Audio comparison of repeat performances of an improvisational work of human + computer music

Mark A. C. Summers¹, Amy V. Beeston² and Adam Stansbie¹

¹Department of Music, ²Department of Computer Science, University of Sheffield

(m.summers, a.beeston, a.j.stansbie)@sheffield.ac.uk

Project overview

• Examines improvisational human + computer (H+C) music.
• Uses audio analysis to help understand the music that results from human + computer interaction.
  • Only way to fully understand ‘non-notated’ music is to study performances [1].
• Key problems:
  • Role of computer system varies dramatically with each H+C work.
  • Improvised music differs from one performance to the next.
  • Non-traditional musical materials are central in H+C improvisation.
  • There is no agreed convention for producing transcriptions.
  • There is no (detailed) score with which to compare the music.

Case study

• Highly improvised H+C work.
  • Summers, M.A.C. Laminate for improver and computer, 2013.
• Improvised crescendo with performance instructions.

1. “It’s an improvised crescendo”
2. Gradually populate initial silence, avoiding easily-identifiable sounds.
3. Once continuous texture is achieved, add layers that use instrument’s whole range, making wide/dense frequency spectrum.

• Performance instructions

• Visualisation 1
  • Instruction: Create a long, improvised crescendo.
  • Examined here with four performances by one performer.
  • Long-term energetic curve of the microphone input and multi-channel output signal (one root-mean-square energy value per second) [2].
  • High variation between performances is visible input signal (above).
  • Global consistency of rising signal output in all cases (below)

• Visualisation 2
  • Instruction: Gradually build up a continuous texture.
  • Uses a time-segmented comparison of the temporal envelopes of the performer’s current input with the system’s recent output [2].
  • The three performers display different strategies.

• Visualisation 3
  • Instruction: Fill up the frequency range.
  • A spectrographic depiction of the overall audio output [3].
  • Layering of sound continues through the work.
  • Frequency-extent (vertical) of the spectrum gradually broadens.
  • Instruments differ in frequency range (incl. extended techniques).
  • Performers fill the range at different rates.

Conclusions

• Our approach
  • Demonstrates complexity of performance practice in H+C music.
  • Highlights the need for better understanding of performance practice.
• The selected work
  • Allows fixing of temporal structure in computer part.
  • Requires highly improvised input in human part.
  • Specifies formal direction rather than sonic detail of performance.
• The selected visualisations
  • Are work-specific.
  • Ask whether performer has achieved aims of the work.
  • Examine variation across several performances by a single player.
  • Investigate similarities among different performers.

Next step

• Analyse work without fixed temporal constraints but which retains clear formal framework.

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References
