

A Reactive Environment for Network Music Performance

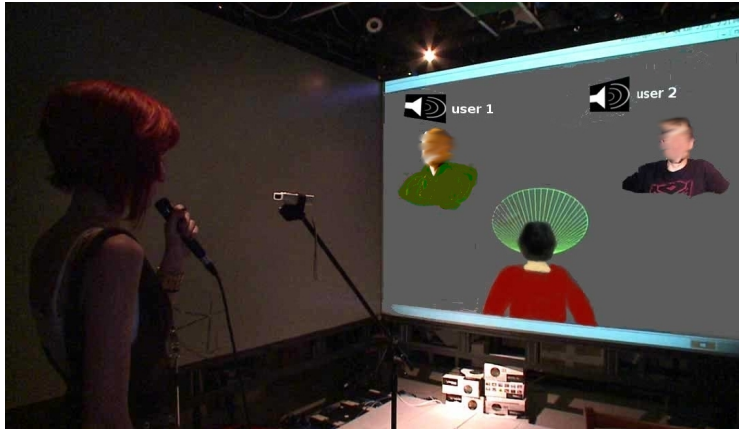
Net-Music 2013

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McGill University, Shared Reality Lab

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Collaboration over the Network



Characteristics of the Network

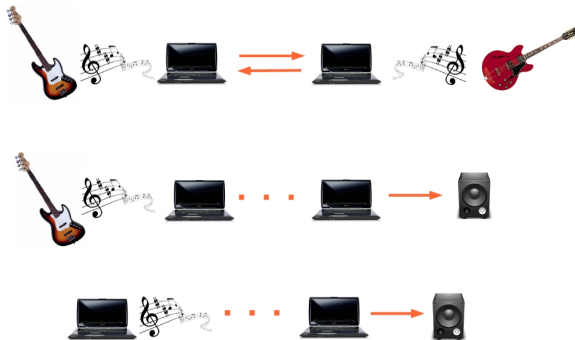
According to Tanaka:

“Music exists in space, in acoustical contexts, in the environment that it is played in. If music is made on networks, the network infrastructure becomes the space the music occupies.” [Tanaka, 2006]

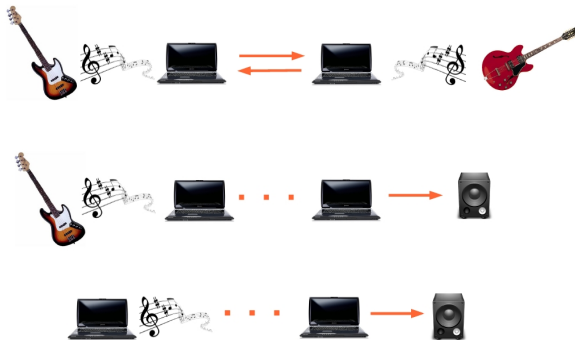
The Big Question

Why not capitalize on the fact that, by definition, the network brings computing technology to the performance setting, and use this to the musicians' advantage by giving them control over certain dynamics of the performance?

Existing Systems



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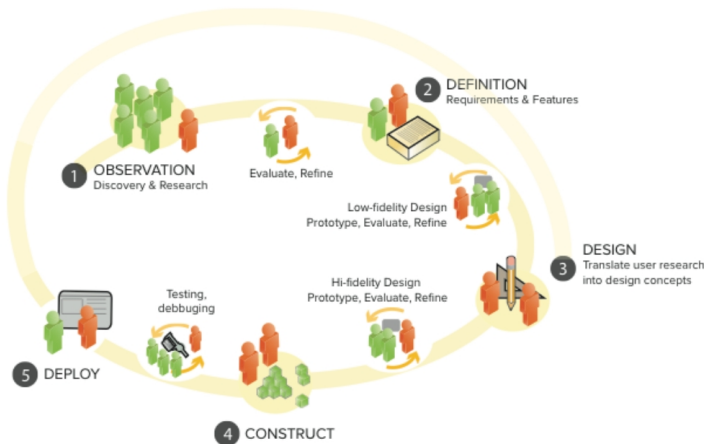
How can the user interact with a system **while** playing an instrument?

Reactive Environments

A Reactive Environment should...

- “reduce the cognitive load of the user by allowing the system to make context-sensitive reactions in response to the users conscious actions” [Cooperstock, 1995]
- “do its job well enough that the occupants are usually not aware of its presence” [Elrod, 1993]

User-Centered Design (UCD)



Our Proposed System

We want to:

- Design a system for NMP that allows musicians to interact with their instruments and their computer-controlled environment simultaneously
- Increase the level of interaction between the distributed musicians
- Apply a user-centered methodology throughout the process

Research Goals

- Create a system that is enjoyable and easy-to-use for musicians
- Examine the merits of UCD when applied to Music Technology
- Draw lessons for interface designers from the HCI community who work with challenging target users

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Understanding the User

- User Observation: Uncovers the *what* and *how* of performance
- User Interviews: Uncover the *why* of performance
- Personas

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System Functionality

A Reactive Environment for NMP that features the following functionalities:

- 1 Dynamic Volume Mixing (DVM)
- 2 Enhanced Stereo Panning (ESP)

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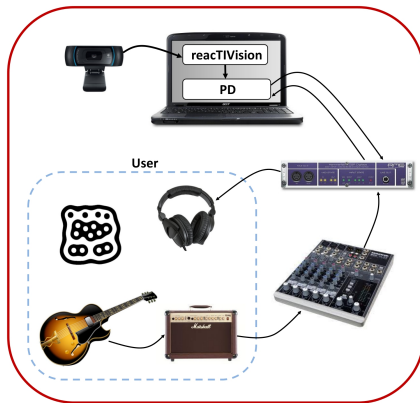
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First Prototype



Feedback and Observations

Several technical problems arose:

- Latency was very noticeable
- Noise level too high
- Placement of fiducial markers did not leave much room for movement

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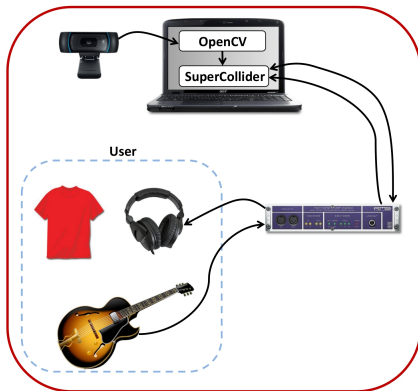
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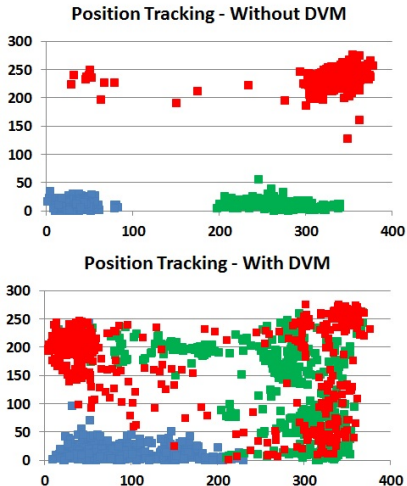
Second Prototype



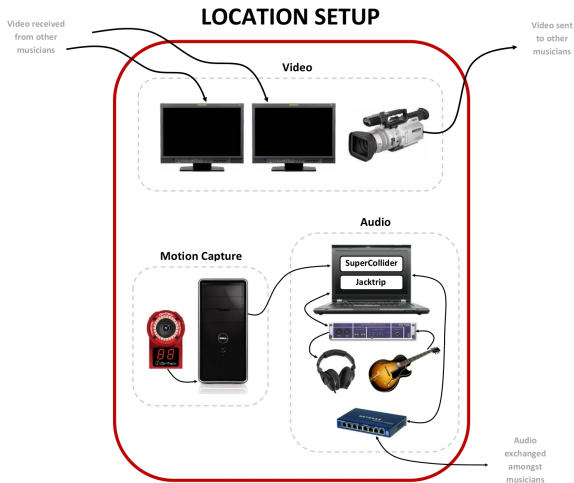
Video - Performance with Second Prototype

- Recorded in June 2011 at Universität Bielefeld
- Three jazz musicians performed together
- Had only performed together once before

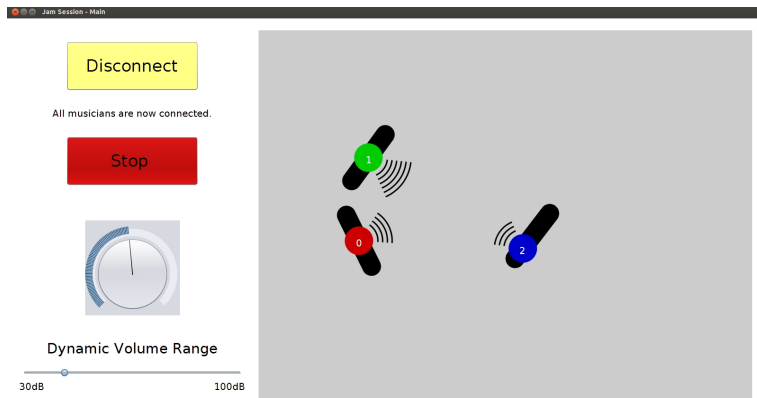
Results - Position Tracking



Alpha System



Graphical User Interface



Video - Performance with Alpha System

- Recorded last night at McGill
- Three musicians performed together from separate rooms
- All were previously familiar with one another
- Audio and Video was recorded from each perspective

Current/Future Work

- **Enable Vocals**
- Formal User Experiments
- Refining Evaluation Techniques

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Thank you!

Discussion