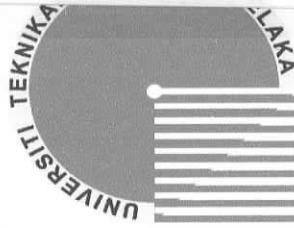


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Jawi characters DOT matrix LED sliding text displayer /
Muhammad Firdaus Mustapa.



UNIVERSITI TEKNIKAL MALAYSIA MELAKA
FACULTY OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT REPORT 2

**JAWI CHARACTERS DOT MATRIX LED SLIDING TEXT
DISPLAYER**

PREPARED BY:

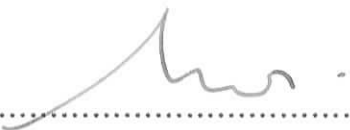
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: Prof. Madya Dr. Ismadi Bin Bugis

Date

: 22th April 2010

**JAWI CHARACTERS DOT MATRIX LED SLIDING TEXT
DISPLAYER**

MUHAMMAD FIRDAUS BIN MUSTAPA

**This Report is submitted in Partial Fulfillment of Requirements for the Degree of
Bachelor in Mechatronic Engineering**

**FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

22th APRIL 2010

“I hereby declared that this report entitle “Jawi Characters Dot Matrix Led Sliding Text Displayer” is a result of my own work except for the excerpts that have been cited clearly in the references.”

Signature :*Firdaus*.....

Name : Muhammad Firdaus Bin Mustapa

Date : 22th April 2010

ACKNOWLEDGEMENT

Final year project is one of the many important subjects to be covered by any engineering students. It is essential as for student doing this project by their own with guided by supervisor. This final year project consists by two sections, which are Final Year Project 1 and Final Year Project 2.

I was lucky enough to be selected to do my final year project with guidance by Prof. Madya Dr. Ismadi Bin Bugis as my project supervisor. Alhamdulillah, I was finished my final year project 2 within the due date required. This kind of project has given the precious opportunity and exposure to me and other undergraduates to involve intensively or extensively to the greater challenges that will be faced in future after graduating from university.

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Finally, thanks to all that had lent a hand and those directly or indirectly helped me in solving problems and finished this report as well. Through all the assistance provided, enable to complete the Final Year Project 2 successfully without obstacles.

Abstract

Nowadays, we have been mesmerized by the latest technology that scattered in front of our eyes. Some of the technologies can significantly change our life culture. One of the major problems facing us in Malaysia is new generation being less aware about one of the very important our heritage in Jawi writings. 'Jawi' Characters DOT MATRIX LED Sliding Text Displayer is the project that can increase the awareness of the writing among the people. This LED DOT MATRIX is located at the student center or in another strategic location, so it can display information to student in Jawi types of writings. This project is using inputs are from (GUI) keyboard. After that, this input will be displayed on LED DOT MATRIX as an output. The different between this LED DOT MATRIX compare to the other products is this project can display Jawi writing. From this project it will improve and will rank up Jawi writing to society.

Abstrak

Dewasa kini, kita telah dikejutkan dengan pelbagai teknologi terkini yang bertaburan di depan mata kita. Diantara teknologi-teknologi baru ini ternyata sekali ia dapat mengubah budaya hidup kita. Satu daripada masalah utama yang dihadapi kita di Malaysia kepada generasi muda adalah kekurangan kesedaran berhubung satu daripada masalah utama mengenai warisan kita iaitu penulisan Jawi. “Jawi Characters Dot Matrix LED Sliding Text Displayer” adalah projek yang dicipta untuk meningkatkan kesedaran kepada penulisan Jawi dikalangan masyarakat. Projek LED DOT MATRIX ini boleh diletakkan pada pusat tumpuan pelajar atau ditempatkan yang strategik, ia berperanan untuk memaparkan maklumat kepada pelajar dalam jenis tulisan tulisan Jawi. Projek ini akan menggunakan input masukan (GUI) papan kekunci. Kemudian, input ini akan dipamerkan di atas LED DOT MATRIX sebagai pengeluarannya. Perbezaan di antara LED DOT MATRIX ini berbandingan produk lain itu adalah projek ini boleh memaparkan tulisan Jawi. Kehadiran projek ini diharapkan ia akan dapat meningkatkan dan akan meningkatkan martabat tulisan Jawi kepada masyarakat.

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LIST OF ABBREVIATIONS

GUI	-	Graphical User Interface
LED	-	Light Emitting Diode
USART	-	Universal Asynchronous Receiver/Transmitter
FYP	-	Final Year Project
PWM	-	Pulse Width Modulation

CHAPTER 1

INTRODUCTION

This chapter will explain the overall description of Jawi Characters Dot Matrix LED Sliding Text Displayer system such as the project background, project objective, project scope, project methodology and expected result for the project. Furthermore, this section also will explain all the step involves from the beginning until the project is completed.

1.1 Project Background

This project title is “Jawi Characters Dot Matrix LED Sliding Text Displayer”. It consists of microcontroller, dot matrix LED block, LED drivers, serial port (USART), guide user interface (GUI) and power supply. The controller provides all refresh cycles and logic operation.

This project is about to display a system which consists of a controller, a memory unit and a display unit. This project has 2 rows x 8 columns of LEDs dot matrix block. LEDs dot matrix block contains of 8 x 8 LED modules and this LED will light only the red colour. The multiplexing circuit is used to reduce the power consumption of the whole LED display. The multiplexing unit contains the necessary decoders, demultiplexers and counter to perform multiplexing operation. The controller unit is based on a standard microcontroller with its internal EPROM and RAM to store data and control program.

The project is used to display useful information in Jawi writing, such as messages and graphical signs. The proposed of this project is to widening the process of learning Jawi writing to be more effective way. The output will display Jawi writing, which is sliding from right to left at the LED block dot matrix.

1.2 Problem Statement

Jawi is a script which is derived from Arabic alphabets and adopted for the use of Malay language writing. Malay language has been recognized as a lingua franca in South East Asia since the 15th century [1]. Malay is spoken by more than 300 million people in Malaysia, southern Thailand, Singapore, Brunei, Philippine and southern Myanmar. There are an estimated of 15,000 known Jawi manuscripts kept in libraries and museums around the world [2]. However, most of the time, they are ignored. Hence, this project will make this writing been rank up again.

Next problem, Spreading information problem and latency of information often occur to student. Because of this problem, students face big trouble to get any information from university. Normally, information will be paste at information corner in the building which always is the student center. Missing and damage information papers that being paste give student a huge impact by not receiving any information from university Besides, Malacca is one of the heritage city so this historical writing also might not been forgotten

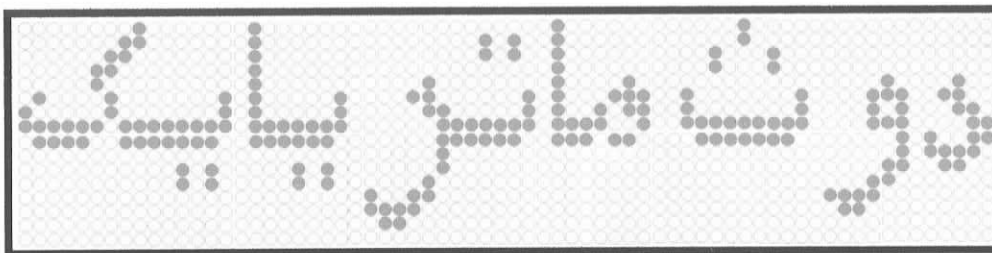


Figure 1.1: The Illustration of the Problem Statement

1.3 Project Objectives

The main objective of this project is to develop Jawi Characters Dot Matrix LED Sliding Text Displayer system to display the data, message or information in Jawi type characters.

In order to achieve the objective, there are specific objectives of this project:

- To identify the components
- To develop Jawi characters library
- To design software and simulate
- To design hardware
- To design graphic user interface
- To analyze output and improve design

1.4 Scope

The scope of the project is to develop Jawi Characters Dot Matrix LED Sliding Text Displayer system. Developing the library, to store the Jawi characters. Then, the graphical user interface (GUI) will be developed as the input of the system.

Before designing and developing the display module, the characters of dot matrix LED have to be identified. By the characteristics of a dot matrix LED driver can be designed as the interface to the microcontroller. In this process low cost budget need to be considered.

In general, the project is to program software using PIC18F452 and hardware for developing Jawi Characters Dot Matrix LED Sliding Text Displayer system.

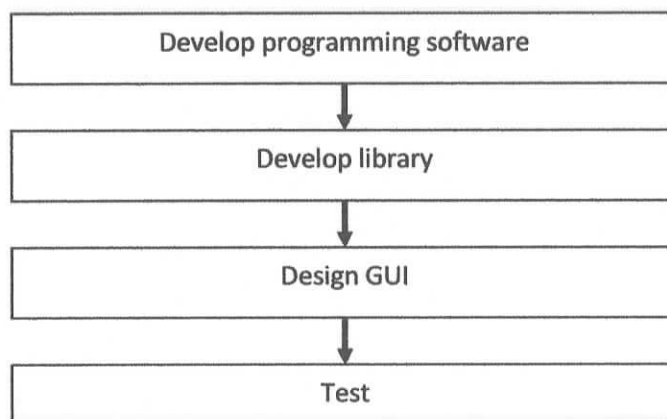


Figure 1.2: Block diagram for the scope of the project

CHAPTER 2

LITERATURE REVIEW

In this chapter, it will take several previous research projects that related to this project. It can bring this project up to date with current literature on this title project. A logical flow of ideas; current and relevant references with consistent, appropriate referencing style, proper use of terminology; and an unbiased and comprehensive view of the previous research will forms the basic or as the reference to the project.

2.1 <http://ejawi.net/v3/> (Jawi Script Learning Tool System)

This is one of my literature reviews, Ejawi was created to enhance the usage of Jawi writing and presenting it to the world about Malay culture as world heritage / Nusantara through internet. [3]

There are four main functions in this Ejawi. One of the functions of Ejawi is as a transliteration engine for Rumi to Jawi writing.

This application functions as a transliteration engine which can translate from Roman to Jawi writing and writing Jawi to Roman. By using this method new words or writing, now can be converted precisely like for example Roman to Jawi or Jawi to Roman [4]



Figure 2.1: Example of Ejawi translation engine

Second function of this Ejawi is as a tutorial. Tutorial is new segment specialized on those who want to study about Jawi writing. Through this application, it will show the correct method on connecting Jawi letters. Tutorial also functions to show the user about connection of Jawi writing one by one completely.

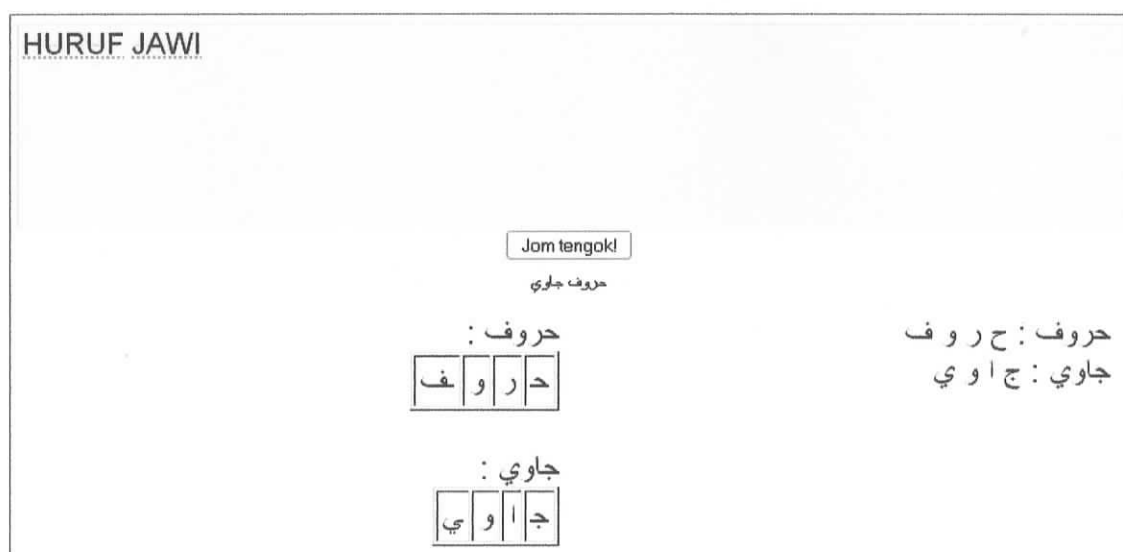


Figure 2.2: Example of Ejawi Tutorial

Next function of this Ejawi is as a website translator. This website translator function is converting whatever website in Malay language (Roman) to Jawi writing fully. The address URL must be keyed in and this application will convert the writing from the website without changing the design of that website.

Finally, this Ejawi also function as a Jawi spelling checker. The function of Jawi spelling checker is to detect words which are considered wrong and makes correction of that particular word.



Figure 2.3: Example of Ejawi Jawi spelling checker

From this Jawi Script Learning Tool System it gives a lot of information and ideas about Jawi writing. In other hand, it is also helping to develop a Jawi characters library of my project.

2.2 Handwritten Cursive Jawi Character Recognition: A Survey

This article is the effort of Mohammad Faizul Nasrudin, Khairuddin Omar, Mohamad Shanudin Zakaria, and Liong Choong Yeun from Center for Artificial Intelligence Technology (CAIT) at Faculty of Information Sciences and Technology National University of Malaysia, 2008. From this article, they provide a comprehensive review of existing works in handwritten Jawi character recognition. It includes the history and writing of Jawi, and challenges of Jawi. [5]

The Jawi alphabet contains 35 basic characters which 28 of them are similar to the Arabic alphabet as shown in Table 2.0.

Name	Letter	Isolated	Start	Middle	End
alif	ا	ا			ا
ba	ب	ب	ب	ب	ب
ta	ت	ت	ت	ت	ت
tsha	ث	ث	ث	ث	ث
jim	ج	ج	ج	ج	ج
hha	ح	ح	ح	ح	ح
kha	خ	خ	خ	خ	خ
Dal	د	د			د
dzal	ذ	ذ			ذ
ra	ر	ر			ر
zai	ز	ز			ز
sin	س	س	س	س	س
syin	ش	ش	ش	ش	ش
shad	ص	ص	ص	ص	ص
dhad	ض	ض	ض	ض	ض
tho	ط	ط	ط	ط	ط
zho	ظ	ظ	ظ	ظ	ظ
ain	ع	ع	ع	ع	ع
ghain	غ	غ	غ	غ	غ
fa	ف	ف	ف	ف	ف
qaf	ق	ق	ق	ق	ق
kaf	ك	ك	ك	ك	ك
lam	ل	ل	ل	ل	ل
mim	م	م	م	م	م
nun	ن	ن	ن	ن	ن
wau	و	و			و
ha	ه	ه	ه	ه	ه
hamzah	ء	ء	ء	ء	ء
ya	ي	ي	ي	ي	ي

Table 2.0 : The Jawi alphabet adopted from the Arabic alphabet

The additional 6 letters, as shown in Table 2.1, were added to the original Arabic alphabets to accommodate the needs of Malay languages. The additional characters are *Nya*, *Cha*, *Nga*, *Pa*, *Ga*, and *Ve*. The letter *Hamza* which is considered as a diacritic in Arabic, are basic letters of Jawi.

Name	Letter	Isolated	Start	Middle	End
nya	ث	ث	ث	ث	ث
ca	چ	چ	چ	چ	چ
nga	غ	غ	غ	غ	غ
pa	ڤا	ڤا	ڤا	ڤا	ڤا
ga	ڠا	ڠا	ڠا	ڠا	ڠا
va	ڤو	ڤو			ڤو

Table 2.1 : The additional Jawi alphabet

According to the table above each character has multiple forms. Depending on where in a word a character appears within its word or sub word, it could appear as isolated form, start form (beginning of a (sub)word), end form (end of a (sub)word), or middle form (anywhere else in a (sub)word). Character without start or middle form cannot be connected to the subsequent character.[6]

From Jawi alphabet 21 out of 36 characters in Jawi have a dot, two dots, and three dots associated with the character. The dot(s) can be above, below, or inside the character.

Words are connected at the same relative height in horizontal lines, which is called the 'baseline'.

The Jawi numeral ۲ (2) is widely used to indicate word repetition in Malay language.

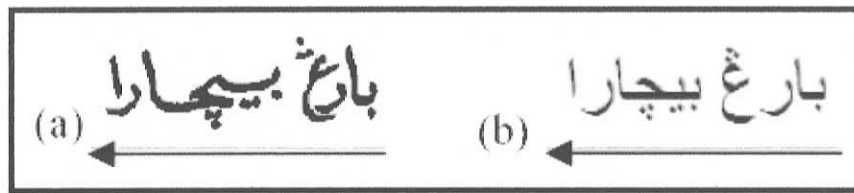


Figure 2.4: Example of jawi scripts
(a) Handwritten (b) Printed

Jawi is written from right to left in both printed and handwritten forms

2.3 Dot Matrix Display System for Korean Numerals

This article also is the effort of W.L. Goh and K.T.Lau from School of Electrical and Electronic Engineering at Nanyang Technological Institute Singapore, November 91. In this article, they presented the layouts for Korean numerals on 10×7 (2 pieces of 5×7) dot matrix. A microprocessor-based display system for a single Korean numeral is discussed.[7]

For displaying the Korean numerals on a 10×7 dot matrix, the microprocessor accepts the input numerals 0-9 through a keyboard. A program then compares the input and selects the appropriate Korean numeral for display from a look-up table of bit patterns stored in memory. As each numeral requires $10 \times 7 = 70$ dots (or bits), 10 bytes of data are required for each numeral, with the last bit of each byte ignored.