Laboration 2
Sound and Gestures in Interaction

In this lab session, you will use laptops and smartphones to map connections between physical movement and sound. You will use the embedded sensors on the smartphone to detect and differentiate between different gestural actions and connect those actions in a meaningful way to a set of provided sound models.

1   Groups and Equipment

Each lab group should consist of maximum 2 persons and each group should bring at least one **laptop** and one **smartphone** per group. Also, make sure to bring **headphones** for all devices. If any group has difficulties with these equipment requirements, responsible teachers must be made aware about this one week before the lab at the latest, so that suitable arrangements can be done prior to the lab session. This will most likely involve a reorganisation of the groups.

2   Preparation

Besides reading through this document, there are some mandatory preparatory tasks that you need to do before the lab session starts:

- Form a group and book a time for your lab session at STRAW POLL.

- Familiarize yourself with FAUST

- Familiarize yourself with the sensors in your mobile

- Try this example first on your mobile to see if Web Audio and motion sensors work on your phone.

- Start practising with GitHub

- Read carefully the instructions for setting up and run the lab here.

- Using the lecture notes from Roberto Bresin's lecture (*Sound in Interaction*), try to think of what types of connections between actions and sounds that are reasonable, and why. What would be a good or bad connection between an action and a sound?

- (Optional) Start working on the lab before and finish as much of it as you can on your own, before the scheduled lab session.

PLEASE NOTE: A group that shows up unprepared or without the right equipment will not be able to pass the lab in time and will need more hours!

3   Lab Procedure

The lab will start with a very brief introduction. After this, you will have the opportunity to discuss issues that may have come up during the preparations, whereafter you will start to work in your group. Lab assistants will be present, but the help files in Pure Data and the other resources provided should allow you to finish the laboratory tasks at a comfortable pace. At the end of the lab, a representative from each group will be called upon to describe and demonstrate one of the created connections.

The task is to select pairs from a set of gestural actions (see Table 1) and a set of audible results (see Table 2) and to create a connection between them. The actions are all movements, and the results are all different types of sounds[1]. It is important that the mappings that you build ensure that the chosen action leads to the desired result. Still, the connection must also be motivated by you, e.g., *"We imagined use case scenario number X, so we chose to map Y to Z because..."* Lab assistants will only be able to approve a connection when design decisions for the connection have been presented with an adequate motivation. You need at least 3 approved connections to pass the lab.

---

[1]Most of the sounds listed in Table 2 are taken from the example developed by Andy Farnell (If you are interested, see http://mitpress2.mit.edu/designingsound/ and https://mitpress.mit.edu/books/designing-sound for further details)

Table 1: Gestural Actions

ACTIONS
The phone...
...is shaken.
...is spun while lying on a flat surface.
...is used to point at the entrance.
...is used to point straight up.
...is used to point towards north east.
...is placed flat in the hand and tilted from side to side.
...is held and used to detect all very small movements, but not large ones.
...is held and used to detect all very large movements, but not small ones.
...free falls for more than 30 cm.
...is used to measure the angle of a surface, like a level.

Table 2: Sounds synthesized using Faust.

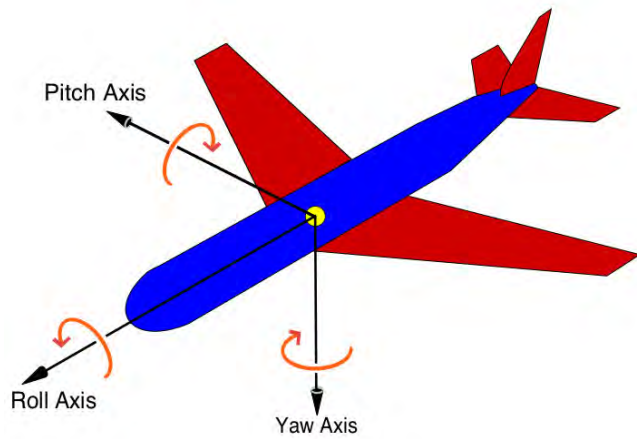| SOUNDS |
| --- |
| Bells |
| Bubbles |
| Creaking door |
| Engine |
| Musical instruments |
| Rain |
| Sci-Fi (photon torpedo) |
| Thunder |
| Wind |

4   Useful Time Saving Hints!

Check Your Hardware

While the information in the documentation is usually accurate, there is always a possibility that a particular combination of device, OS version, and settings results in you receiving data that is different from the specification.

Try this example first to see if Web Audio and motion sensors work on your phone.

Gyroscope Angles

The gyroscope data is in *yaw*, *pitch*, and *roll* format, illustrated in the picture below. The data for each axis is $-180°$ to $+180°$, meaning that there are discontinuities or jumps in the data when you move past certain rotational positions. Take this into account when you design your patches. Consult the Wikipedia page if this is unfamiliar to you.

5 Results

Prepare a short text to be uploaded in Assignment Lab 2: Sound and Gestures in Interaction in Canvas in which you list the following information:

1. Complete name of your partner for this lab

2. Link to the GitHub repository where you save your work for this lab

3. Connections that you made between gestural actions and sounds, using a structure like the table below. The fourth mapping is optional; you can implement it if you have time.

Table 3: Suggested Mappings

NUMBER	ACTION	SOUND
1		
2		
3		
4		

6 Examination

Contact one of the laboratory assistants and present the work that you have previously uploaded to Canvas.