The University of Oxford

Engineering Science

4YP Project Report

- Using Machine Learning to Control Software Synthesisers -

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FINAL HONOUR SCHOOL OF ENG

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Abstract

Software Synthesisers (Soft-Synths) are computer applications which create sounds in response to musical input typically in the form of MIDI messages. They are widely used in a variety of musical contexts. Typical soft-synths have hundreds or thousands of parameters which control the sound generation algorithm, allowing the user to create sounds that suit their musical needs. This results in a high dimensional, non-linear search space which the user must navigate in order. Research indicates that humans are bad at navigating such interfaces with serial controls, and that there is a strong link between interface design and the level of creativity that the user with experience when using the interface.
This work describes a novel interface designed to help users control synthesisers in a quicker and more intuitive manner. It combines 3 interfaces together: a traditional 'knob and slider' interface, a search space visualisation interface, and an iterative blending interface.

THIS ABSTRACT NEEDS A LOT MORE WORK, WILL WORK ON AFTER WRITING MORE OF THE REPORT

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Introduction

1.1 Background Information

Software Synthesisers (Soft-Synths) are computer applications which create sounds in response to musical input typically in the form of MIDI messages. They are widely used in a variety of musical contexts. Typical soft-synths have hundreds or thousands of parameters which control the sound generation algorithm, allowing the user to create sounds that suit their musical needs. This results in a high dimensional, non-linear search space which the user must navigate in order. Research indicates that humans are bad at navigating such interfaces with serial controls, and that there is a strong link between interface design and the level of creativity that the user with experience when using the interface.

This work describes a novel interface designed to help users control synthesisers in a quicker and more intuitive manner. It combines 3 interfaces together: a traditional 'knob and slider' interface, a search space visualisation interface, and an iterative blending interface.

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The interface proposed in this project has many benefits over a traditional synthesiser interface, as has been designed following design heuristics from the fields of Human Computer Interaction and Creative Cognition. Based on simulated user studies, the interface has at least as good performance as a traditional interface when carrying out search based tasks, and based on real user feedback it has many advantages in terms of creativity.

7.1 Further Work

The evaluation of this interface was only carried out on a single synthesiser, due to the projects time constraints. The interface has been designed to be as general purpose as possible, allowing it to control arbitrary synths over the OSC protocol, but due to a lack of standardisation between soft synths, and lack of implementation time, more work needs to be done to create a truly general purpose soft synth controller. As many soft-synths are in the VST format, making a version of the interface with acts as a VST host, and uses the parameter retrieval and preset storage functionality of VSTs is a good next goal if this project is continued in the future.

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