DT228 - Final Year Proposal Form 2010/2011

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Project Title: Image processing music creation

Summary (approx 200 words)

The goal of this project is to create a music creation method, primarily synthesis, using the medium of image processing.

This project will allow a user to capture a live image stream using a mobile device and use this as a basis for musical synthesis. This sound can then be altered by the user, allowing them to change many parameters concerning the synthesized wave form e.g. frequency, LFO and so on. Using the camera input will provide interesting and uniquely generated sounds, increasing interactive sound generation in the process.

This will be deployed onto an iphone/ipod touch making use of touch screen and the camera as the image feed to overlay the information. I will also make use of the various sensors embedded onto these devices such as the accelerometer for the pitch bending of a notes.

The hope of this project is to create a new and interactive method of mobile music creation and synthesis whilst eliminating the screen space barrier encountered by other such synthesis programs found on mobile devices.

Background (and References)

I am an avid electronic music producer, with a strong background in music. I feel this project will provide a unique way of creating interesting sounds, with a strong emphasis on musical interaction. This will give freedom in the creation process, breaking away from the confines of a standard synthesis program.

References and related links:

Korg Kaossilator:
http://www.korg.co.uk/products/dance_dj/kaossilator/kaossilator.asp

Radius music:
http://hendersonsix.com/#212455

Synthesis demonstration:
http://www.cubefestival.com/2010/4-hands-iphone-de-atau-tanaka-adam-parkinson/

Reactable mobile:
http://www.reactable.com/products/mobile/

STK synthesis toolkit:
https://ccrma.stanford.edu/software/stk/

FMOD:
http://www.fmod.org/

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Proposed Approach

I will have three main stages in my proposed approach for this project.

- Research and high level design of the system
- Implementation of the system
- And finally testing and evaluation

I will be encompassing the use of iterative development cycles also - This will help break up my tasks and keep me on track.

-Research and design-

Before actual development may take place, I will have to do some research into a number of areas required for my project. Research will have to be done in the following areas:

-Image processing
-Sound synthesis and manipulation
-And iOS development

I will be firstly doing research into iOS development to get me up to speed on the use of the language objective-c and also development within the xcode IDE.

I will then do research into image usage and how to process the image feed for the overlaying of relevant information for the program – this will also include looking into any open source libraries that I can make use of. This will then lead to a deep research into sound synthesis and manipulation which be needed for a good chunk of this project.

-Implementation of the system-

I will firstly implement the use of the camera functionality on the iphone. This will give me my base from which I can build the other components on top.

I will then create the basis from which my sound signals are generated. This will lead to the development of functions that will allow the user to alter and manipulate the sound by changing the frequency,release,decay and other such parameters.

The next such area of development will be that of the integration of the image processing system into the project. I will use the then processed image as the foundations from which the sound wave will be formed i.e. a threshold using the image information.

The last stage of development will be the creation of the user interface to control everything. This will be quite an important aspect of the project as I want the creation process to be as intuitive as possible to allow complete freedom.

-Testing-

The testing will consist of a number of aspects – the main being a list of different scenarios that will be separately tested. These will then be used to create a report from which the results may be

determined.

I will also undertake a number of user based tests and records the results throughout the development process. Thus having both user and logic based tests.

Evaluation Criteria

The project will be evaluated on the basis of a number of factors including:-

- Design of the system
- Quality of research done
- Implementation of the system
- Completeness
- Usability of the system
- Documentation
- Quality of testing and testing reports

Deliverables

- Project dissertation and system user manual
- Configuration files i.e. source and relevant files required for the application
- Working system running on a standalone iphone/ipod touch

Priority features

- Usable sound synthesis and generation
- Enhanced user interface
- Real time sound manipulation

Secondary features

- Transport for audio i.e. play/pause/bpm etc
- Save song created
- Load images instead of live stream.

Technical Requirements

An iphone/ipod touch with camera, preferably running the latest iOS i.e. 4

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Project Plan

October 2010: Set up development blog and start research into iOS development and technologies
November 2010: Researching sound synthesis and algorithms surrounding this - also research into image processing for iphone/ipod touch.
December 2010: Get image capture and information overlay running on the phone, continue research into sound synthesis
January 2011: Create basic sound creation and manipulation for application
February 2011: Continue with sound synthesis implementation, making it more robust. Create user interface.
March 2011: Finish integration of components. Start testing and bug fixing. Documentation and evaluation.
April 2011: Finishing touches to project. End project evaluation.

Lecturer Comments: INTERESTING IDEA - VERY TOPICAL SOMEWHAT OPTIMISTIC BUT CAN EASILY BE SCALED BACK	
Student Signature: Kellyann	Date: October 6th 2010
Lecturer Signature: Dan Barry	Date: October 6th 2010