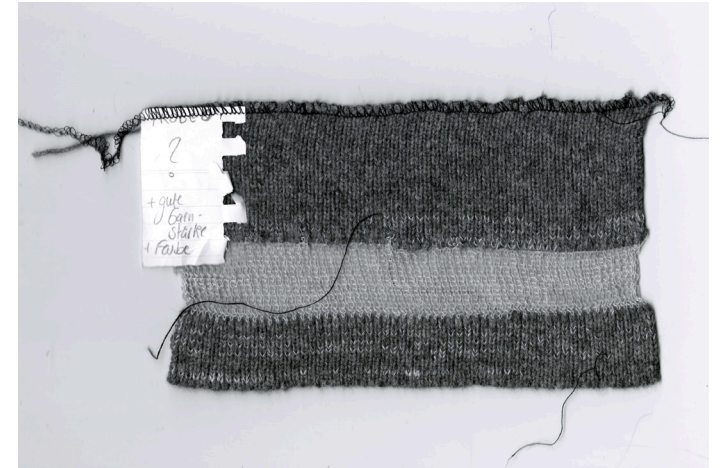
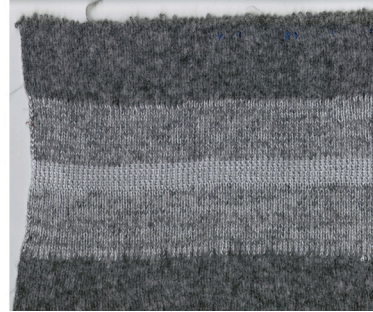
knit as a material creates the basis for this project. it offers an elastic structure that moves and stretches with the body, while resembling one of the most familiar clothing items - the knitted pullover. different yarns were tried and combined to form a knit with elegantly integrated sensor parts in the most sensitive by using a piezoresistive yarn.



PES / stahl

100% Baumwolle

swatches



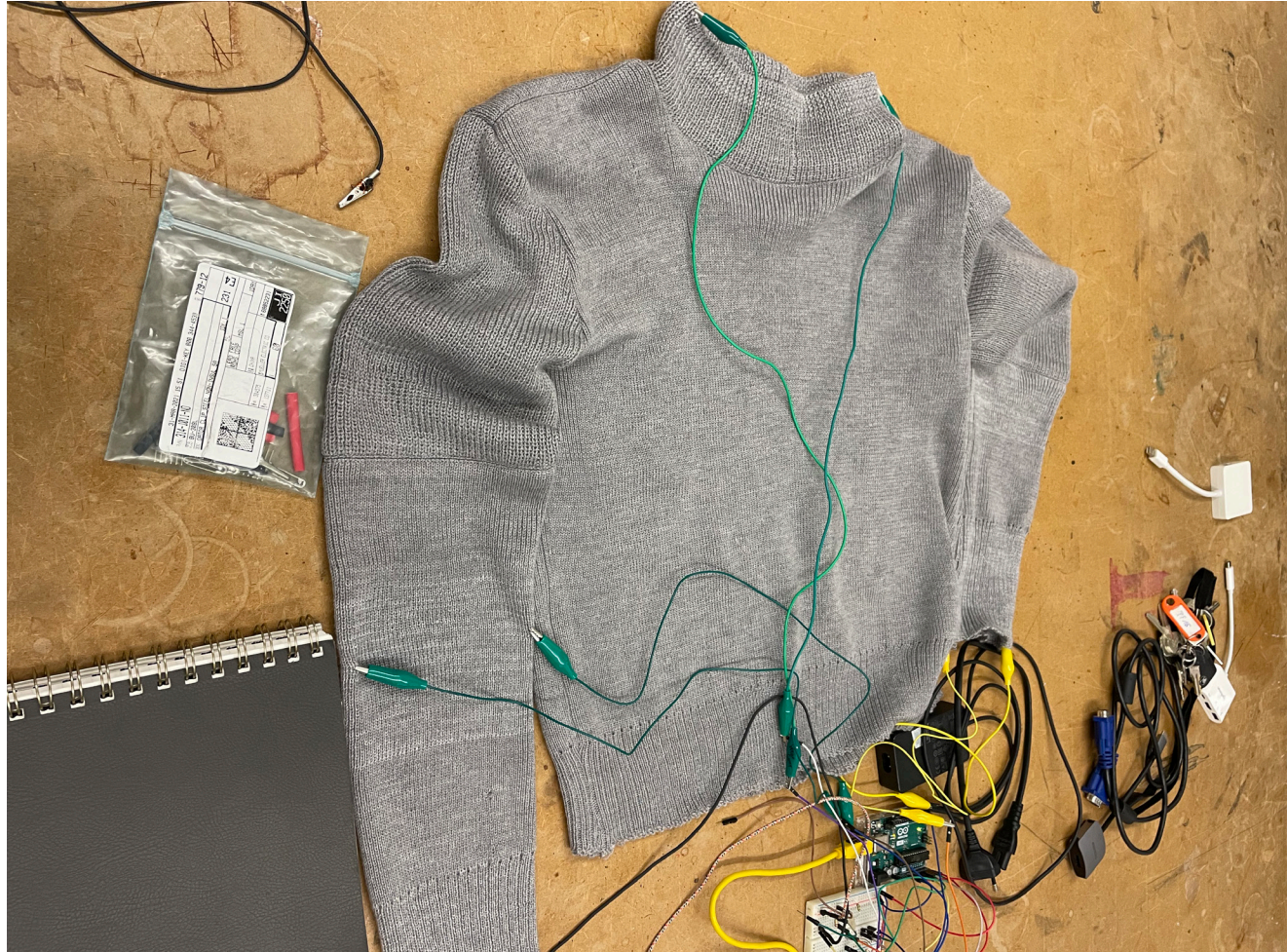
swatches on prototype



knitted surface



try outs with garment



try outs with garment



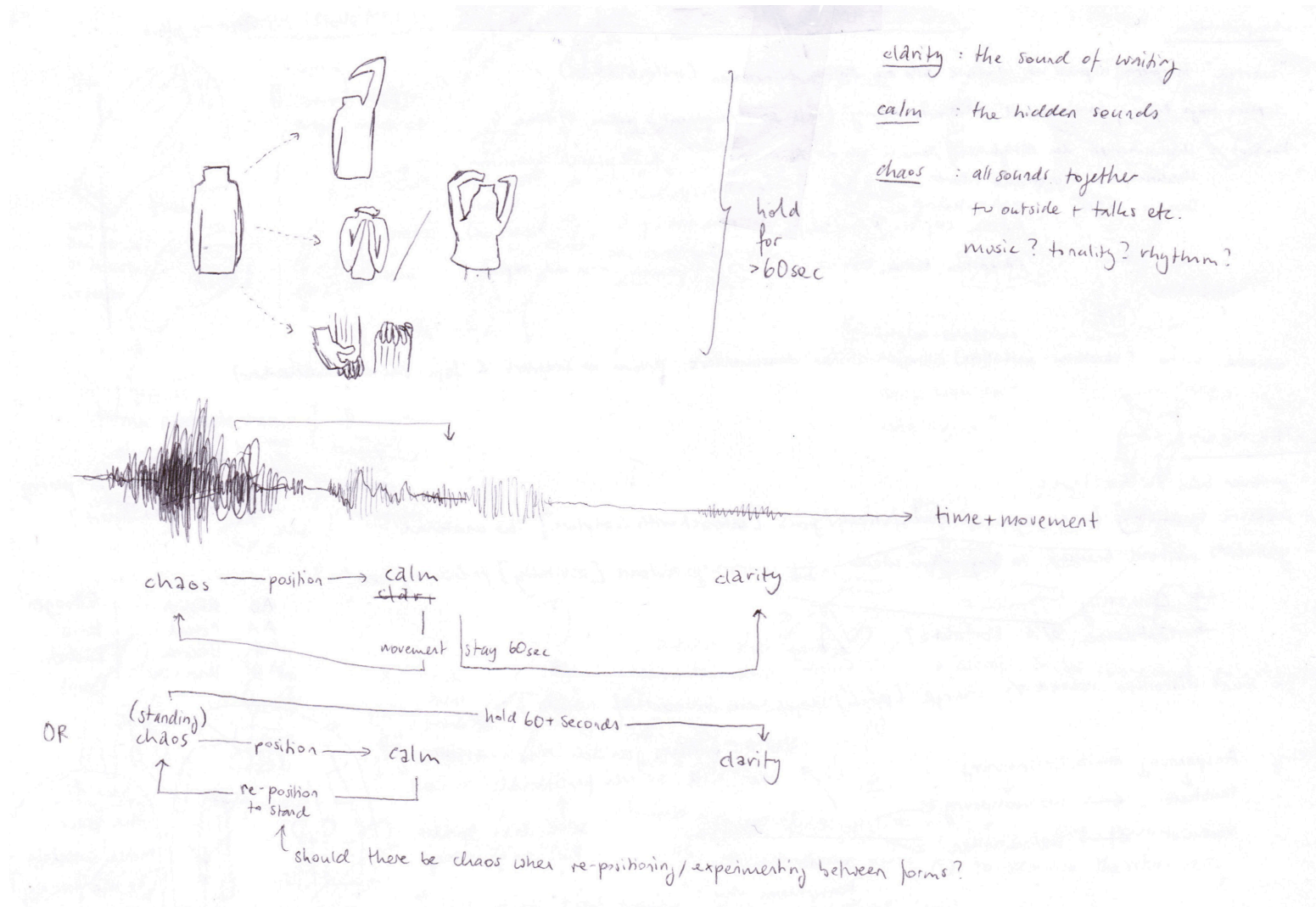


to connect the pullover with the arduino uno and to fit the simple, everyday feel, cables were newly made. a piezoresistive thread was pulled through a paracord, after which a crocodile clip was soldered on one, and a pin on the other end.

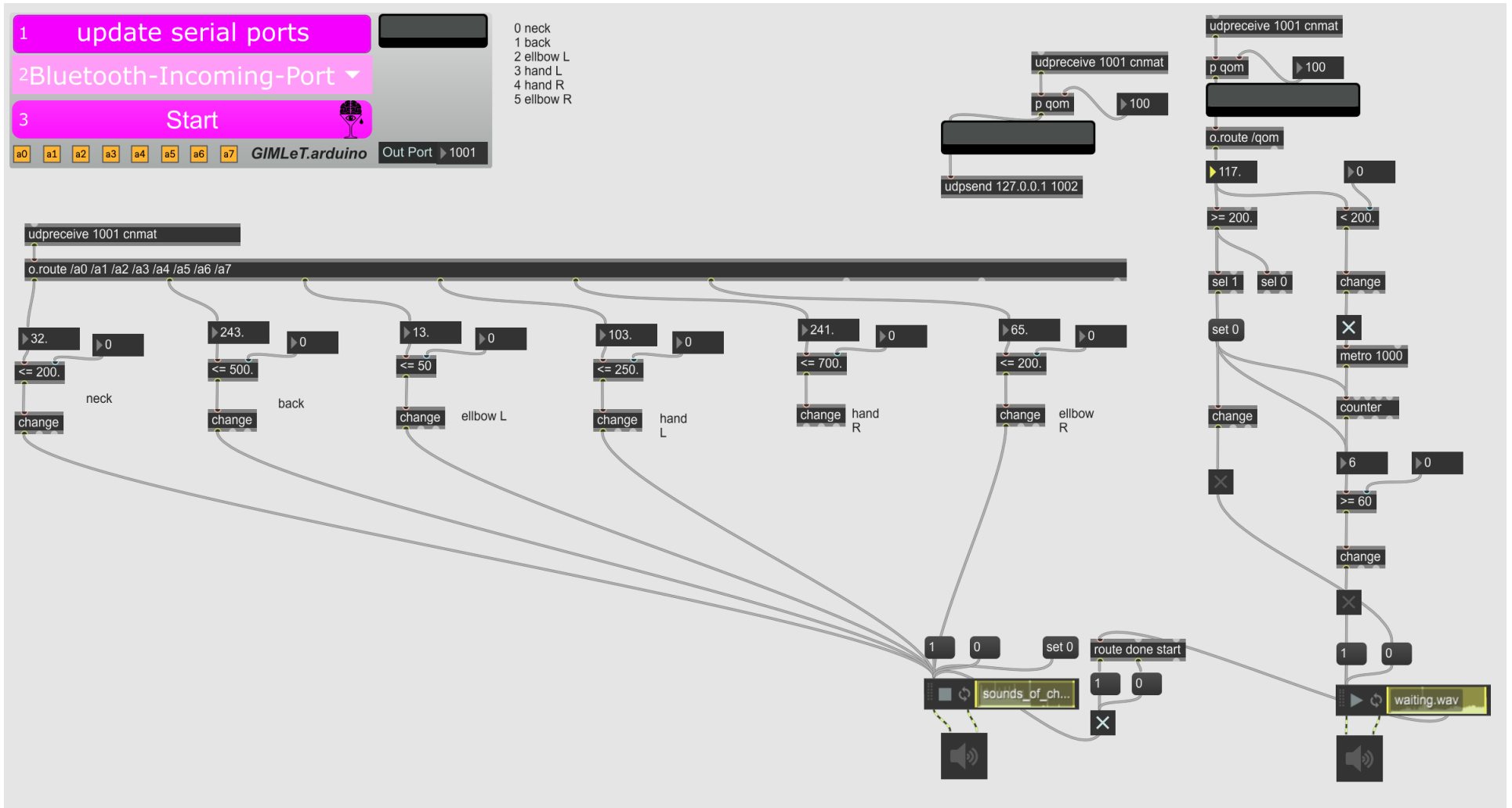
garment

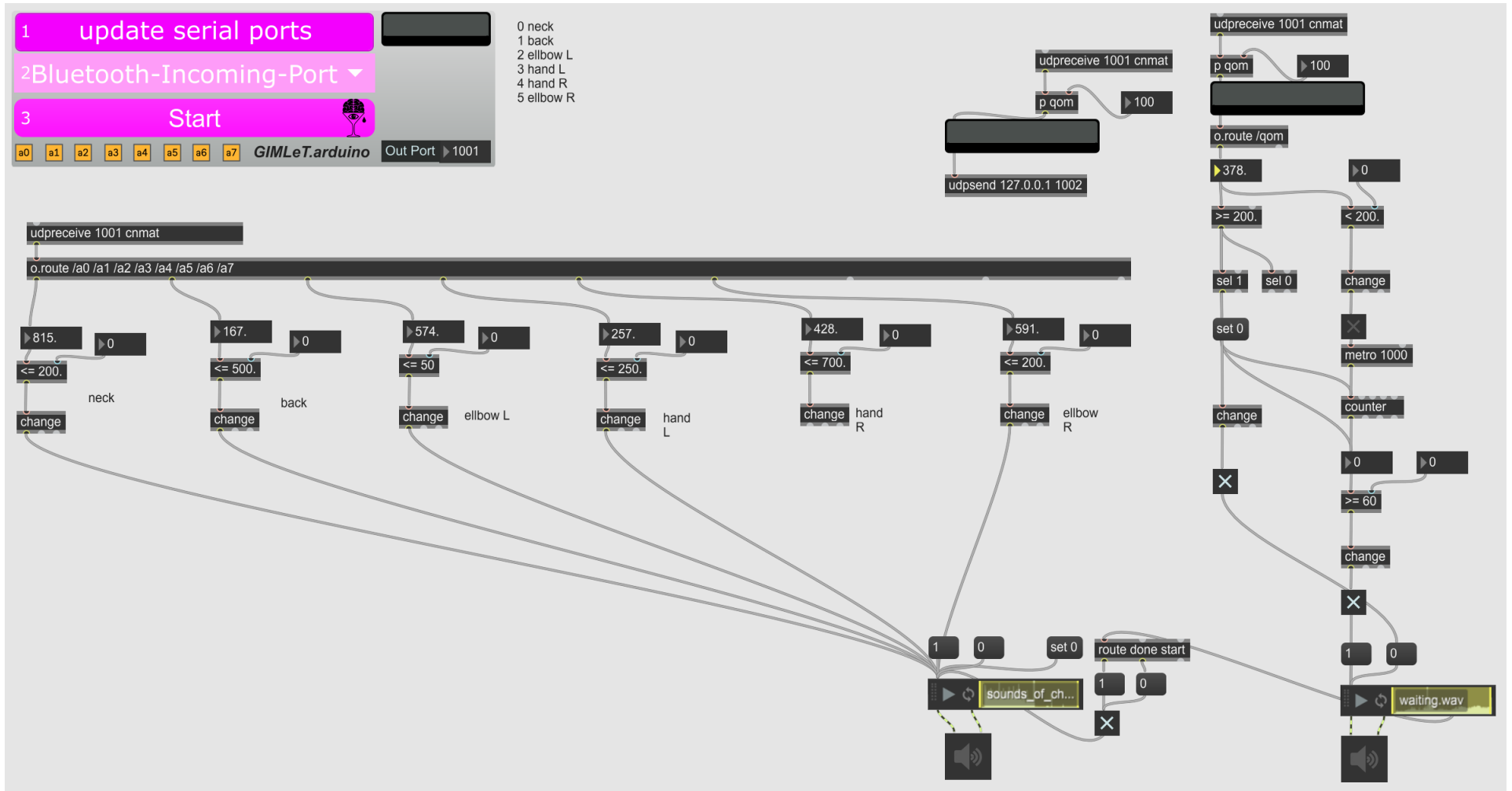


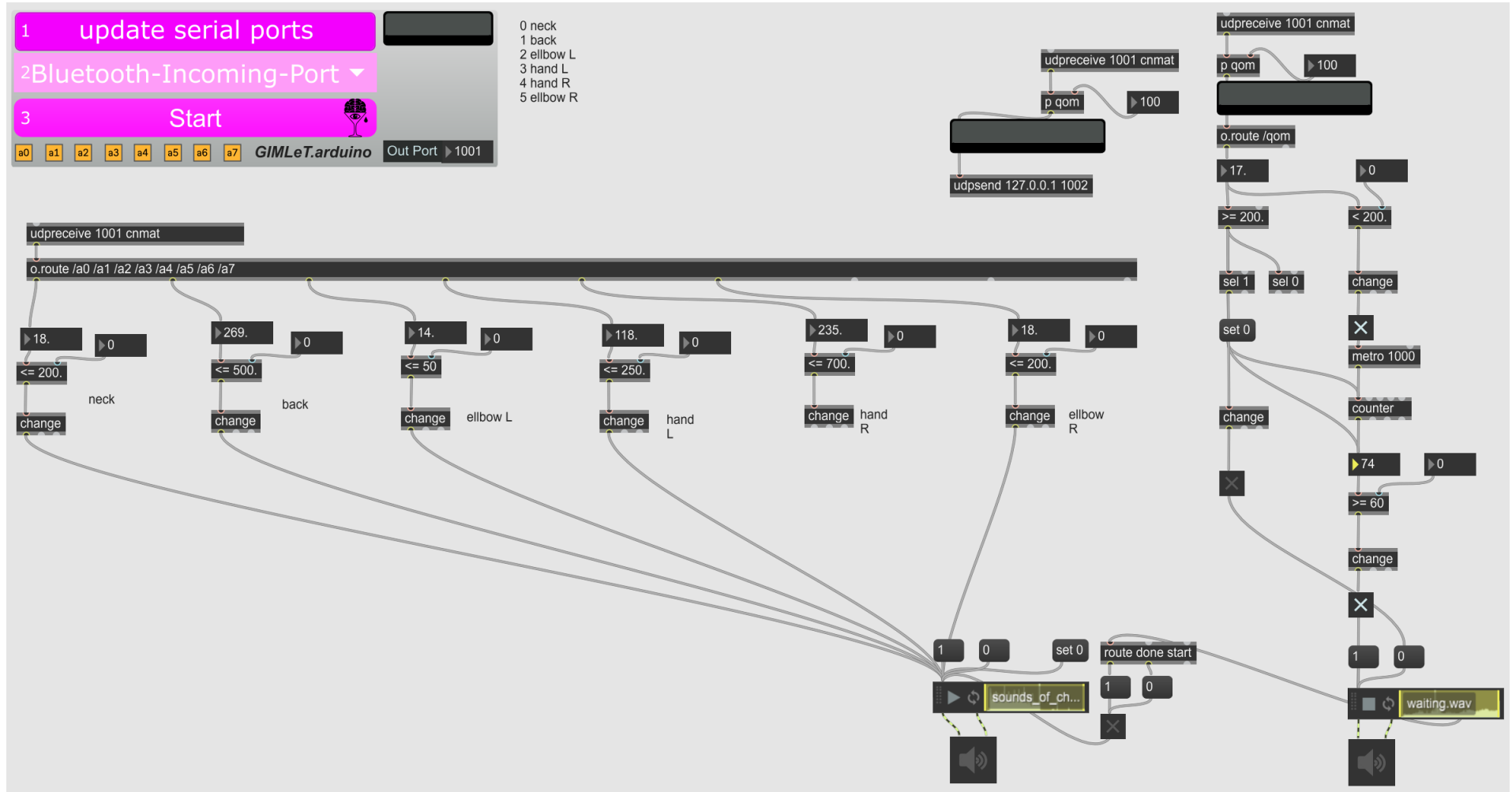
example of a sleeve with added cuffs and piezoresistive yarn.

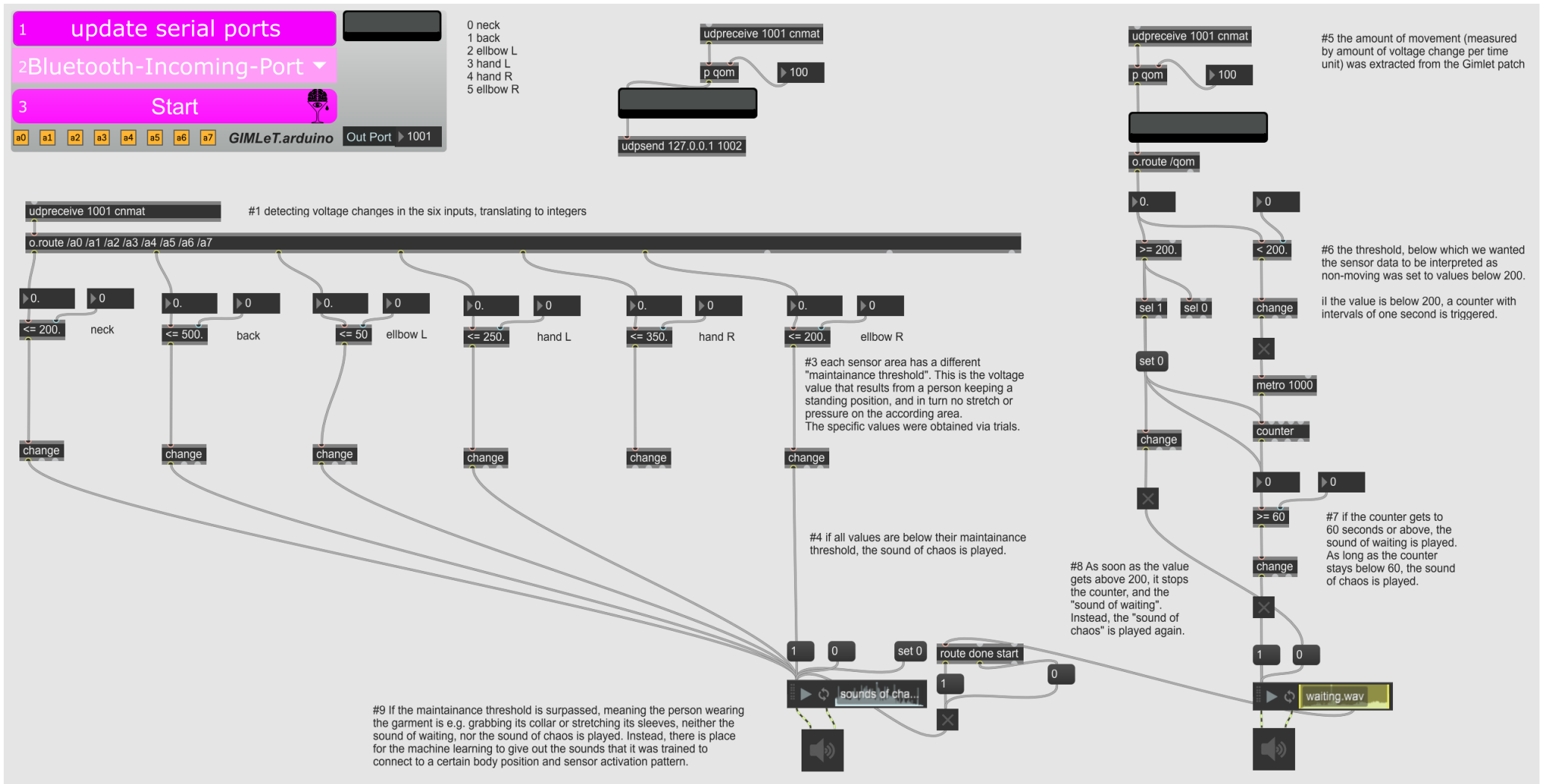


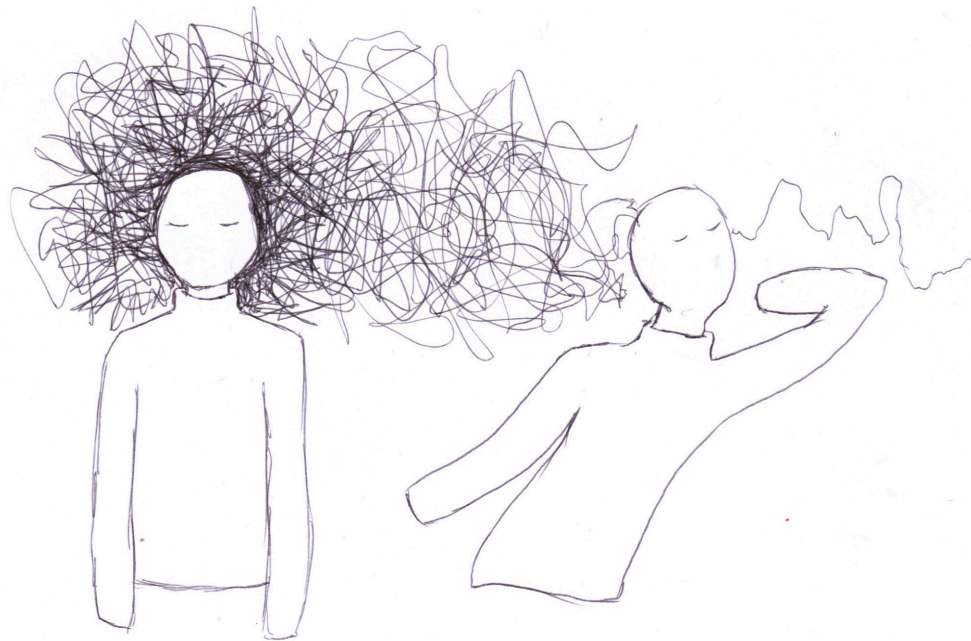
max msp integrated a total of six analogue inputs from the arduino uno. the gimlet package was used to train the programme on different body movements, such as stretching or pulling the neck of the pullover. a combination of change, comparison and counter objects lead to three possible modi: standing still and hearing chaotic sounds, moving to a certain position and hearing a specific sound, or standing still for more than 60 seconds, resulting into a subtle playback of the sound of people in a room, waiting for something to happen.

















wearing sound
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