

Influence of latency on musical interaction

Henri Holopainen and Lauri Parkkonen
Department of Neuroscience and Biomedical Engineering
P.O. Box 12200, FI-00076 AALTO, Finland
email: henri.holopainen@aalto.fi

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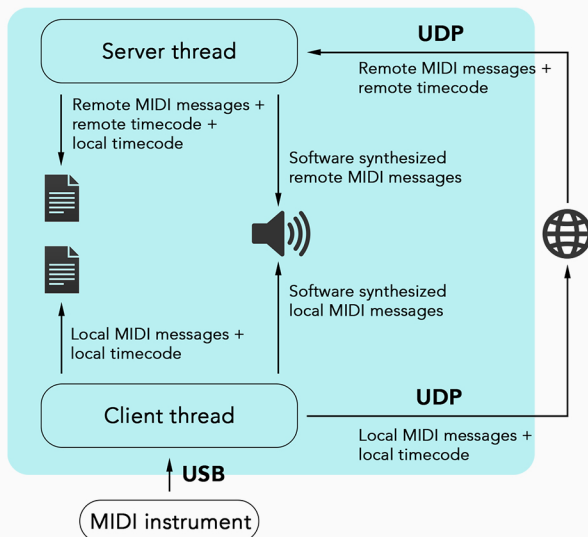
Introduction

Simultaneously recording the brain functions of two test subjects, i.e. *hyperscanning*, is a method to study fast-paced social interactions on the brain level.

To achieve sufficient temporal and spatial accuracy MEG (*magnetoencephalography*) is required. However, MEG units usually house only one MEG machine, so a low latency solution to connect two units and their test subjects is also needed.

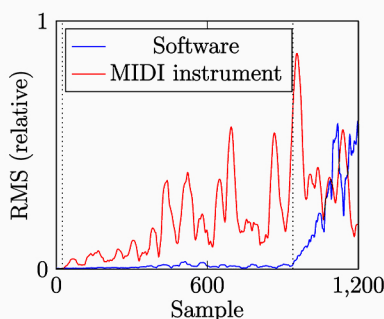
A series of hyperscanning experiments focusing on musical improvisation is being planned between Aalto University in Finland and Aarhus University in Denmark. In this study we implemented a real-time music link and validated its suitability for the upcoming improvisation experiments with a local test setup.

Real-time music link



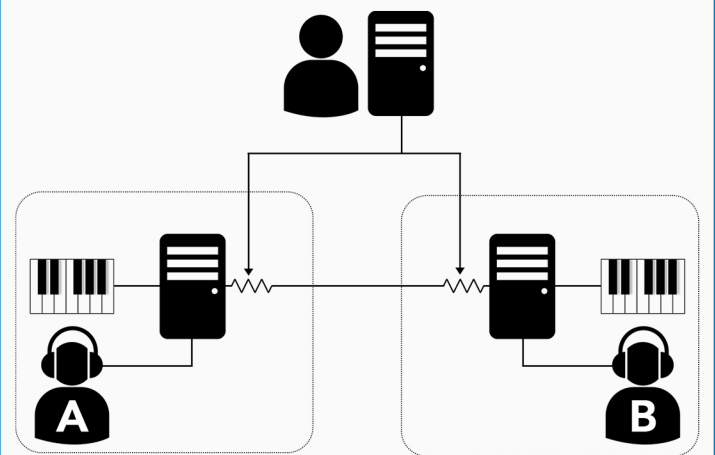
Sources of latency in the system:

- software synthesis, ~20 ms
- network between MEG units, ~10 ms

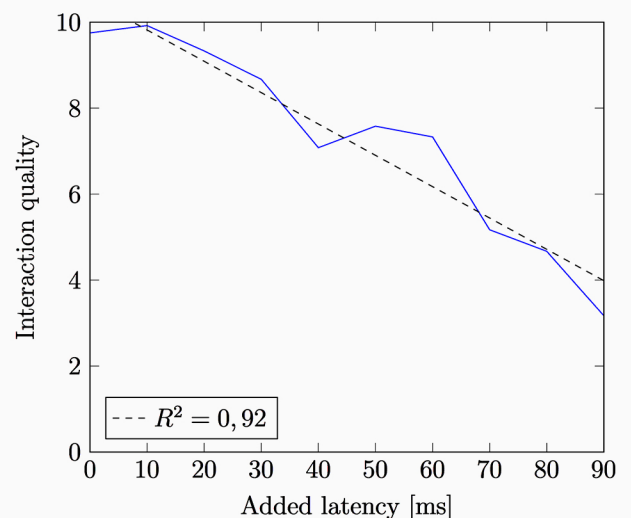


Latency experiment

The software was tested locally with musicians to study the influence of latency on musical interaction. A pair played short sessions while the artificial latency between the musicians was varied. Between sessions the musicians evaluated individually the quality of their interaction on a scale of 0 to 10.



Results



The musical interactions were perceived as good with simulated network latencies up to about 30 ms. The level of latency from software synthesis didn't pose any problems for the musicians' performance.

Conclusion

Carrying out the planned improvisation experiments between Otaniemi and Aarhus is feasible using the implemented software.