

Carnegie Mellon University

Master Thesis Proposal

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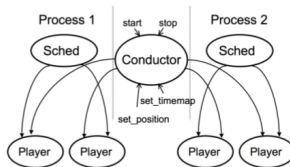


Figure: Architecture of HCMP

Human Computer Music Performance(HCMP) Project

- ▶ Conductor, Scheduler
- ▶ HCMP Player

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- ▶ Conductor, Scheduler
- ▶ HCMP Player
 - ▶ Especially Tailor For HCMP
 - ▶ Standalone Mode
 - ▶ Connection Mode

Software Architecture

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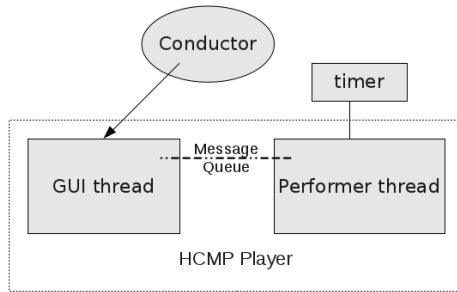


Figure: Architecture of HCMP

Control Thread Design

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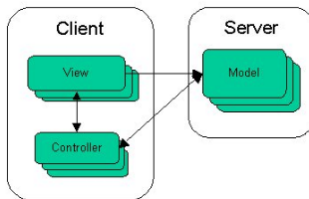


Figure: Frontend Design

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 predefined 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 value
 - pause - store current play information
 - set_position - set play position to the given parameter

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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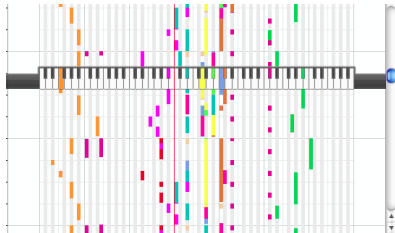


Figure: Midi data display integrated with virtual keyboard

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

A Midi Score Library

Overview

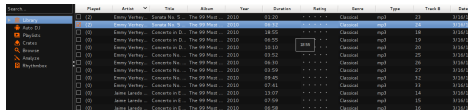
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The screenshot shows a web-based audio library interface. On the left is a sidebar with navigation links: Home, Audio DJ, Playlists, Charts, Browse, and Analytics. The main area displays a table of audio tracks. The table has columns for checkboxes, ID, Artist, Title, Album, Year, Duration, Rating, Genre, Type, Track #, and Date. The data rows list various classical music tracks by Enya Verhey, including 'Sonata No. 5', 'Concerto in D', and 'Concerto No. 1'.

	ID	Artist	Title	Album	Year	Duration	Rating	Genre	Type	Track #	Date
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Sonata No. 5	The 99 Must	2010	01:20	★★★★★	Classical	mp3	23	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Sonata No. 5	The 99 Must	2010	01:20	★★★★★	Classical	mp3	24	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto in D	The 99 Must	2010	04:55	★★★★★	Classical	mp3	18	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto in D	The 99 Must	2010	04:55	★★★★★	Classical	mp3	19	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto in D	The 99 Must	2010	04:55	★★★★★	Classical	mp3	20	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto No. 1	The 99 Must	2010	03:52	★★★★★	Classical	mp3	25	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto No. 1	The 99 Must	2010	04:30	★★★★★	Classical	mp3	26	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto No. 1	The 99 Must	2010	03:59	★★★★★	Classical	mp3	27	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto No. 1	The 99 Must	2010	04:40	★★★★★	Classical	mp3	32	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto No. 1	The 99 Must	2010	07:41	★★★★★	Classical	mp3	33	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto in D	The 99 Must	2010	13:07	★★★★★	Classical	mp3	14	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto in D	The 99 Must	2010	07:58	★★★★★	Classical	mp3	15	3/18/12
<input checked="" type="checkbox"/>	(0)	Enya Verhey	Concerto in D	The 99 Must	2010	04:58	★★★★★	Classical	mp3	16	3/18/12

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 builtin 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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Summary

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