DIGITISATION OF AN ENDANGERED WRITTEN LANGUAGE: THE CASE OF JAWI SCRIPT

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ABSTRACT

Jawi is the Malay writing script based on the Arabic script that adds six extra characters to accommodate Malay vocal sounds. The use of this script is fast dwindling and the Malaysian government as well as interested parties have attempted to promote the use of the script through digitisation projects. This paper describes the attempts in Malaysia to promote the use of the Jawi script through collaborative ventures between government agencies, educational institutions and commercial software houses. The paper traces the early research collaborative activities in this area between the University Technology of Malaysia (UTM) and the Standards and Industrial Research Institute of Malaysia (SIRIM) to develop prototype computers and keyboards to handle Jawi as well as establish a standardised code for the script. The paper describes the activities of the Digital Jawi Project partners (Department of Islamic Development Malaysia, JAKIM, the Association of Jawi Writing Enthusiasts, PENJAWIM and the University of Malaya) to popularise the use of Jawi through Internet applications. Such ventures include the development of JAWINET, Jawi browser, Jawi word processing software, Jawi character recognition and computer aided instructional products and services for the study of Jawi writing and spelling.
THE ENDANGERED SCRIPT

The evolution of the spoken human language was estimated to be between 50,000-30,000 B.C. (Crystal, 1998, p.293). The spoken language therefore evolved way before writing was invented, as the ability to produce and comprehend written language comes later than people’s ability to speak. “Spoken language does not have to be taught; written language, by and large, does” (Writing and reading, 1998). Malaysia is a multi-racial country and the spoken languages of its populace are largely in this order, Malay or Bahasa Melayu (61% of the population), Chinese (various dialects) (30%), Tamil, Punjabi, Telugu, and Malayalam (8% of the population) (Malaysia’s data, 2000). The Malay language is Malaysia’s national language and is the language of the Malays of the Malay Archipelago (Malaysia, Singapore, Brunei, Southern Thailand and Indonesia). The other spoken languages, however has their roots from the languages in India and China.

The Malay language was the spoken word way before the written script evolved. Jawi originates from the Arabic scripts and evolved in the Malay world as early as 440H (1104A.D.) (Nafisah, 1999). An evidence of this is the inscription found on a tombstone dated 1303 AD in Terengganu. As such, the early written script for the Malay language naturally evolved from the Arabic alphabets. The Jawi alphabets comprise 29 Arabic characters and 6 additional letters devised by the Malays to accommodate local vocal sounds. The British invented the romanised Malay script when they colonised the Malay Peninsular in the 18th century and the English language had subsequently greatly influenced the spelling structure of the Malay language until it was standardised in the post 1973 years.

The romanised Malay or Rumi survived and thrive. The use of Jawi Malay scripts however, dwindled in an alarming rate and is considered to be an endangered script. It was once widely used in the Malay courts and was the dominant writing in the Malay world. Today the Jawi script is mainly used for Islamic religious
documents and texts. There are factors that threatened even these usages of Jawi. One dominant factor is the growing reluctance among local publishers to publish religious books for the public mainly in Jawi. Economic pressures favour publications in Rumi Malay, that would include quotations from the Quran printed in Arabic script. This is because fewer Malays are Jawi literate and the situation is exacerbated by the wide availability of romanised word processing software that can easily accommodate Rumi Malay (Muhammad Mun‘im and Haliza, 1994). The consequences was felt by the national Jawi daily newspaper Utusan Melayu, which almost stopped its print run due to lack of sales (Ahmad Zaki, 1998).

REVIVALISM THROUGH DIGITISATION
An attempt to revive the use of Jawi was initialised when the Ministry of Education in Malaysia introduced the teaching of Jawi script in public primary schools. The essence of this is reflected in one of the mission statement of the Department of Islamic and Moral Education Malaysia that is, to ensure that every Muslim child that completes year six at the primary level can read the Quran as well as read and write Jawi. This skill is taught within the Islamic education curriculum. Even so, the rate of Jawi literate Malay children remain low today and there is growing concern that the future generation would not be able to read the literary text of their national heritage (Study on learning..., 1989). The study found that among the sample of 853 standard six students from 24 schools, throughout Malaysia, only 68.23% could read Jawi and 58.34% of the students could write it.

Another approach is to popularize the use of Jawi through information technology. Research and development in this area was dominated in the early years by academics from Universiti Teknologi Malaysia (UTM). UTM produced the first prototype computer, which can handle the Jawi script, in 1983 (Ahmad Zaki, 1986, 1987, 1998). UTM also collaborated with the Standards and Industrial Research Institute of Malaysia (SIRIM) to devise a standard for Jawi national character set for data interchange purposes. This led to the development of a character set compatible with the ISO8859 Arabic character set. The Jawi
software developed could handle left-to-right and right-to-left script writings. UTM also designed a new keyboard layout that supported Jawi character input. The software and keyboard is used by UTM to enter data into their Quran Information System (QIS) project (Mohd. Shazali, 1990). Today, those working with Jawi text use custom fonts either in the Windows or Macintosh environment. The Jawi provided by most software is a modification of the Arabic font. Examples of such software are WinText and AlKaatib. Also, the Jawi characters are based on the ISO 9036 code set (ISO9036, 1987) which defines the stand-alone version of Arabic characters in a form that can be used for interchange between computer systems using a 7-bit code set. This is supplemented by the ISO 1182 (1996) that defines the use of Arabic alphabet character set for bibliographic information interchange. UTM and SIRIM were also active in the area of automatic conversion of Rumi text into Jawi. The method used was to break up the Rumi phonemes and map it to the corresponding phonemes in Jawi. There are numerous problems that need to be surmounted in this context, because the multiplicity of mapping may result in errors, especially when handling words which have multiple meanings or variant pronunciations (Muhammad Mun‘im, 1994).

The Malaysian government’s involvement in popularizing the use of Jawi was more active through the Department of Islamic Development Malaysia (JAKIM), which was established by the Malaysian Council of Rulers (Majlis Raja-Raja Malaysia) in January 1997. One of JAKIM’s mission is to increase the reverence and acceptance of the Jawi script by using information technology as an enabler (JAKIM, 2001). A memorandum of understanding was signed between JAKIM, the Association of Jawi Writing Enthusiasts (PENJAWIM) and a software company (Allis Tech) in 1997 and as a result, the JAWINET homepage was launched and was maintained by PENJAWIM. These project enables selected schools with computers that can support and have Internet connections send and receive e-mails, as well as post web pages in Jawi. The project uses a multilingual browser called Tango distributed by Allis Technologies Inc.
To activate more participation from the educational institutions, another MOU was signed between JAKIM, PENJAWIM and the University of Malaya in March 1998. In the same year, a workshop on JAWINET was held at the Faculty of Computer Science and Information Technology (FACSIT), University of Malaya, which brought together parties interested in popularizing the Jawi script. FACSIT subsequently continued the JAWINET project and this extended into the *Digital Jawi Project (DJP)*.

The focus activity of the collaborative parties is on research and development and dissemination of Jawi applications especially through the Internet. The JAKIM, PENJAWIM and UM collaboration have five main issues to tackle:

(a) To produce the architecture, standard, technology, product and services related to digital Jawi and for the use by JAWINET users;

(b) To produce an Internet software for the JAWINET system to enable Internet users to surf, read, author and communicate in Rumi or Jawi Malay;

(c) To organise educational and training programmes to encourage the use of digital Jawi technology;

(d) To form an association that gather members from various fields who could contribute to the continuous development of the digital Jawi; and

(e) To promote awareness about digital Jawi and JAWINET (Ahmad Zaki, 1998).

The University of Malaya currently provides and maintain a Digital Jawi Laboratory, where most of the Jawi script projects were developed. Collaborative efforts were also geared towards improving the JAWINET homepage that disseminates information about research and development as well as activities of the Digital Jawi Project (Figure 1).
True to its mission, JAWINET provides the basis for various possible applications that can be developed using Jawi. Five main modules are provided; informational section on the Digital Jawi project; a guide on writing Jawi; an information kiosk on knowledge and Islam; a section on the Malay heritage; a recreation module and a module that links to relevant Malaysian organizations. An overview of the Jawi Digital Project is illustrated in Figure 2.

In Figure 2, JAKIM represents the government’s involvement in the collaboration. To indicate their earnestness, JAKIM has provided for a dual-script viewing especially in its digital library module, where users can choose to view menus and text in Jawi (Figure 3). JAKIM contributes expertise in the orthography, spelling and pronunciation of Jawi script. PENJAWIN represents Jawi enthusiasts, comprising Jawi clubs and software companies who work closely with the Malaysian Standards and Research Institute (SIRIM) and Dewan Bahasa dan Pustaka (DBP) to develop Jawi-based products and services. PENJAWIM helps to shape the policy, content and standards for Jawi products and services. The University of Malaya represents the educational institution who will collaborate with other interested parties to raise funds and promote research.
and development in this area. The model also highlights some of the projects undertaken by the Digital Jawi task group to popularize the use of Jawi.

Figure 2: E-Jawi Collaborative Ventures between JAKIM, PENJAWIM and UM

Figure 3: JAKIM’s Digital Library Module
The research activities on Jawi have spread to other local universities. Khairuddin and Ramlan (1996) first mentioned the application of neural network techniques at a conference in Serdang, Malaysia. The NN technique was used to classify Jawi characters. Following this, researchers at the Mara University of Technology (UiTM) and National University of Malaysia (UKM) collaborated on the application of recurrent neural network techniques in recognizing handwritten Jawi words. Work on this project was first reported in 1998 (Mazani, et al.) and after four years, the researchers revealed that RNN can be applied to solve handwritten recognition problems (Mazani, et al, 2001). This result means that it would be possible for the Jawi illiterate reader to understand old literary text, which were handwritten. Although this goes against the grain of encouraging researchers to read Jawi, it help promote research on Malay manuscripts. At the Multimedia University three researchers are developing a teaching software that aids users in the learning of Arabic calligraphy. The software can be used to test handwritten Arabic characters for correctness specific to the Thuluth calligraphy method (Nor Rafeah, Seyed Mohamed and Akbar, 2001). The Universiti Sans Malaysia (USM) and Winsoft of France have produced a Jawi word processing programme called Winsoft Jawi in 1994 (UTM, 2001).

There are also input from the private sector. The software houses have played their role by publishing software for Jawi. The local company Softrade have created the Jawi Writer which can run with Word 97 (Softrade, 1999). The company also provided a daily prayer program in Jawi called Daily Doas.

Profficient Computer Technology Sdn Bhd (2001) in the state of Kelantan is another example of an active software house in this context (Profficient, 2001). The company develops a Virtual Jawi keyboard, which follows the International Jawi keyboard standard in line with MLIT standardization. The keyboard comprises 28 Arabic alphabets and 35 Jawi alphabets. The company worked closely with Malaysian Institute of Microelectronic Systems (MIMOS) and have successfully developed the Jawi and Arabic word processing sub-programme
The company also collaborated with the Dewan Bahasa dan Pustaka to market the Jawi word processing software, called *Jawi Word Pro 1.0*, which runs with Windows 95/98. This tool was developed by using Jbuilder 4.0. The features provided together with this word processing package includes; a virtual keyboard which support both the Arabic and the additional six Jawi alphabets; the insertion of punctuations marks for writing Quranic text; a spell word list for Rumi-Jawi transliteration; Jawi e-mail and the storing of text in html format. Proficient Computers also develop a Jawi Board game of droughts that promotes the learning of Jawi spelling. In addition, Gordon (1990) from Image Alpha, Hong Kong, revealed the development of an application to translate documents in Rumi to Jawi. This would allow the creation of Jawi version of any Rumi document and as such assists in the use and preservation of the Jawi script.

Another example of a private sector venture in this context is the development of information systems that uses Jawi. In Kedah, a partially state owned company stationed at the Kulim HiTech Park have launched the *Mosque Net* that connects mosques in the state through a communication networks that links various

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computer applications which support Jawi. In the banking sector, the Islamic Bank boasts of an Islamic banking solution that supports the Jawi script. Online financial transactions give their users the option to use Jawi or Rumi when submitting transactions with the bank’s computer systems.

CONCLUSION

The revival of interest concerning Malay Jawi is still sporadic and a number of programmes need to be spearheaded to promote and sustain interest. This can be done in a number of ways, which includes the possible hosting of international conferences on the digitization of non-Roman scripts and the management of non-Roman script-based information systems in the WWW. This will help pool researchers in this area and activate collaboration.

The Jawi script applications can also make use of other research findings. Suaidi (1997) at the University of Leeds, has developed an Arabic writing programme called *Uktub Li (UL)* text generator to aid non-Arabic speaking students to improve their Arabic writing skills. *UL* is made up of component modules and linked references to assist the production of Arabic text. In addition to word processing facilities, *UL* has a library of rhetorical structures, useful for developing styles of documents. Students using it, can incorporate the structures provided within their writings. The system assists students to detect and correct errors during the writing process. Students can consult the dictionaries and grammar books provided online for them. A similar system would be a bonus to the novice Jawi users and help hasten their grasp of Jawi spelling rules.

In the National University of Singapore work is underway using Java applets, for a multi-language converter that can give a truer display of non-Romanised characters over the World Wide Web (Leong, Tan, Govindasamy and Lee, 1996). The project has been successful in handing Chinese, Korean and Tamil text. The converter allows users to submit queries and text in their own non-Romanised script. Possible collaboration can be initiated in this context for the Jawi script.
Arabic character database management and text retrieval system could be the focus of future research. A Jawi querying agent and search engine would do wonders to unveil relevant information from large full-text databases of Jawi text. This means the possible usage of Jawi for daily life needs instead of using it only to read religious and classical literary text or manuscripts. This would help to disassociate the perception of Jawi with the script for religious and traditional purposes but rather a language that can be used for everyday living.

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