Masterarbeit

Titel: **Redesign, Entwicklung und Nutzung Analyse eines Eingabesystems für Hyperbraille Taktile Anzeige**

Title: **Redesign, Development and Usage Analysis of an Input System for Hyperbraille Tactile display**

Details:

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Objective :

- Analysing the existing working of Hyperbraille and integration of a new Hardware to its framework.
- Comparing the functioning and feasibility of Smart pen and a 9 axes sensor with respect to position and gesture recognition on the Hyperbraille.
- Incorporating the functions of existing buttons in the Hyperbraille like Pan, Zoom and select functionality in the selected input device.
- Incremental development of the existing framework for interaction of the input device with Hyperbraille.
- Analysis of the effectiveness of new setup in exploring navigation systems for Visually challenged users.

Description:

Running Graphical applications on refreshable pin matrix tactile display is an established concepts and there are many products like Hyperbraille (1). Its input controls includes normally a scroll bar, joysticks or cursor keys for scrolling purposes and function buttons for special purpose. However the displays are predominantly the size of an A4 sheet or smaller, hence its usage should be similar to tablets rather than that of a computer.

The aim of this thesis is to develop an low cost and portable input control technique similar to that of a normal touch screen, i.e. input control at a particular point on the Hyperbraille. The closest techniques currently available are a keyboards or a touch screen on the side of the display, which are very efficient (2) but do not provide the same feel of a touch display which is more intuitive to use. The closest available technique is the finger mouse and its user review has not been encouraging because it hinders the user from feeling the tactile display (2). This project aims to

develop a technique without the disadvantages.

The input controls used in any tablets are with a finger or a touch pen. This project aims to use a 9-axes sensor or smart pen after comparing their feasibility with respect to position and gesture recognition for basic GUI functions.

Next part of the project will be to include this new hardware with the existing Hyperbraille which will include incremental development of its current framework to include the new input controls (3). This need to be developed without adding any additional redundancy to the setup.

Since this input control technique will concentrate on normal input purposes and not text inputs, its effectiveness will be checked by exploring a map by visually impaired users. There are many methodologies implemented for display and reading of tactile maps like (4). This project focuses on study of the implemented input control for navigation purposes, since reading the maps on tactile display and performing operations (zoom, pan, select..) using input controls in a different area is cumbersome and slow. This project aims to improve the efficiency and time needed to explore a new map. The evaluation is planned by comparing user performance and review in using the current input controls and the planned input control.

As an additional task, we hope to use this input control in printed tactile maps for visually impaired users. The current techniques includes need of a Smartphone or a tablet to overlay the printed map (5) (6) and read its data. In this project, the aim is to examine the possibility of interacting with these printed maps using the developed input control without usage of Smartphone touch or camera interface to increase location awareness by connecting the input control with the stored map data in a smart phone or a portable server (raspberry-pi in this case).

Bibliography

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