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2. Course Number : CS-492

3. Course Title : Kinect Programming

4. Work Number : PR-02

5. Work Name : Project Proposal

6. Work Version : Version 1

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**Project Proposal**

**Requirements:**

1. A Kinect.
2. SimpleOpenNI library.
3. Jm-Etude music library (http://jmetude.dihardja.de/.)
4. A computer with speakers.

**To Do:**

1. Come up with an algorithm for the general flow of the program (which I already have represented by pseudocode/flowchart.)
2. Determine Gesture->Emotion->Markov Chain mapping (incrementally throughout project.)
3. Determine rules that can be used to detect the compatible gestures (incrementally.)
4. Assemble data for a Markov Chain from music that represents the compatible emotions (incrementally.) (Music will be selected based off of the key that it is in.)
5. Figure out an algorithm for generating music with the Markov Chain.
6. (Optional) Create an Expert System that will check the generated music to see if it follows music theory principals (maybe needed if multiple instruments are being used.)

**Schedule (assuming a four week period):**

**Week 1**

Goal: Get some rudimentary music generation working.

1. Create a simple Markov Chain for the music that plays when no gestures are recognized.
2. Create and implement a simple algorithm that generates music using a Markov Chain.
3. Put all that together into a simple program that plays the generated music.

**Week 2**

Goal: Make the program so that it can recognize a gesture and generate music from the respective Markov Chain (another Markov Chain needs to be made.)

1. Create a different Markov Chain that represents a certain emotion.
2. Make the program able to recognize a gesture that suggests an emotion.
3. Make the music generation algorithm check to see if an emotion is present within the user. Then use the respective Markov Chain to generate the appropriate music.

**Week 3**

Goal: Refinement of the music generation algorithm. Having a concrete idea of what the design of the music generation is (what makes up the states of the Markov Chain is part of it.) Add in other emotions/gestures/Markov Chains that will be used in the program.

1. Making basic design decisions that I have no idea about at this point.
2. Adding in compatibility for other gestures and emotions so that there is some diversity between the generated pieces of music.
3. Creating more Markov Chains that will represent the added emotions (multiple gestures could suggest the same emotion.)

**Week 4**

Goal: The addition of another instrument for each of the emotions that is compatible (those instruments will need their own Markov Chains too.) Deciding whether or not an expert system is needed in order to prevent the instruments from clashing with each other (this will likely not be needed.) Further refinement of the algorithms might need to be done because of the addition of the second instrument. And if possible, I can always add to the Markov Chains that already exist so that the data won’t produce anything recognizable.

1. Add in compatibility for another instrument into the music generation algorithm.
2. Create a second Markov Chain for each emotion (but model it after background instruments.)
3. Make an expert system, or not (which could be thought of as altering the music generation algorithm.)
4. Refining algorithms and adding to Markov Chains.