6.111 Final Project Abstract

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Virtual Piano

Who says you need a piano to play piano? For our final project, we plan to be able to play music based on hand gestures that imitate piano playing. Just as an electric keyboard is able to change modes to make the output sound like a different instrument, so will our virtual piano. The project can be divided into three parts, video capture and processing, sound processing, and display.

By the nature of the project we are looking to accomplish, video capturing and processing is a large aspect. At an abstract level there will be frame by frame comparison to determine if there is a significant enough difference in finger position. Possibly the use of specific finger tagging (by using distinct colors for each finger) may be used to separate individual fingers to make detection easier. Hopefully this detection of differences can be done in real-time to imitate the instantaneous reaction of a key press on a piano.

At the most basic level, the Virtual Piano will play a pure tone based on what notes it sees. However, in real life, instruments do not sound like pure tones. In fact, they all sound slightly different. The distinct timbre of each instrument comes from a combination of the fundamental tone and various overtones. Once we determine what note we want to play, the pure tone will need some processing before sounding like another instrument.

Lastly, we would like to display the last few notes played on a staff on the computer screen. The note name should also accompany the notes.