A Flexible Tool for the Visualization and Manipulation of Musical Mapping Networks

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Abstract

This report describes the use of LaTeX to format a thesis. A number of topics are covered: content and organization of the thesis, LaTeX macros for controlling the thesis layout, formatting mathematical expressions, generating bibliographic references, importing figures and graphs, generating graphs in MATLAB, and formatting tables. The LaTeX macros used to format a thesis (and this document) are described.

Acknowledgments

Acknowledge this, asshole.

Preface

There are some things I should probably pre-face, certainly not reface.

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various graphs of response time (discussion) screenshot of drawing screenshot of saving/loading screenshot of main view screenshot of grid view

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List of Acronyms

IDMIL	Input Devices for Musical Interaction Laboratory
MVC	Model View Controller
DMI	Digital Musical Instrument
OSC	Open Sound Control
GUI	Graphical User Interface

Chapter 1

Introduction & Motivation

1.1 Context and Motivation

1.2 Project Overview

1.3 Thesis Overview

1.4 Contributions

Chapter 2

Background

2.1 Mapping

2.2 Interface Design

2.2.1 MVC

2.3 Visual Design

2.4 All my citations

2.4.1 Mapping

1. GDIF: (Jensenius et al. 2006)
2. disembodied performance
3. Wanderley's mapping paper (Hunt et al. 2000)
4. MPG Care Package (Wolek 2010)
5. Jamoma (Place and Lossius 2006)
6. Braun: view OSC data flows (Bullock 2008)
7. surely some other stuff from class

2.4.2 Data Visualization

1. Allosphere? :(Höllerer et al. 2007)
2. Heirarchical edge bundling: (Holten 2006)
3. Tukey: (Tuckey 1965)
4. Envisioning information: (Tufte 2006)
5. Beautiful Evidence: (Tufte 1990)
6. The other Tufte book I have at home.
7. OSC data flows with Braun (Bullock 2008)

2.4.3 User Centered Design

1. Organizational context (Kling 1977)
2. Usability testing (Corry et al. 1997)
3. Information professionals (Schulze 2001)

2.4.4 User Interfaces

1. Inclusive interconnections (Booth 2010)
2. Integra (Bullock et al. 2011)
3. Junxion (STEIM 2004)
4. Sense Stage (Baalman et al. 2010)
5. Patchage: a linking, dragging, connecting interface (Robillard 2011)
6. Osculator: mapping OSC stuff (Wildora 2012)
7. Eaganmatrix: GRID VIEW! (HakenAudio 2013)

MVC

1. MVC Krasner Pope (Krasner and Pope 1988)

2.4.5 Libmapper

1. OSC: (Wright and Freed 1997)
2. Vizmapper (Rudraraju 2011)
3. joe's libmapper paper: (Malloch et al. 2008)
4. joe's other paper? (earlier), his master's thesis

Chapter 3

Design & Implementation

Development of a graphical user interface for libmapper creates a unique challenge. Obviously such an interface is a practical tool, and should function as such, yet it also must work in concert with DMIs which are inherently designed for abstract and creative use. For the purposes of this project, the assumed solution to this innate paradox is to provide the user with multiple independent modes of control. This assumption was made based on experiences with prior user interfaces for libmapper (vizmapper, max mapperGUI): for each interface users reported excellent functionality for certain use cases, and poor functionality for others. Libmapper itself is an extremely flexible API that makes few assumptions as to the network of devices and signals, nor how they are being mapped. It is fitting that a GUI for libmapper would be equally as flexible. In lieu of a single perfect solution for network visualization an interactivity, providing users with various independent solutions provided a good compromise.

3.1 User Centric Design

use cases

3.2 Development of a "Modular" Interface

3.3 The Model-View-Controller

Because a modular design is desired, the Model-View-Controller (MVC) metaphor for structuring software applications as described in [KrasnerPope88] was used as a general framework for structuring the application. In fact, the whole scale swapping in and out of independent visual modes can be thought of as a quintessential implementation of MVC.

3.3.1 The Model

The model consists of an abstract copy of the network, residing on the local machine. Independent views can consult this data, but cannot directly modify it.

3.3.2 Controller-View Pairs

3.4 Graphical Design

wiggly arrows

3.4.1 Typography

3.5 Robustness and Responsiveness

speed tests

Chapter 4

Results & Discussion

4.1 Undoing and Redoing in a Collaborative Distributed Environment

4.2 Edge Use Cases

4.3 User Feedback

4.4 Modular vs Hard-Coded

4.4.1 Was the approach successful?

Are sections graphically unified? (Is this even necessary?)

4.5 Visualization vs Interaction

4.6 Different namespaces

Chapter 5

Conclusions & Future Work

5.1 Summary and Conclusions

5.2 Future Work

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