Fachgebiet Audiokommunikation
Prof. Dr. Stefan Weinzierl

Master Thesis

Mapping Four-Finger Combinations to Pitch - An Experimental Evaluation on a Novel Musical Interface

In the context of a master's thesis at Audio Communication Group, a musical interface for controlling monophonic synthesizers has been developed [3]. The device (see Fig. 1) uses four valve-like mechanics to select pitch and is equipped with eight force sensitive resistors for applying expressive gestures. A first experiment evaluated the general reaction time and error rate in the use of the interface, compared to a MIDI keyboard.

This thesis aims at comparing different mapping strategies of the four valve mechanics to the pitch of a connected synthesis algorithm. A binary mapping [3] has been introduced in the first user test. Alternatively, a mapping based on the Gray Code has been proposed [2]. Further mapping approaches, based on physiological, psychological, and musicological paradigms shall be proposed within this project. These mappings will be evaluated in a user study, considering their applicability in a musical context. More precisely, the influence of different mappings on several aspects of musical performance will be investigated.

Besides the design and evaluation of the experiment, the work will also include the handling of hard and software aspects of the controller. This incorporates adjustments of the PD patches for the experiments, as well as proposing and possibly implementing improvements of the prototype. We therefor cooperate with instrument builders at the SIM (Staatliches Institut für Musikforschung).

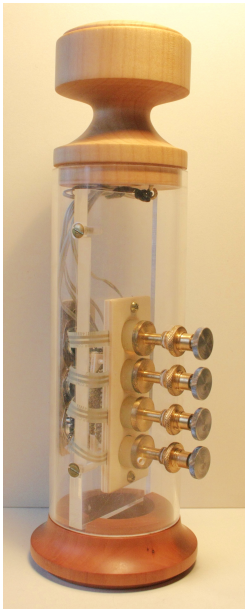

Figure 1: The *BinBong*

References

[1] Klaus Backhaus, Bernd Erichson, Wulff Plinke, and Rolf Weiber. *Multivariate analysemethoden: eine anwendungsorientierte einführung*. Springer-Verlag, 2013.

[2] G.T. Beauregard. *Rethinking the Design of Wind Controllers*. Dartmouth College, 1991.

[3] Gabriel Treindl. Entwicklung und Evaluation eines Controllers zur Tonhöhensteuerung über Vier-Finger-Kombinationen. Master's thesis, Technische Universität Berlin, 2016.

Requirements

- Focus on / strong interest in experimental design and statistical evaluation [1]
- Basic knowledge / interest in Arduino (Teensy) programming and sensor technology
- Basic knowledge / interest in PureData programming

Supervisors

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