A Study on Designing Projection Mapping Tools to Support Content Creators

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Summary of Dissertation

The goal of this research work is to propose tools which support content creators to achieve new forms of expressions using projection mapping techniques.

In chapter 1, goal and background are introduced. Projection mapping is currently trending as novel interface, and, empowered by open source community added to the access of new methods of distribution via online repositories and digital fabrication, users can have the chance to build tools and devices by themselves. Projection mapping techniques are available online, scattered on the internet, in forums or inside custom libraries. But in order to manipulate and create contents on top of this existing base, it is still necessary for users to bear enough programming skills and deal with complex development environments. Ready made tools are limited. This research aims efforts in compiling information necessary to produce affordable dynamic projection mapping through creative coding. A way of programming which can be feasible for beginners but also valuable for experienced users focusing on experimentation and tinkering.

Chapter 2 dedicates its pages to highlight the importance of supporting tools and how these objects have been augmenting its users' capabilities in many different fields. This chapter also introduces concepts behind the design framework such as immediacy and subversion, among others. These concepts were used as base to develop the tools presented on the next chapters.

Chapter 3 presents an original tool developed for this research is proposed: a game console designed to interact with dynamic projection mapping. Along with the project development and explanation of hardware and software, new techniques aimed to create interesting spatial augmented reality is present, including an authoring tool which allows users to map custom surfaces to play as game level. This tool includes a multi-layered projection mapping algorithms which allows game contents to be more accurately displayed on surfaces according with its inner functions. Subjects who have been introduced to this project demonstration have reported the console can contribute with new game plays mainly because of its customizing characteristics.

Chapter 4 presents a second original tool: a diy laser projection array system. Hardware and software is explained, and an interface made of alternative materials was introduced as example of how to prepare surfaces to be used with this projection system.

Furthermore, by following building instructions designed for this project, users attempt to assemble a laser projector module used in the system. Users were able to complete the task although some were partially assisted.

In chapter 5, this study evaluates some of the designed tools with the help of a performer artist. Projection mapping custom library developed as base for all the projects in this research was used to produce a combination with dance and illumination. A compilation of our experiments were formatted to video and submitted to an Art contents, resulting in acceptance as original form of expression.

Chapter 6, discusses about overall results evaluated in each individual chapter, including its limitations.

Chapter 7 presents conclusions and future works, also considering each individual project details. This work concludes that although it was possible to present projection mapping tools which are capable to support content creators to achieve and explore new forms of expressions, there is still many improvements to be done on each project, in order to facilitate the building and using experience for users.