2016 CSE 481 I Sound Capstone
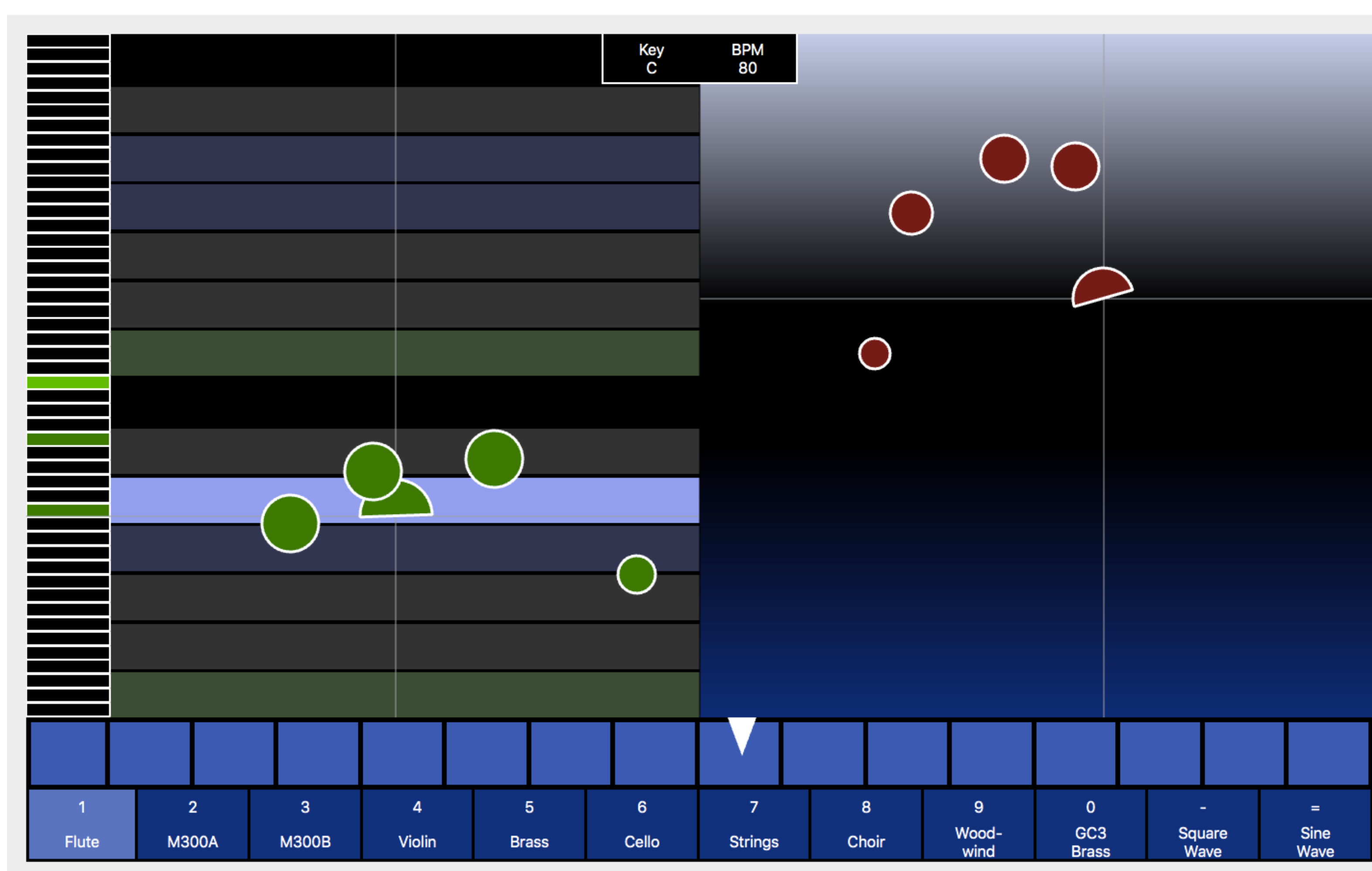
YoHand

Your Hand   Your Music

Autumn Johnson   Chad Price   Nick Jones
Dylan Swiggett   Jack Conger   Steven Dong
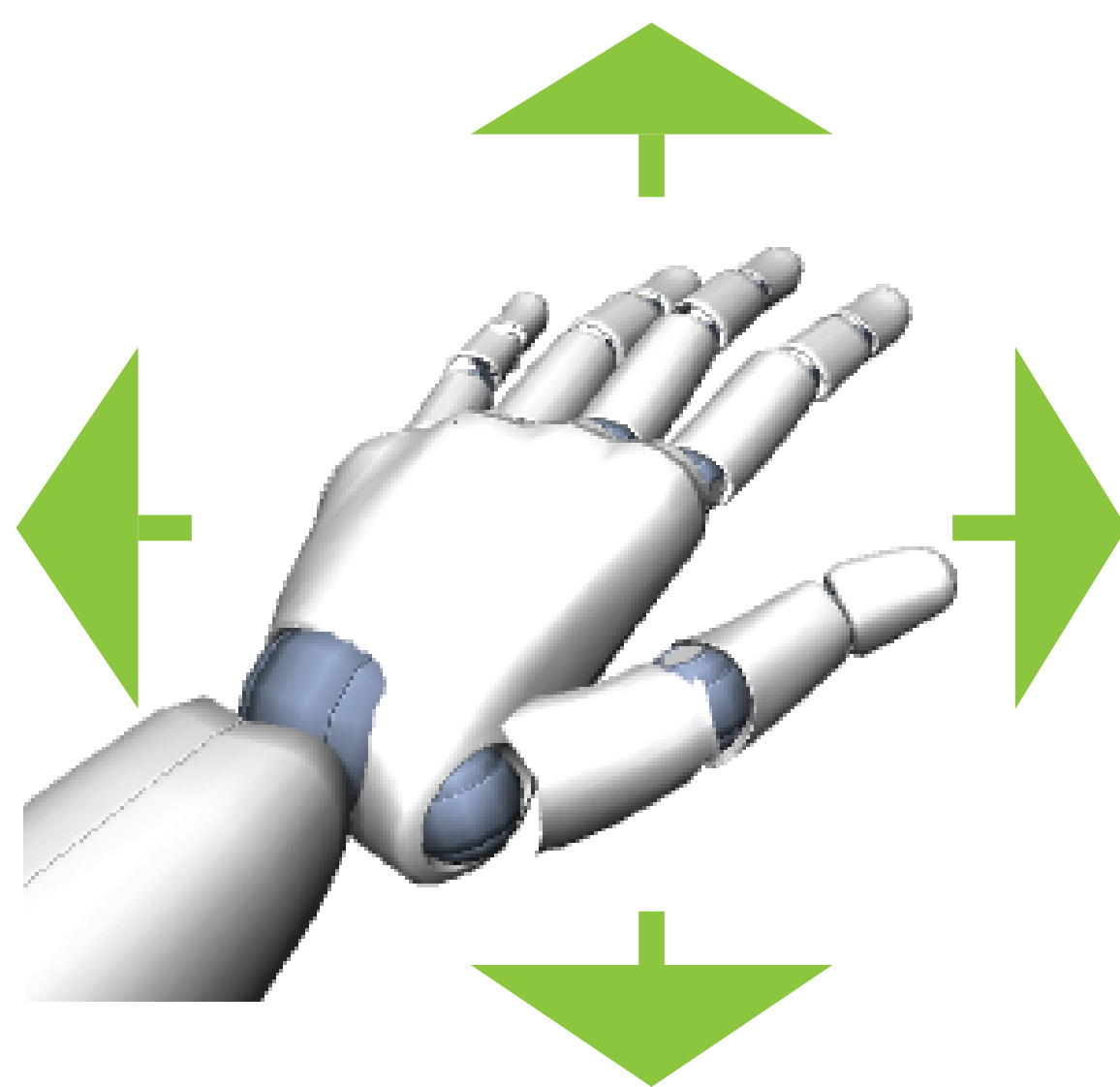
Instructor: Bruce Hemingway   TA: Johnson Goh

YoHand is a digital instrument using LeapMotion controller that can produce a wide range of sounds and musical progressions, all within a real-time performance context.
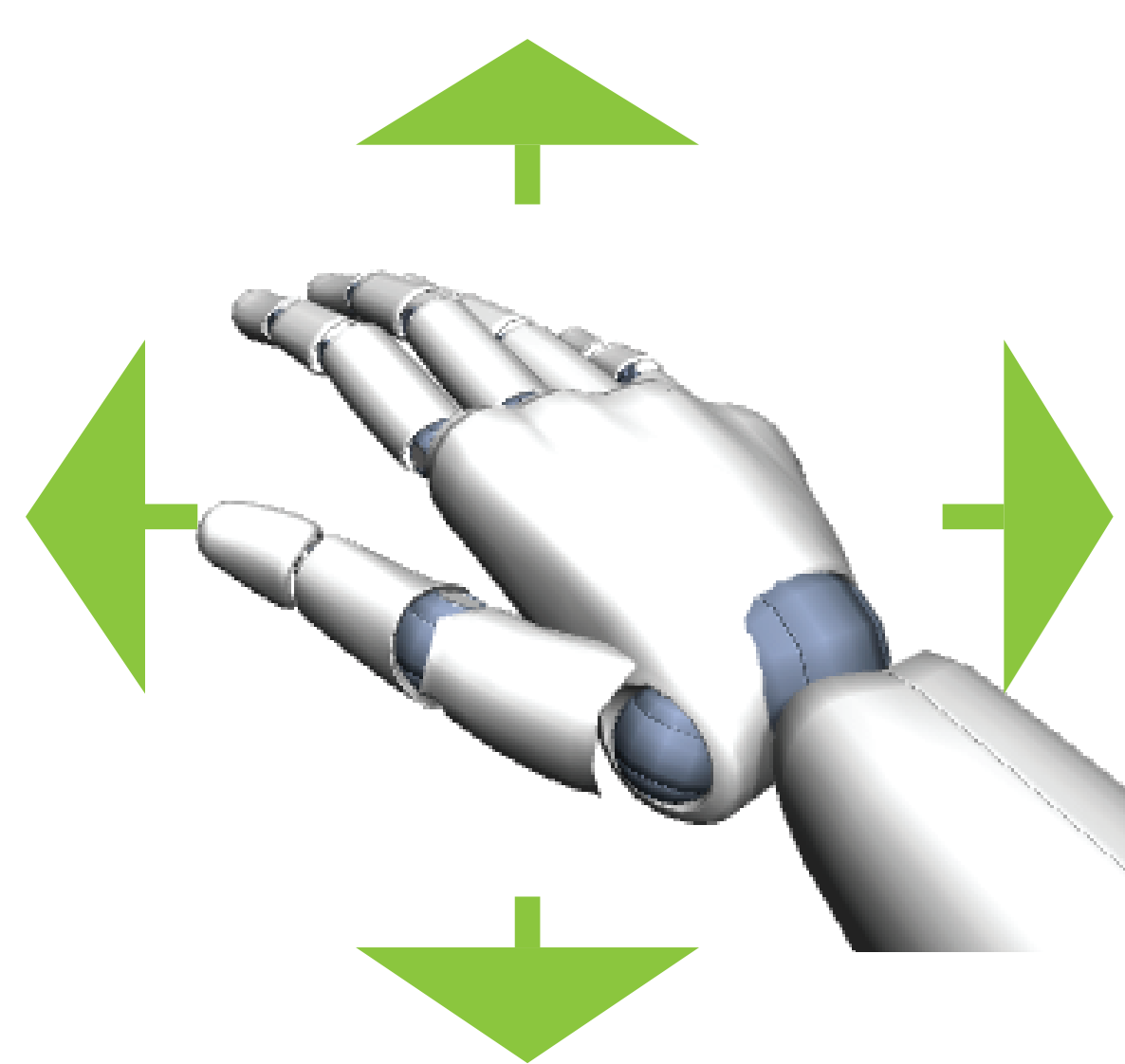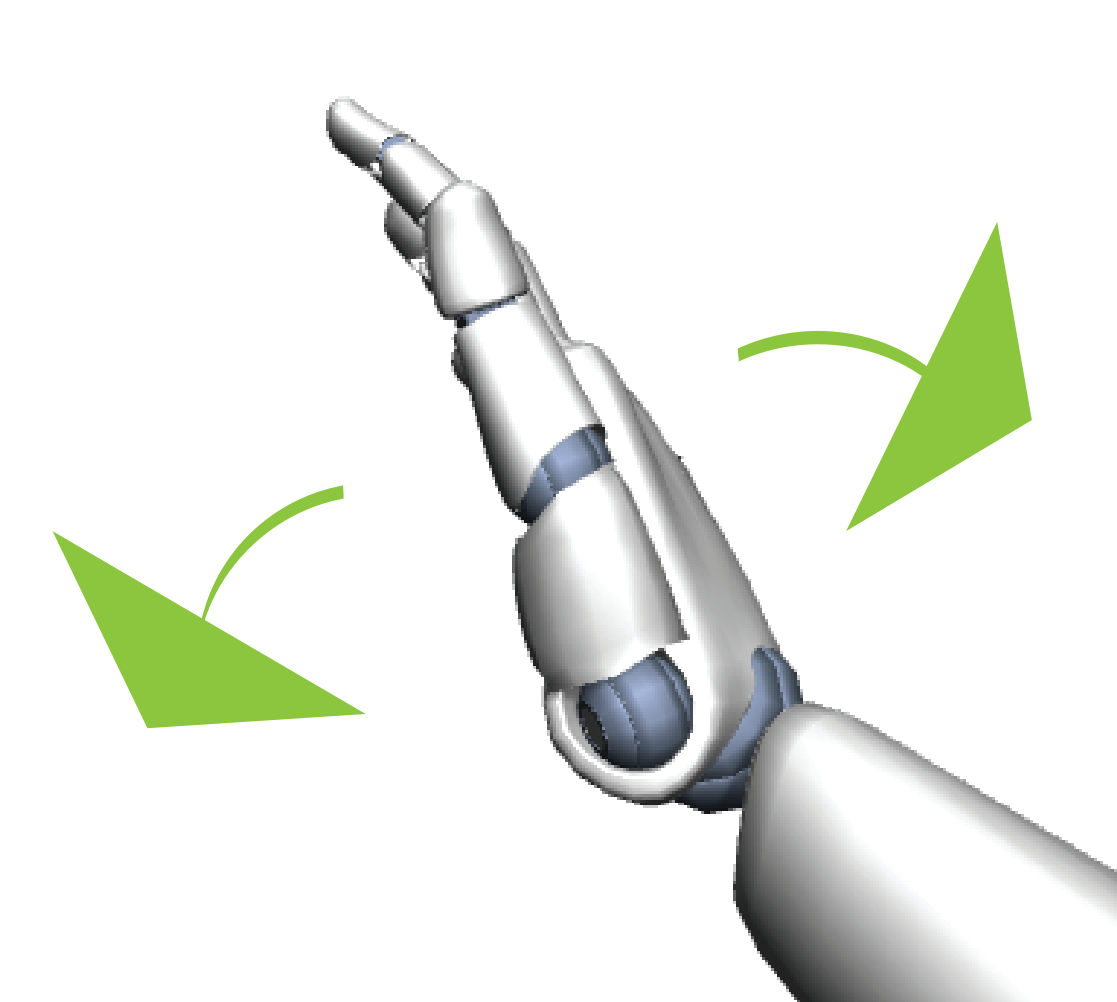

Select Instrument

Play Instrument

Control Pass Filter

Play with Effects

Controller

Leap motion is our main control, which it reads gestures as input and allows the user to play music and add effects real-time with their hands.

Audio Processing

PureData is used to build audio synth and effect patches, which music theory and waveforms were implemented.

Framework

The user interface was implemented with Qt framework which provides real-time graphic of tones, instruments, effects, and user's hands.
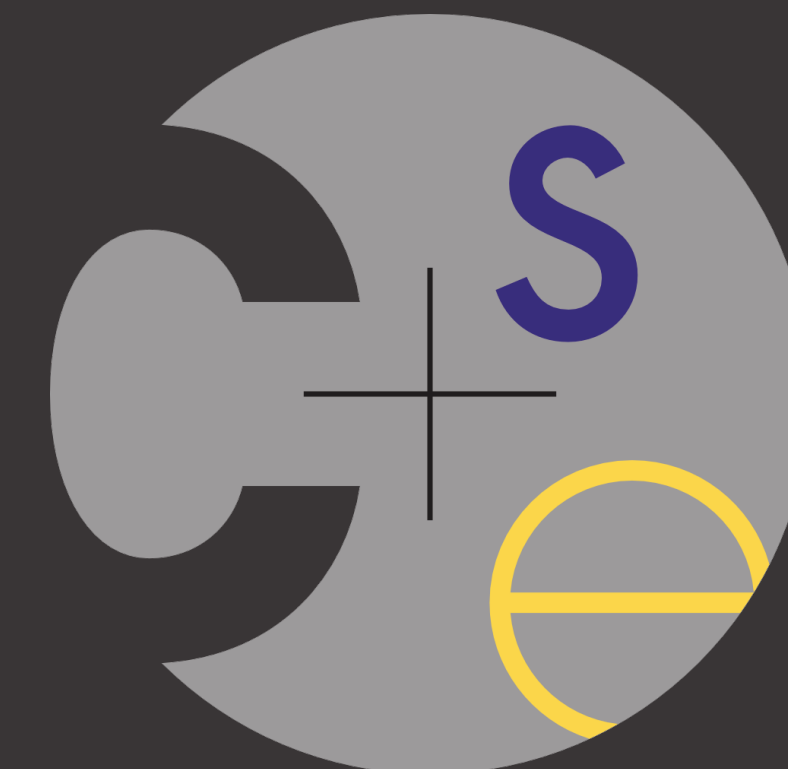
Your Hand

The most nature and intuitive way of input are to use your hands. Play music with your hands with YoHand.

YoHand Sebastian Bach

Instructor: Bruce Hemingway   TA: Johnson Goh

Rhythmic manipulation team

Nick Jones   Chad Price   Steven Dong

Audio effect manipulation team

Autumn Johnson   Dylan Swiggett   Jack Conger

Design Goal

Currently, there is no application provides an intuitive way to manipulate instrument and effect, they are either difficult to learn, difficult to manage, or provides limited functions. We aim to design an instrument which has low learning curve that experienced musicians could lively add effects and pass filters to their performance in the most intuitive way.

Features

· Chord playback (Left hand)
· Arpeggiation manipulation (Left hand)
· Band-pass filter (Right hand)
· Wah-Wah and reverb effect (Right hand)
· Increment/Decrement keys (Left hand)
· Support multiple instrument patches
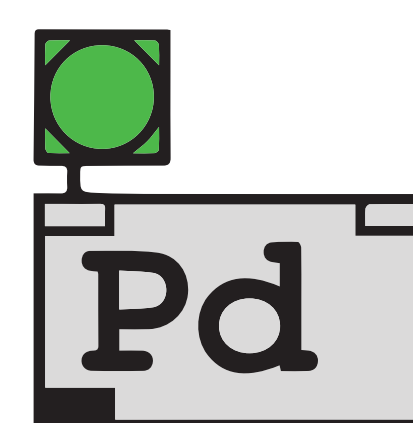· Visualized hand graphics, metronome, and keyboard
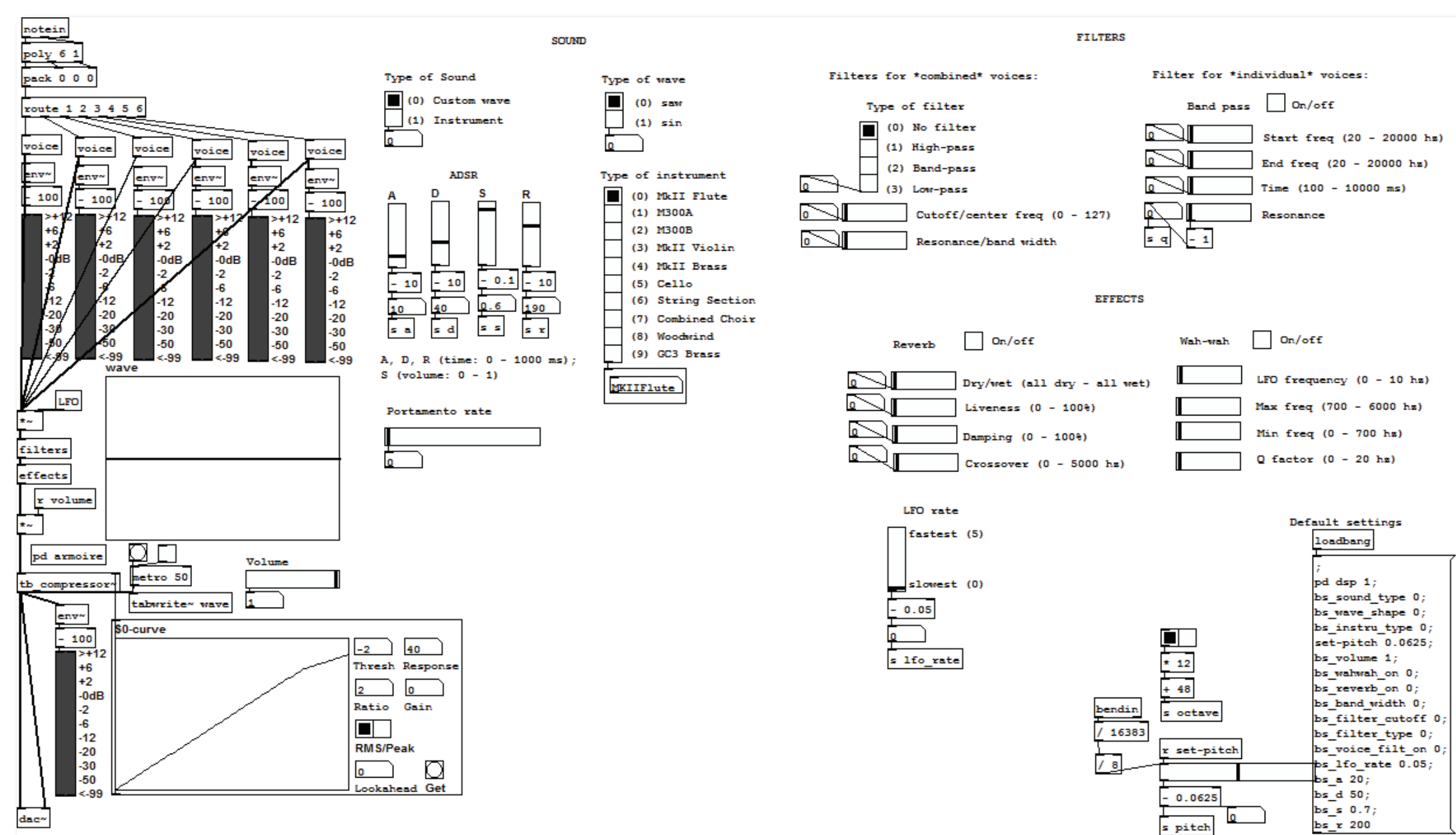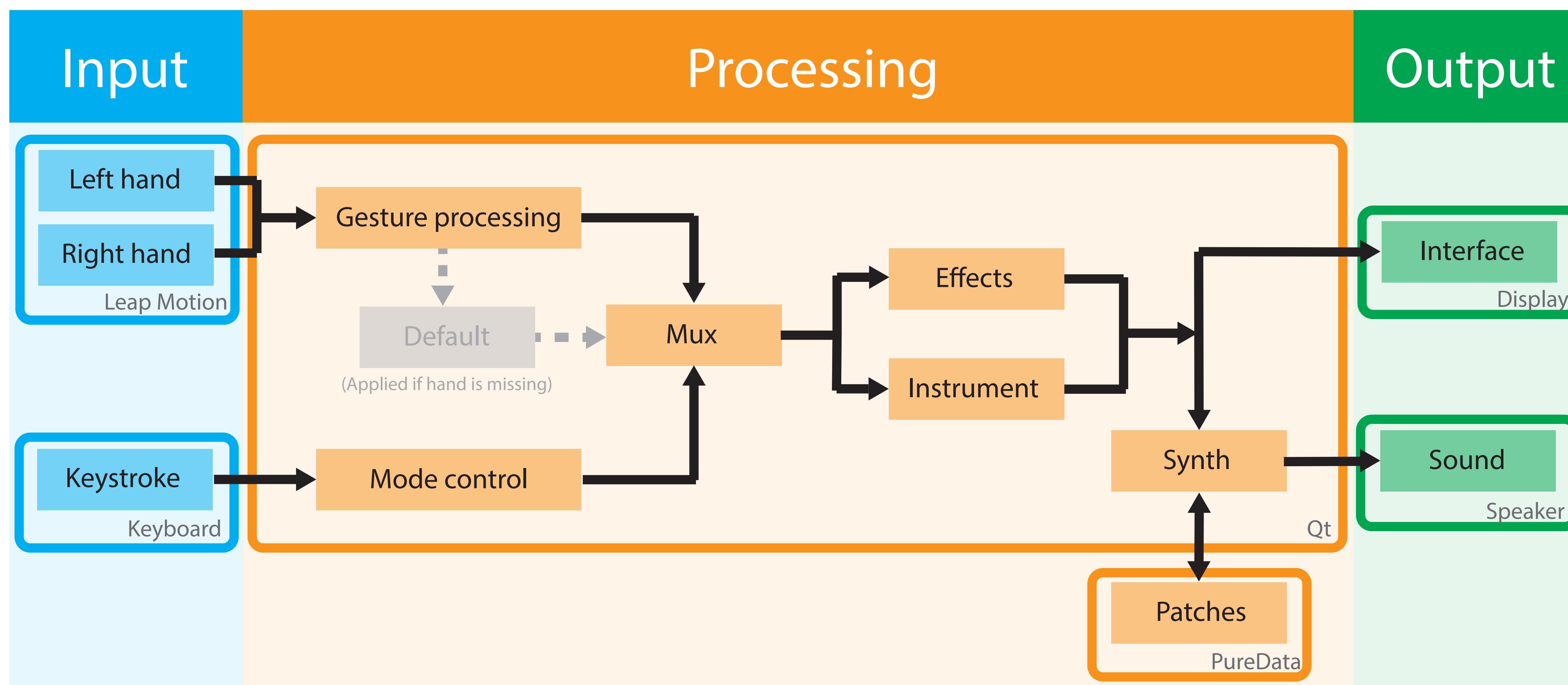
Design Strategy

Qt is the graphics library that eases the challenge of building complex and responsive visualizations.

Leap motion provides the most accurate hand-tracking solution compare to other camera-based tracking system.

PureData is a real-time graphical programming environment for audio processing which was used to create patches for out application.

Implementation

Input

Left hand
Right hand
Leap Motion

Keystroke
Keyboard

Processing

Gesture processing

Default
(Applied if hand is missing)

Mux

Mode control

Effects

Instrument

Synth

Patches
PureData

Qt

Output

Interface
Display

Sound
Speaker

PD file for polysynth and effects

Future work

· Add more instruments patches
· Refine current instrument and effect patches.
· Allows user to further modify effects and filters
· Provides record and replay functions
· Refine user interface, adding startup screen and setting windows