STSM Detailed Work Plan – Pashalidou Stella

My research interests are focused on the gestural control of digital audio systems, and in particular of digital audio effects.

My intention through an STSM is to further experiment with and develop some of the issues I have been concerned with during the master's project "Alternative Control of Digital Audio Effects" under the supervision of Dr. Andy Hunt (University of York, 2003).

In the abovementioned project, a try has been made to realize a control system of a prototype digital audio effect in an attempt to demonstrate our belief that:
(1) the use of a user-manageable number of high-level (effect-) parameters directly related to our perception of the sound,
combined with
(2) a suitable gesture-tracking user control interface that matches these parameters for the specific implementation and purpose, and also
(3) a visual feedback to the control process for helping the user comprehend the way he is affecting the sound/parameter space
can make the use of audio effects easier, more flexible, more creative and more intuitive.

The specific implementation included:
A reverb (freeverb) as an effects-prototype,
Motiontracking of hand-gestures through a webcamera, based on Eyesweb as the effects controller and
A simple 3D-visual environment as feedback to the control process.

The main issues that need to be examined, and for which an STSM would be a good opportunity according to the time available, are the following:

- Mapping: Experimentation with
  - more complex strategies or
  - neural networks instead of developer-predefined strategies.
- Digital audio effect: Application of a similar approach to another digital audio effect.
- User control interface: Experimentation with either the same intrerface (webcamera/motiontracking/Eyesweb) or an alternative (e.g. data glove) or a combination of these.

  In the case of motion tracking:
  - application of whole-body motion and gesture tracking (instead of hand-gestures)
  - experimentation with the recognition and translation of user intentions into parameter values needed for the specific sound processing algorithm

and

- experimentation with two cameras for taking advantage of the whole 3D-space.

- Control feedback: Development of more appropriate visuals that would better correspond and represent both the perceptual parameters and the gestures.
- Multiple Effects: Addition to the system of the ability to apply multiple effects to a single track at the same time, which is one of the main drawbacks of the current commercially available effects units.
- “Fine-Tuning”: Alteration of the program’s design, in order to enable access to the low-level parameters for refinement of the effect’s parameters adjustment.

The target group of this project/application can either be the sound engineer or a second musician, who we will call the "effect performer", solely performing on the reverb effect and interacting with the instrument performer.

Ideally we can imagine the effects-control-environment as part of a bigger mixing and editing system, which could improve the traditional interface of a mixing desk without making “traditional” operation harder. Such a system would consist out of 3 layers:

(1) “Mixing space”, from which the user will be able to “switch” in real-time during a performance to the
(2) “effects space” of a specific effect just by a simple gestural movement and possibly a
(3) “mapping space” which will be the visual environment, in which the user himself will be given the freedom to set up—prior to the performance—his own mapping strategy, in case no use of neural networks is made.