

Languages of Myanmar in Cyberspace

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Key Words: Myanmar Languages, Computerization, Myanmar Script

Abstract

There are a total of 111 languages spoken by the people living in Myanmar. Among them, the top language groups are Myanmar (Burmese), Shan, Kayin(Karen), Rakhine, Mon, Chin and Kachin. The earliest stone inscription of Myanmar and Mon languages can be found on MyaZeDi Stone inscription (AD 1113). There are long history of printing and publishing in Myanmar languages. Computerization also has been started long ago. It is still not sufficient enough to localize basic software into Myanmar languages and present in cyberspace. Myanmar Character Code (with Extension for ethnic languages) has been allocated in UCS/Unicode (U+1000 – U+109F). Many people have put effort since long time ago to develop Myanmar Character Codes and Fonts but the limited cooperation between international organizations, experts, venders and local end users slowed implementation of Myanmar languages (Burmese language and the Ethnic languages). This paper mainly emphasizes on the necessary cooperation among the developers, venders and local end users.

Outline of the paper

This paper overview the diversify world of writing system and give historical overview on the evaluation of computer usage in Myanmar and on Burmese language. After reviewing the off-line printing and the computerization history, the objective of this paper is to propose active agenda for digital divide on how to move forward on localization of Burmese scripts.

In section 1, the languages spoken by the people living in Myanmar is described. It also contains the development history of Burmese language and other selected major language groups. In section 1.9, the history of type printing technology in Myanmar is mentioned.

In section 2, the availability of digital technology in Myanmar is mentioned. It also describes about the development of Myanmar font and the rendering of Burmese script.

In section 3, the availability of internet in Myanmar is mentioned. It also describes about the initiatives and the difficulties of Natural Language Processing for Myanmar Languages.

In section 4, it describes about the actions needed for Myanmar languages.

Section 5 describes about the acknowledgement to Language Observatory Project.

1 Outlines of Selected Major Myanmar Languages

There are a total of 111 languages¹ spoken by the people living in Myanmar. Bible has been published over 50 languages spoken in Myanmar². There are altogether 135 ethnic groups, also known as “Nationalities”.³ Some two or three ethnic groups speak same dialect or language and some ethnic groups speak more than one dialect. Among them, Burmese (Myanmar) is the official language and spoken by about 69 % of the population as their mother tongue. According to 1983 census,⁴ the top language groups are Myanmar (Burmese) 69 %, Shan 8.5%, Kayin (Karen) 6.2%, Rakhine 4.5%, Mon 2.4%, Chin 2.2%, Kachin 1.4%.

Table 1: Selected Major Languages in Myanmar

Language	Language Group ⁵	Region	Religion	Speaking Population	Scripts	Remark
Kachin (Jinhaw)	Tibeto-Burman	Kachin State	Mostly Christian	0.7 million	Latin scripts	Sample website: ⁶
Kayin/ Karen	Tibeto-Burman	Kayin (Karen) State	Animism, Buddhism and Christianity	3.0 million	Karen scripts (extended Myanmar scripts)	Sample website: ⁷
Chin	Tibeto-Burman	Chin State	Christianity, ethnic religion	1.0 million	Latin scripts	
Mon	Mon-Khmer	Mon State	Buddhism	1.2 million	Mon scripts (extended Myanmar scripts)	Sample website: ⁸
Myanmar (Burmese)	Tibeto-Burman	Official language		34.5 million	Myanmar scripts	Sample website: ⁹
Rakhine (Arakenese)	Tibeto-Burman	Rakhine (Araken) State	Buddhism	2.1 million	Myanmar scripts	Sample website. ¹⁰
Shan	Tai- North West	Shan State	Buddhism	4.0 million	Shan scripts (extended Myanmar scripts)	Sample website. ¹¹



Figure 1: Map of Myanmar: States and Divisions

1. Thaninthayi 2. Mon 3. Yangon 4. Ayeyarwaddy 5. Kayin 6. Bago 7. Rakhine 8. Magwe 9. Mandalay 10. Kayah 11. Shan 12. Sagaing 13. Chin 14. Kachin

1.1 Myazedi Stone Inscriptions

Myazedi stone inscription, now displayed in Bagan Museum, discovered in 1886-87 by a German Pali scholar and Superintendent of the Epigraphic Office, Dr. Forchhammer, is dated 1113 A.D or 474 Myanmar Era. Myazedi stone inscription was discovered near Myazedi Pagoda at Myinkaba village the south of ancient Bagan (now, Bagan, Nyaung Oo Township, Mandalay Division). Another one discovered in the Ku Byauk Kyi Temple is now set up on the platform of Myazedi Pagoda. These two inscriptions are identical except the one display at the Bagan Museum is a square pillar of sand-stone and the other on the platform of Myazedi Pagoda is rectangular. The Myazedi inscribed pillar is a quadrangle, each side bearing an inscription in one of four different languages, Pali, Myanmar, Mon and Pyu. Myazedi is one of the earliest stone inscriptions so far discovered in Myanmar and the first to inscribe the Myanmar and Mon languages. Myazedi Stone Inscription, Ku Byauk Kyi Stone Inscription and Rajakumar stone Inscription (since both stone inscriptions were set up by Prince Rajakumar of Bagan Period) are the three names famous for these two stone inscriptions in Myanmar history. It is also known to many as the first Myanmar script.



Figure 2: Myazedi Stone Inscription

1.2 Kachin Language

Kachin Language, also known as Jinghpaw, is also one of the officially recognized minority languages of China. Most of the people, who speak Kachin (Jinghpaw), live in Kachin State (Myanmar). Kachin Language uses Latin script. The alphabets used by Kachins were developed by Rev. Ola Hanson from American Baptist Foreign Mission Society purposely to write the Bible.

1.3 Kayin/Karen Language

There are two major types of Karen Languages, Pwo Kayin (Karen) and S'gaw Kayin (Karen). Most of the people who speak Karen language live in Karen State (Myanmar), and some in Ayeyarwaddy division. In the 1820s American Baptist missionaries Judson, Wade, and Mason came to Burma and evangelized the Karen. In the process they translated the Christian Bible into the Sgaw Karen language using the Burmese script. This Bible translation was finished in 1839 and this translation is still used today.

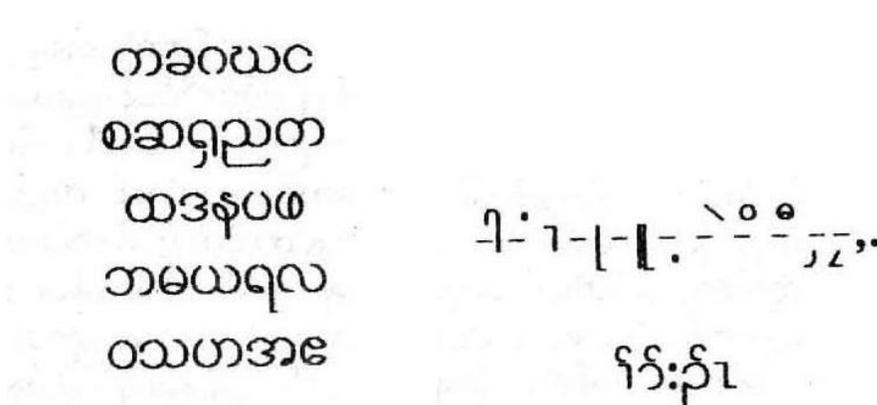


Figure 3: Kayin/Karen Alphabet: Consonants (Left) and Vowels (Right)

1.4 Chin Language

There are many different types of Chin Languages but mostly are quite similar. Examples are Chin-Asho, Chin-Falam, Chin-Haka, and Chin-Khumi.

1.5 Mon Language

Mon belongs to the Mon-Khmer language group. The earliest Mon inscription, found at Lopburi in Thailand, dates from the eight century and is written in the Pallava script used at the Hinayana (Theravada) Buddhist center of Conjeeveram in the area of Madras on the east coast of India.

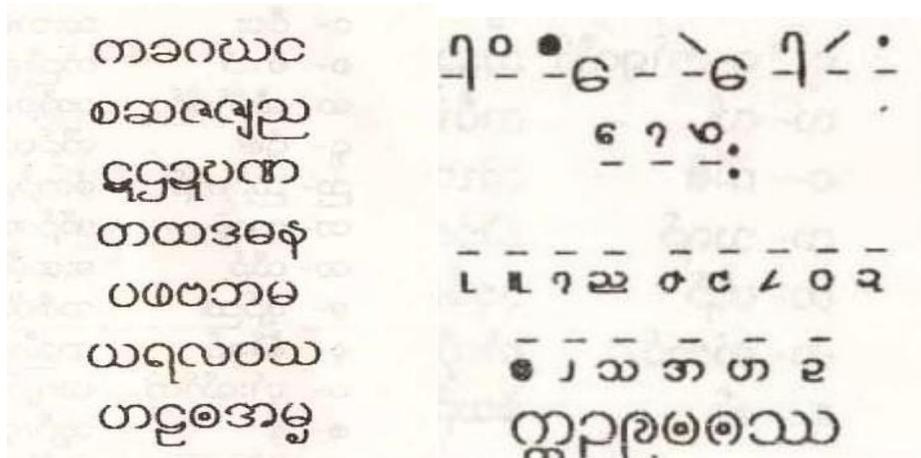


Figure 4: Mon Alphabet: Consonants (Left) and Vowels (Right)

1.6 Rakhine Language

Rakhine (Arakanese) language is recognized as one of the Tibeto – Burman Lolo-Burmese Southern group. Myanmar script is used to describe Rakhine Language.

1.7 Shan Language

Shan language is recognized as one of the Tai-Southwestern-East Central-Northwest group. The earliest reference to Shan scripts was found in a Bagan era¹² from AD1120.



Figure 5: Shan Alphabet: Consonants (Left) and Vowels (Right)

1.8 Burmese (Myanmar)

Burmese (Myanmar) is the official language of Union of Myanmar (Burma). Myanmar (Burmese) is recognized as one of the Tibeto-Burman group. About 34.5 million people speak as their first language and almost all the educated people in Myanmar speak as second language if their mother tongue is another ethnic language. The language of Education from primary level to secondary level is Myanmar (Burmese). From tertiary level is English. Mother tongue speakers of Myanmar/Burmese language live mostly in Myanmar Proper/Region of Myanmar, that is, seven divisions of Myanmar: Yangon, Mandalay, Sagaing, Tanintharyi, Ayeyarwaddy, Pegu and Magwe Division.

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Figure 6: Burmese Alphabets: Consonants (Upper) and Vowels (Lower)

1.8.1 History of Burmese Scripts

The Burmese script derives from 11th century Mon. In A.D 1057 one of the first Burmese Kings, Aniruddha, conquered Thaton, a major Mon center, and the wise Monks, skilled artists and artisans were brought back with him to Bagan. The Burmese writing system derives from a Brahmi-related script borrowed from South India in about the eighth century for the Mon language. The first inscription in Burmese dates from the following years and is written in an alphabet almost identical with Mon inscriptions. Aside from rounding of the originally square characters, this script has remained largely unchanged to the present. The rounder forms were developed to permit writing on palm leaves without tearing the writing surface of the leaf.

1.8.2 Myanmar Language Commission

From the Rajakumar stone inscription (also known as MyaZedi stone inscription) which bear the date 475 Myanmar Era (1113 A.D.), it can be inferred that Myanmar language had developed into the written form at least more than eight centuries ago. However, although effort had been made by the monarch to establish orthography of the language and a standard orthography and a monolingual dictionary of the language were still lacking after a quarter of a century had passed since gaining independence from the British in 1948.

To correct this discrepancy and to establish the Myanmar language which is in fact the medium of the communication for the vast majority of the people either as their mother tongue or the most practical second language in this multi-ethnic society on a sound basis, the Revolutionary Council laid the corner stone for the future formation of the Myanmar Language Commission by forming the Commission for Myanmar Literature Translation in 1963. The Commission published “Burmese–Burmese dictionary” in 1968 and “The correct way of Burmese spelling” in 1978.

After a series of organizational and functional changes, the present commission assumed its present form in 1983, consisting of members appointed by the Cabinet and with a department under the Ministry of Education providing its management and operational requirements.

1.9 Availability of Type-printing Technology in Myanmar

The first printing in Myanmar (Burma) started from 1836 with the publication of English language newspaper under British colonial area (Assam, Manipur, Arakan and Tenasserim). Adoniram Judson of the American Bapt Mission published the first English-Burmese dictionary in 1852. The first publication under Burmese Monarchy started with the book “*The Life or Legend of Gaudama*” in 1854. Myanmar (Burma) got independence from British in 1948, *The Mirror* daily newspaper started publishing in 1957. It was renamed as *Kyemon* in 1964 and still in publication. *Loktha Pyithu Nezin* started publishing in 1963 and renamed as *Myanma Ahlin* in 1993. The English language newspaper *Working People’s Daily* started publishing in 1964 and later renamed as *New Light of Myanmar* in 1993.

The Chronological order of History of Type Printing in Myanmar is shown in table 2.

Table 2: History of Printing and Publishing in Myanmar¹³

Year	Publication
1824 - 1826	[The First Anglo-Burmese War ended in a British victory, and Myanmar lost Assam, Manipur, Arakan and Tenasserim]
1836	The first English language newspaper published under British colonial area.
1842	The first ethnic [Karen] language newspaper under British colonial area.
1843	The Baptist mission published the newspaper in Moulmein under British colonial area.
1852	The English-Burmese dictionary published.
1852	[The Second Anglo-Burmese War ended also in British annexing Pegu province and the whole part of lower Myanmar (Burma) and renamed it Lower Burma.]

1853	The first publication by ethnic [Araken] language under British colonial area.
1854	The first publication under Burmese Monarchy: <i>The Life or Legend of Gaudama</i> .
1885	[The Third Anglo-Burmese War put the whole Myanmar (Burma) under British colonial.]
1869	The first Burmese-language newspaper published under British colonial area.
1875	-The first Burmese-language newspaper, named <i>Yadanabon Naypyi Daw</i> started publishing under Burmese Monarchy. -The first English-language newspaper, named the <i>Mandalay Gazette</i> started publishing under Burmese Monarchy.
1919	Burmese newspaper <i>Myanma Ahlin</i> started publishing.
1948	[Myanmar got independence]
1957	The <i>Mirror Daily</i> newspaper started publishing.
1963	Burmese newspaper <i>Loktha Pyithu Nezin</i> started publishing.
1964	- <i>Working People's Daily</i> started publishing - -The <i>Mirror</i> newspaper was nationalized and renamed as <i>Kyemon</i> .
1969	<i>Myanma Ahlin</i> newspaper was nationalized and later stopped publishing.
1993	- <i>Working People's Daily</i> was renamed <i>New Light of Myanmar</i> . - <i>Loktha Pyithu Nezin</i> was renamed <i>Myanmar Ahlin</i>

2 Availability of Digital Technology

Generally, there is no basic software in Burmese (Myanmar) language. Due to the lack of nationwide standardized encoding scheme in Myanmar Character set, even Myanmar Government's official website www.myanmar.gov.mm is presented in English only. But many efforts have been made on localization of basic software into Myanmar languages.

Table 3: History of Computerization in Myanmar¹⁴

1979	The first computer used in Myanmar at UCC (Universities' Computer Center); IBM PDB-11/70
1989	The first Computer company opened in Myanmar which provided training of usage of Software.
1992	The first Myanmar Font on Windows platform.
1993	- The technical report was submitted by Andy Daniels to Unicode Technical Committee. - Michael Everson reported to Unicode Consortium "Names of Burmese Characters: comment on Unicode Technical Report #1"
1994	Myanmar official government website www.myanmar.com launched.
1997	MCF (Myanmar Computer Federation) founded.
1998	- Limited dial-up IP connection service started by Government. - Unicode specification on Myanmar Languages, Myanmar Languages on U+1000 to U+109F ¹⁵
1999	Amendment for Myanmar Languages in Unicode
2000	The Second Internet Service Provider, Bagan Cyber Tech established. www.bagan.net.mm .

2001	-Myanmar ICT Park opened. -The work program for Standardization of Myanmar Character Codes was presented by Pyone Maung Maung, Joint Secretary of National Task Force - Encoding of Myanmar Character Set and Implementation, Dr. Aung Maw, Myanmar Standardization Committee
2003	- Encoding Myanmar Language to Unicode, Zaw Win Aung, Project Administrator Burmese Language Support from Sourceforge.net. - Myanmar Unicode Test web page by Alan Wood - Myanmar Language Commission proposed “Myanmar Romanization”
2004	- Representing Myanmar in Unicode by Martin Hosken and Tun Tun Lwin - Analysis of Myanmar Keyboard by Myanmar NLP Research Team - Proposal of Myanmar Script Extension (Shan, Mon, Kayin (Karen) scripts) by Myanmar Unicode and NLP Research Center

2.1 Local Versions of Myanmar Font

Because of the unavailability of nationwide standardized encoding scheme in Myanmar language/script and extension of Myanmar scripts (ethnic scripts), Myanmar people try to develop local version of True Type Myanmar fonts which can easily run on Standard English version software. The first publicly used Myanmar font for Window platform, named *Shwe and Mya*, was developed around 1992. Some fonts were developed for Mac platform. But Mac is not a popular platform in Myanmar and these fonts are not widely used in Myanmar. The fonts are developed by using some graphic software and assign each character to the respective Latin key in ASCII code. These true type fonts can show the web pages correctly if they are downloaded and installed into the computer. But normally, the web sites use different fonts and just downloading one font is not enough for seeing all web sites written by ethnic languages in Myanmar. Normally, the font developers develop only the font of one script instead of developing font to use all ethnic languages (most ethnic languages use extended Myanmar scripts). In other way, the ethnic languages also have to develop their own fonts. The sample WebPages which corresponds to three different Fonts for Burmese Language are shown in the reference.¹⁶ The font that includes some ethnic scripts is *WinMyanmar* Font.

Most Myanmar True Type Fonts use the Myanmar Typewriter keyboard style which is the one most Myanmar people are familiar with. But it is not widely used in creating ethnic language web pages. The font *MyaZedi* is the one that has tried to be a Unicode standard font. In *MyaZedi* font, the Myanmar script graphics are not assigned to Latin ASCII codes. Instead, the Myanmar scripts are assigned to U+1000 as assigned by Unicode Standard, Version 4.0. The font designer added supplementary glyphs not included in Unicode but needed to represent ligatures and variant forms, and assign them to unused code points in the Myanmar block in Unicode. The only site which used *MyaZedi* font so far is www.etrademyanmar.com. Still in www.etrademyanmar.com, most of the pages are written in English.

Table 4: Currently Available Unicode Aware Myanmar Fonts

Font Name	Ethnic Script	Ligature
Padauk.ttf	No	Yes

Code2000	Yes	No
MyaZedi	Yes	Yes
fsex2p00_public	No	No

The unavailability of Unicode Myanmar keyboard and the inconsistent and non-standardized Myanmar fonts lead web developers to present information in English or in pdf, gif and jpg format if they try to present ethnic languages in Myanmar.

2.2 Rendering Burmese Script

Myanmar script requires very complex processing for rendering. A sequence of characters may have to be drawn as single ligature glyph, or glyphs may have to be drawn at 2-dimensionally shifted positions. Furthermore, glyphs may require reordering. The technology, known as CTL (Complex Text Layout) is needed to render Myanmar script. CTL typically includes following steps: 1. clustering, 2. reordering, 3. character to glyph mapping, 4. glyph substitution, and 5. glyph positioning.

The “m17n”¹⁷ library developed by The National Institute of Advanced Industrial Science and Technology (AIST) of Japan and the Free Standards Group, a U.S.-based nonprofit organization, included Burmese script. The “m17n” library is the open source software written in C programming language and is preferred to be worked on Linux, UNIX environment.

In the past, the lack of rendering Myanmar script made the local font developers to develop the ligatures using the unused glyph of the Unicode.

3 Availability of Internet

Connection to internet has been available since 2000. Before that there was a Government organization that provides E-mail services, but this was mostly available for Government organizations and foreign missions. Some computer experts working at Government organizations got limited access E-mail services.

From the year 1998, the Government organization ISP provided dial-up internet Service with the maximum speed of 56 kbps. But due to the poor connection of the phone lines, the highest available speed at the user end is only about 32 kbps. Now, the total number of internet & email user through the Myanmar Post and Telecommunication (MPT), the Government organization, is about 5000 users.¹⁸

In 2000, another ISP, Bagan Cyber Tech, a semi-Government organization was established. It started providing dial-up service and some email service. Now, Bagan Cyber Tech provides also Broadband wireless (Yangon and Mandalay), IP Star Broadband satellite system and ADSL (Yangon and Mandalay).¹⁹

3.1 Development of Software in Myanmar Language

Myanmar software developers develop some software for local companies and mostly for international outsourcing companies. Even though the software is for local companies, they use English as a language for medium of instruction. There are two main reasons: although Myanmar Language is the official language, the use of English is permitted²⁰ and is used in all the universities for all kinds of specialized subjects. This means the intellectuals do not hesitate to use English, and moreover, there is no standardized

encoding scheme for Myanmar scripts. The use of English also makes easy for foreigners employed in Myanmar to use the locally developed software. Once, one company tried to use the Burmese/Myanmar version of locally developed software but the unavailability of interfacing with other software led to discontinuation of the use Burmese/Myanmar version.

3.2 Promoting Computer Usage for Local Languages

Local languages mostly used in computers are in the printing and publishing industry. The availability of using silk screen printing and off-setting force the publishing industry to use Myanmar Fonts and neatly printed computer print-outs. Before that, the high cost of hot printing limited the industry to government organizations and some ethnic printing houses. Using Myanmar Fonts in Computer to design for printing makes it less costly for the publishers and can produce a neatly designed product in comparison with using lead-based typefaces.

3.3 Natural Language Processing (NLP) Research Center²¹

The Natural Language Processing for Myanmar Language was formed in 1997 to develop technologies to use Myanmar Language on computer such as 1) localization of operating system and software, 2) spelling checking and grammar checking in Myanmar Language, 3) sorting in Myanmar Language, and 4) machine translation to/from Myanmar Language from/to foreign language. It formed under the guidance of Myanmar Computer Federation (MCF) and formed as NPO (Non-Profit Organization) and NGO (Non-Governmental Organization). It is formed with computer technicians and the representatives from private computer companies and government organizations. It is solely aimed to research for development of IT in Myanmar Language that the private companies cannot do by themselves alone.

4 Actions Needed for the Languages of Myanmar

4.1 Implementation of Myanmar Character Code

There had been a lot of effort on Myanmar (Burmese and ethnic) scripts. There are many Burmese and ethnic TTF fonts available for free downloading on the internet.²² Many people (local mother tongue speakers and foreign experts) had put a lot of effort but most of them always start from the scratch. They got to some level of development and stop their development. In another way, their resources are used up. It is the one that most people have too much initiative for development of Burmese scripts and fonts but less initiative for cooperation between the developers.

Although character codes for Myanmar Languages has been allocated in UCS/Unicode (U+1000 – U+109F), lack of implementation makes unavailable to local end users. Much effort had been made to develop Myanmar character codes and fonts by many international experts and local experts. They are working on their own and limited coordination between the experts, international organizations and venders slowed implementation. Bridging between international organizations, experts, venders and local end users may be the way to proper way to implementation of Myanmar Character Codes.

4.2 Extension of Myanmar Character Code

Except Kachin and Chin, other major ethnic languages have some common characters with Myanmar/Burmese language. There is not yet an official national standard for the encoding of Myanmar/Burmese Font. In setting Myanmar Font as official standard and in Unicode, it is necessary to cover the ethnic languages as much as possible. Especially for Shan, Karen/Kayin and Mon languages, where scripts are near to Myanmar/Burmese scripts. The current encoding proposal to Unicode standard was prepared with consultation of experts from Myanmar NLP research center²³. It may be advisable to include experts from linguistic area for these ethnic languages in developing fonts in Unicode.

4.3 Promotion of Ethnic Languages

Publications, both hard documents and soft documents (in cyberspace), in ethnic languages are in limited availability. The development of official standard font for these languages and widely access to Internet throughout Myanmar may lead not only to the development of these languages but make it easier that access opportunity of the ethnic minorities. Equal access opportunity should be secured for every language.²⁴

5. Acknowledgement

This study is supported by Language Observatory Project. www.language-observatory.org

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