Vissynth Project Proposal

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1   Project Description

Vissynth is a visual synthesizer, receiving input from a webcam. By changing the input to the camera (e.g. moving around frantically in front of the camera), a user can change the music produced by the synthesizer.

To accomplish this, we will use the OpenCV library to handle talking to the webcam. We intend to have our program save individual images from the camera at a given rate (e.g. 10 Hz), and then have our program operate on the images in the appropriate sequence (first image in time will be read first, followed by second, third, etc.) instead of attempting to handle live input from the camera.

For every image saved, the program will do (roughly) the following:

1. Turn the contrast of the image to 100%, leaving only black and white pixels.

2. Separate the image into a 10x10 grid, each corresponding to a button on the synthesizer (explained below).

3. Count up the number of white and black pixels within each square of the grid.

4. For each square, mark that square ON if there are more white than black pixels, OFF otherwise.

We will then use the ON/OFF sequences as input to the synthesizer in the following manner. Each column of the grid represents a time point (i.e. column 1 = time 1, column 2 = time 2, etc.), such that all of the squares within a given column will be played at the same time. Each row corresponds to a particular frequency, with lower rows representing lower tones and higher rows representing higher tones.

The program will take a grid based on a image, and step through each time point (each column) sequentially, playing each tone corresponding to an ON

square at the same time. The rate at which the program takes photos from the webcam will be proportional to the amount of time it takes to step through one image. So, for example, if each image has ten columns and each column plays for .2 seconds, our program will take a new photo once every 2 seconds, or at a rate of 0.5Hz.

In addition, the program will display the given grid being operated on at each time step (using ncurses or some other library), highlighting the column currently being played.

Because of the design of this project, we have several different modules that individuals in the group can work on, including talking to the camera, writing to the screen, producing sound, and processing the actual images. This will enable us to clearly delineate responsibilities and construct series of deadlines to reach.

2 Feature Lists

2.1 Checkpoint

1. Talking to the camera: be able to access a webcam, and save files in an ordered fashion.

2. Drawing to the screen: be able to draw a grid object to the screen.

3. Making sound: be able to play multiple tones at the same time.

2.2 Final Submission

1. Operating over images: transform the images into grid objects for use in the synthesizer.

2. Real time sound processing: be able to step through given grid objects and play appropriate tones at appropriate times.

3. Real time screen drawing: be able to update the screen in real time to reflect what the synthesizer is doing.

3 Dates

For checkpoint review:

1. 11/23/2010: 2PM

2. 11/23/2010: 3PM

3. 11/23/2010: 4PM

For final submission:

1. 12/15/2010