Carnegie Mellon University

Master Thesis Proposal

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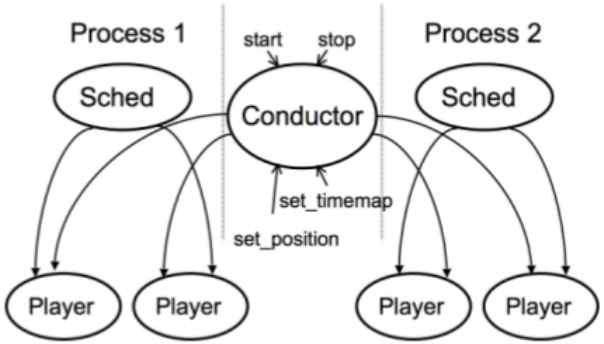

Figure: Architecture of HCMP

Human Computer Music Performance(HCMP) Project

- Conductor, Scheduler
- HCMP Player

Overview

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- Conductor, Schduler
- HCMP Player
  - Especially Tailor For HCMP
  - Standalone Mode
  - Connection Mode

Software Architecture

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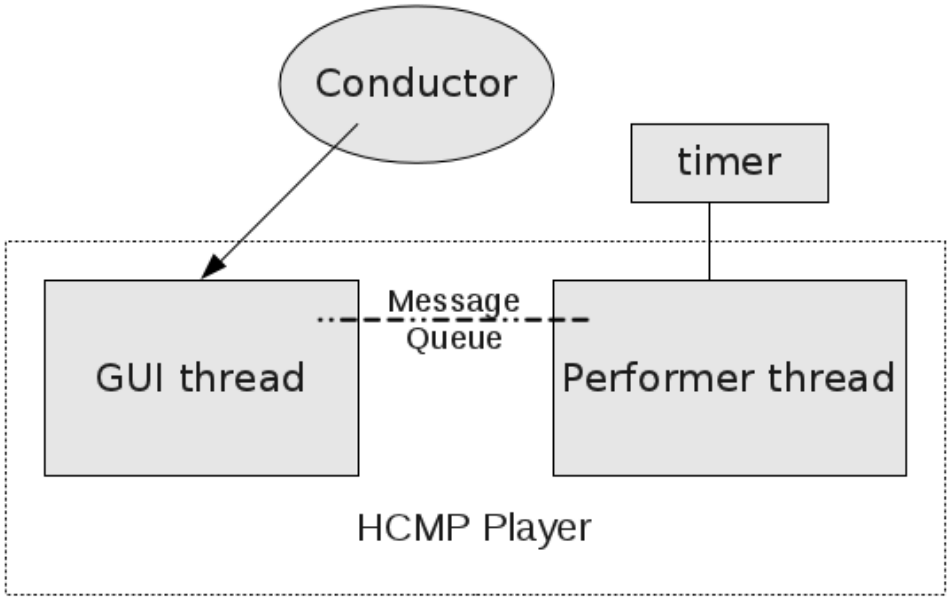

Figure: Architecture of HCMP

Control Thread Design

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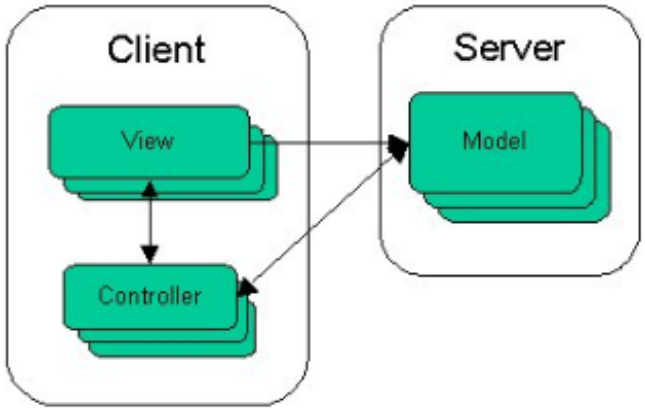

Figure: Fontend Design

GUI thread

- Classic client/server model
- Response to user action
- Update canvas based on backend response

Performer Thread Design

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Performer thread

- Communicate with GUI thread via message queue
- Execute predefine command from GUI thread
- Update canvas based on backend response
- Sample API

  - `play - play midi message`
  - `reset - reset all backend player's settings to default valuea`
  - `pause - store current play information`
  - `set_position - set play position to the given parameter`

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Network API Support

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- Fully support network control
- GUI thread will be a proxy for backend
- Sample API

  - `play_all` - indicate conductor to play
  - `stop_all` - indicate conductor to stop
  - `ready` - tell the conductor that the player is ready
  - `position` - indicate conductor to set to given position

Data Visualization

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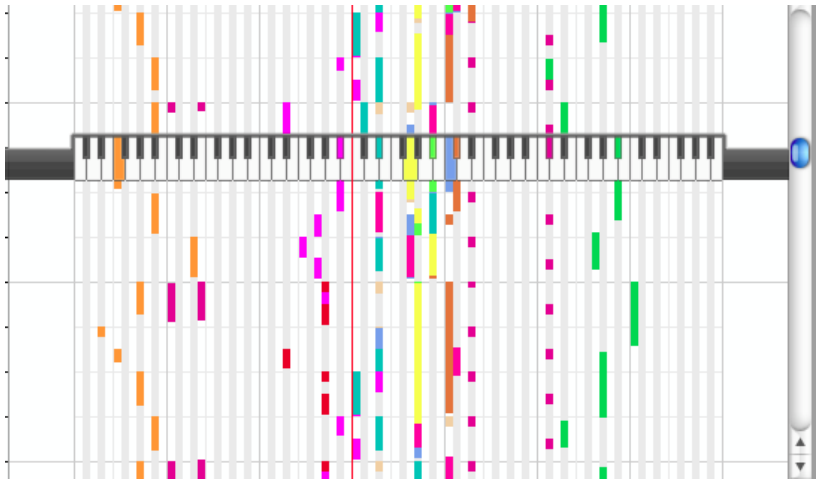

Figure: Midi data display integrated with virtual keyboard

- Map different track with color
- Map midi to note on keyboard
- a Intuitive visualization effect

A Midi Score Library

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Figure: HCMP player audio library

- a "Project" file to store user setting
- Manage all the user audio
- Support fetch midi from website

Implementation

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- wxWidget for GUI part
- Use Serpent for backend
  - Many buildin midi message function
  - Support multi-thread
  - Fully compatible with HCMP project

Future Works

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- Fully integrated with score display feature
- Integrate with Dawen Liang's previous work
  - music database function into user audio library

Summary

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- Robustness of code is first priority !
  - develop unit test for all the functional component
- a Engineering project
- a Live performance for the final defense