DESIGN OF ARTIFICIAL INTELLIGENCE-BASED ELECTRONIC MALAY LANGUAGE LEARNING TOOL FOR VISUALLY IMPAIRED CHILDREN

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By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirement for the Degree of Master Science

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December 2011

Chairman: Professor Ishak bin Aris, PhD
Faculty: Engineering

For many years, the application of assistive technologies for the disabled has been given little attention, despite the undoubted need for more. Disable people especially for those who are blind, always face a lot of difficulties in their learning process. Personal teachers have to guide them patiently with the aid of limited learning devices. The advancement of technology in twenty-first century should provide more design of great learning devices. However in developing countries like Malaysia, there are limited locally made assistive devices to suit the language used and the local culture. There are more than 20,000 people who are categorized under vision disability in Malaysia. The percentage of visually impaired people who master Malay language, as the national language in Malaysia, is low.

The main purpose for this research is to develop a Malay language learning tool for blind children. This research work involves the implementation of Hamming Distance
Technique (HDT) and simple Genetic Algorithm (GA) in spell checking and word suggestion mechanism. Besides spell checking, this system has a complete, step by step learning method with audio output. The learning contents are built using MATLAB. Moreover, it is linked with a tactile feedback module that is built using C language and microcontroller, to provide Braille display functionality. Also, this research involves developing a database for 10,000 Malay root words. This number of words is more than enough for kindergarten level. The simulation results indicate that the algorithm is able to suggest a word, based on the design settings. It depends on the size of word. The longest word, which is 6 ALP, has the slowest word suggestion time, at around 10 seconds for the worst case scenario. The feedback from two surveys is positive with 100% satisfaction on the overall performance of the prototype.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

REKA CIPTA ALAT ELEKTRONIK PINTAR DALAM PEMBELAJARAN BAHASA MELAYU UNTUK KANAK-KANAK BERMASALAH PENGLIHATAN

Oleh

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I certify that a Thesis Examination Committee has met on 28 December 2011 to conduct the final examination of Yeoh Sing Hsia on his (or her) thesis entitled "Design of Artificial Intelligence-based Electronic Malay Language Learning Tool for Visually Impaired Children" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Degree of Master Science.

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or other institutions.

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Date: 28 December 2011
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