Meta-instrument and Natural User Interface: a new Paradigm in Music Education

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Music is gaining a growing role in children and teenager education

Playing music is not as natural as listening

Strong limitation for educational contexts where student’s time is a limited resource
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What

Meta-instrument

✓ A new music instrument paradigm that overcomes learning limitations

✓ Instantly execution of a music score without a specific training
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How

- Applying the natural ability of the human beings to tap the music
- Moving the interaction level to the timing
- Smart logic implementation
- Natural user interface (NUI)
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Meta-instrument framework

✓ The meta-instrument is a new paradigm that enables the music performer to interact with the instrument via sensing technologies

✓ The music performer is part of a sound-generation process very similar to an automatic control system
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Meta-instrument framework

From the traditional musical instrument to the Meta-instrument

Traditional musical instrument

Pitch control (full)
Intensity control (full)
Duration control (limited)
Timbre control (very limited)
Training (intensive)
Interaction (specific purpose)

Musical Meta-instrument

Pitch control (extended)
Intensity control (extended)
Duration control (unlimited)
Timbre control (unlimited)
Training (not requested)
Interaction (general purpose)
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Meta-instrument framework

✓ A computer is a generalized processing system capable of real-time performance

✓ The traditional instruments can be considered like a subset of all the possible instruments that can be implemented
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Learning by Meta-instrument

✓ The meta-instrument adapts itself to the performer

✓ The score is encoded into the meta-instrument memory

✓ The score is executed by a player engine that interprets the gesture coming from the interface
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Learning by Meta-instrument

✓ The performer can interact intuitively with the meta-instrument

✓ The score can be inputted from any media and encoded in a meta-code

The nine-key Metapiano by Jaen Haury allows to play any music score without specific playing skills
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IEEE 1599 Music Standard

✓ A peculiarity of the meta-instrument framework is that it can refer to multiple and heterogeneous contents

✓ To accomplish this goal we propose to apply the specification of IEEE 1599, an XML-based international standard for the representation of music
Final considerations

✓ The meta-instrument framework can be a powerful tool to enhance the learning abilities of young students who approach music studies and the instrumental practice.

✓ The meta-instrument capitalizes the natural ability of children to play music intuitively by implementing a natural user interface that shifts the learning efforts of the performer from practice to music interpretation.
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Thank you for your attention

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