

Design Process of Augmented Instruments

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Abstract

Augmented instruments (instruments expanded through their placement in a sound chain, the use of sensors and software tools) use advances in electronic and computational technology to develop new forms of expressiveness in musical performance, sonic possibilities, and compositional languages, widening the frontiers of musical art and its staging.

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This article focuses on describing the design process behind a series of case studies of hyper instruments: The augmented violin developed at IRCAM (Frédéric et al. 2006), the Hybrid Augmented Saxophone of Gestural Control (HASGS) (Portovedo, Lopes, and Mendes 2018), the augmented concert harp (Sullivan et al. 2018) and the sets used by Yaron Deutsch for the performance of contemporary electric guitar works.

One of the aims pursued by studying these examples is to categorize the augmented instruments according to several parameters: types of sensors and hardware, mapping, need for computers and kind of software, type of gesture control (Newton and Marshall 2011), graphical user interface (Portovedo, Lopes, and Mendes 2018) and need for a musical assistant (Perrotta, Menezes, and Martins 2014). These parameters can be defined as present or absent (mapping, graphical interface, musical assistance, use of computers), specific data (sensor name, software name) or two values parameters (applicable to gesture) (Jansenius, Wanderley, and Godøy 2009). The data is analyzed for each case study and plotted in tables. Another aim is to characterize non-measurable aspects such as

the importance of the performer and his involvement in the design of the instrument considering the relationship of the new instrument with the base instrument and the connection among the composition, the performance of the instrument and its theoretical and technological design. Finally, the flexibility of augmentation, that is, the possible appearance of new uses for which the instrument was not originally conceived, is also discussed.

The case studies range from Deutsch's proposal, where the performer designs the different hardware connections, no software is used and each set is defined based on the work to be performed, to the concert harp, where technological analysis prevails, the performers test the operation, mathematical and mapping models are of utmost importance and there is a graphical software interface for the user. Like this case is the augmented violin of IRCAM, without a graphical interface in its description, but with a much closer collaboration of the composers. Finally, the HASGS approaches the versatility of the Deutsch sets and is designed from the interpretation and its needs, but places special emphasis on the composition of several specific works for the instrument and on the importance of the graphical user interface.

48 From the analysis of collected data, criteria are established to describe the augmentation process and the different organological typologies, making it possible to organize the family of augmented instruments under a logical classification that allows delving deeper into their repercussion and possibilities. The additional description about the “non-mensurable” offers an image of the background and artistic framework in which the instrument is inscribed.

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