**Project Proposal**

**Project Description [5 pts]:**

**Piano hero**- An air piano similar to guitar hero built using OpenCV  
**Competitive Analysis**-

There are several virtual keyboards available online, but none of them actively track the user’s fingers. The lack of this feature presents a problem as the simulation loses authenticity. A perfect example of this is https://recursivearts.com/virtual-piano/.

My project plans to address this problem by actively tracking fingers through a library called OpenCV. The project will be actively tracking finger movements and colors to play various sounds on the piano. There is also no piano alternative for Guitar Hero, a very common choice amongst piano users. There will be notes falling down from the top of the screen and the user must press the keys to make a song.

**Structural Plan:**

A structural plan for how the finalized project will be organized in different functions, files and/or objects.  
Different *threaded* functions are:

Play audio, video, record audio, display audio blocks

Some more functions are:

Different game modes etc using tkinter

**Algorithmic Plan:**

* The trickiest parts are - restricting color ranges to detect only fingers, making the audio blocks.
* For these, I need to implement, keys in the form of classes and find the right color range through testing.

**Timeline Plan:**

* By Wednesday, Nov 21 - I will complete the threading, matching of audio and keys, and recording the audio
* By Saturday, Nov 24th - I will complete the blocks falling
* By Wednesday, Nov 28th - I will have a completely functioning application
* By Wednesday, December 5th - Additional features

Version Control Plan:

https://github.com/sathyahari9/sathyah\_15112  
  
Module List:

OpenCV,

PyAudio,

\_thread

Pygame

TP2:

* Implemented multiple windows using Pygame
* Solved threading problems
* No significant design issues encountered

TP3:

* Replaced previous pygame functionality (threading issues)
* Implemented falling blocks at different speeds
* Implemented multiple keys
* Implemented Long piano style (36-keys)
* Improved User Interface
* Implemented Record Audio functionality
* Play audio from recordings
* Implemented scoring