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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Primary Objective :

- Analysing the existing working of Hyperbraille and integration of a new Hardware to its framework.
- Comparing the functioning and feasibility of IR camera, 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.
- Conducting a study to verify if the proposed technique offers improvement to the existing Hyperbraille setup.

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 a 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 main aim of the thesis is to analyse the efficiency of said input control wrt to the existing Hyperbraille setup. Hence this thesis is proposed to be performed in 4 stages:

- Hardware Selection
- Pre-implementation study
- Integration of hardware to Hyperbraille framework
- Final study to analyse its efficiency

Hardware Selection: The criteria is to use a high efficient setup rather than a portable low efficient setup, hence IR camera setup or smart pen will be used after comparing their feasibility with respect to position resolution and gesture recognition for basic GUI functions.

Pre-implementation Study: This will be a simulated test. Earlier tests have been conducted to compare various input techniques for Hyperbraille display (2). The aim here is to compare the existing Hyperbraille input controls with a simulated proposed input control.

Integration of hardware to Hyperbraille framework: In the existing framework, the button classes or signals will be replaced by the output of selected Hardware gesture. Since only basic gestures for page navigations are considered, no new gestures need to be defined, and existing algorithms can be used to solve the gesture data. This need to be developed without adding any additional redundancy to the setup.

Final study: A final study will be designed and conducted on the proposed input control technique and its performance will be compared with that of existing Hyperbraille.

Since this input control technique's effectiveness will be checked by exploring a map rendered with existing software. There are many methodologies implemented for display and reading of tactile maps like (4). 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.

Bibliography

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