

Appendix A: A Detailed Work Plan

Using gestural information to control a model-based sound synthesis of the guitar

This paper describes a detailed work plan for my short-term scientific mission (STSM) with the Music Technology Area of the Schulich School of Music at McGill University, during October 10-24, 2006. Dr. Gary Scavone will be my supervisor for the stay, and I will work with him on the sound synthesis issues. For the gestural control part, I will cooperate with Dr. Marcelo M. Wanderley.

Background

For the last 15 years, sound synthesis has been an integral part of the research in the Laboratory of Acoustics and Audio Signal Processing at Helsinki University of Technology. My personal research interests include physics-based modeling of the nonlinear and time-varying phenomena in string instruments. In 2004 we collaborated with our university's Telecommunications and Multimedia Laboratory, and produced a virtual air guitar (<http://www.airguitar.tml.hut.fi>), a gesture-controlled guitar synthesis model, which can be played in real-time. Since March 2005, the virtual air guitar has been playable in the Finnish science center Heureka, and it has gained a lot of media coverage worldwide.

Research problem

Currently, we are implementing a virtual slide air guitar, an instrument with continuous pitch control. This model simulates also the friction sounds generated from the contact between the virtual string and the virtual slide tube. Since the control method here is different from the one used in the earlier air guitar version, we need to re-think the gestural control part. Our laboratory has a long experience in model-based sound synthesis of string instruments, but we are not very familiar with gestural control of the synthesis models. For this reason, I believe that my visit to the Music Technology Area at McGill University would be fruitful and help us to generate better gesture-controlled sound synthesis models.

Result

As a result of my STSM visit, we expect to have formulated a salient control strategy for the virtual slide air guitar, especially for tracking the fretted/open notes from the left hand, and the vibrato. We also expect to have new ideas for making the synthesized slide guitar tones more realistic. The results will be published in a journal article, written in collaboration with my M.Sc. student Tapio Puputti and my doctoral thesis supervisor Prof. Vesa Välimäki. Also, a real-time implementation of the slide air guitar will be generated. Possibilities for a joint publication between the researchers in McGill University and Helsinki University of Technology will be discussed.