RomanPP: Myanmar Text Typing with Consonants Romanization and Possible Vowel Combinations Prediction with 4 Directional Arrow Keys

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1. Introduction

This paper introduces new Romanization text input interface, which we have named Roman Positional Prediction (RomanPP) for Myanmar language (Burmese) on mobile devices. The text input method is based on our proposed "Romanization with Vowel Positional Information (RomanLRUD)" [1] and "Positional Prediction (PP)" [2]. In this proposal, we use 4 directional arrow keys for predicting possible combinations of vowels instead of typing "L", "R", "U", "D" commands for each vowel. The total keystrokes requirement to finish typing fifteen frequently used Myanmar syllables is 124 and 37.90 % less than RomanLRUD. We held initial user study with RomanPP text input prototype to measure the user-friendliness of our approach. The average Characters per Minute (CPM) of three first-time users is 14.15. The result shows that RomanPP is easy to learn and applicable to QWERTY keyboard mobile devices.

2. Romanization of Myanmar Language

Myanmar language is the official language in Myanmar. It belongs to the Tibeto-Burman language family and derives from Sino-Tibetan. Myanmar alphabets adapted the Mon script, which in turns developed from a southern Indian script in the 8th century. Myanmar script is a system of writing constructed from consonants, consonants combination symbols (i.e. medials), vowel symbols related to the relevant consonants and diacritic marks indicating tone level. Myanmar language alphabet is recognized as containing 33 or 34 consonants, vowels (dependent and independent) and some conjunction alphabets or abbreviations [3], [4], [5].

In Myanmar language, many words are spelled differently from the way they are pronounced. For example, the word for "snack" is pronounced *tha-ye-sar* (သရေစာ) but spelled *thwa-ye-sar* (သွားရည်စာ), and therefore, replicating Myanmar sounds in Roman script is difficult [6], [7]. There is a Pali-based Romanization system, but it fails to replicate consonants in contemporary Myanmar language. There are various Romanization methods such as Duroiselle's System, Latter's System, Grant Brown's System, Stewart's System (IPA), Cornyn's System (typewritten), Minn Latt's 1966 System and Myanmar Language Commission's Pronunciation System [6]. Current Romanization rules for Myanmar language are difficult to understand for first-time users, and it will be more difficult to apply for text input process on small mobile devices. For example, Burglish Romanized text input system has no definite

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or concrete definition for Romanization rule for their system because they try to cover all possible or similar pronunciation ("ye" represents "ရေ", "ရဲ", "ရည်း", "ရယ်", "ရေ", "ရေး", "ရည်", "ရဲ", "ဧ", "�ယ်", "ဿည်", "ဿယ်", "ဧေ", "ဧး", "ဿည်", "ဿဲ", "ဧဲ", "ဧဲ", "ဧျည်", "ဧျယ်" and "ဧဿ", "thape" and "thi pf" for typing "ဿပ်" and "ta ka Ka thol" for typing "တက္ကသိုလ်") [8]. And thus, Burglish Romanization text input method is difficult to apply directly for mobile devices because a lot of candidates are listed and capital letters are used for subscript characters etc.

3. RomanPP (Consonants Romanization + PP)

To reduce the ambiguities of Romanization, RomanPP text input method uses Romanization only for Myanmar consonants, independent vowels, special characters and punctuation. In other words, RomanPP is not Romanization for Myanmar words. The text input process of RomanPP is as follows:

1) type Romanization of a consonant,
2) give parameters (Left, Right, Up and Down) for vowels
3) select a syllable from a candidate list

Typing steps for a Myanmar word "မြိတ်" (Myeik city) can be seen in Fig.1. Here, we divide the typing process of this word into two; one is for "မြိ" (syllable of Ma consonant) and the other is for "တ်" (syllable of Ta consonant).
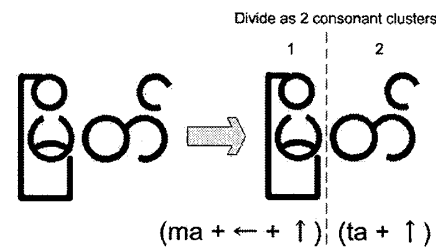

Fig.1 Typing Myanmar word "Myeik" with RomanPP

4. Keystroke Comparison with RomanLRUD

We have developed a RomanPP prototype for keystroke comparison and typing experiments of Myanmar text with Microsoft Visual Basic, which can run on Windows OS platforms. We made keystroke requirement comparison for frequently used Myanmar syllables ("အ", "ကို", "သည်", "တယ်" and "နေ" etc.) between the proposed RomanLRUD and RomanPP text input methods. The results are shown in Fig.2. The total keystrokes to finish typing 15 syllables are 171 for RomanLRUD and 124 for RomanPP. RomanPP is 37.90% less than RomanLRUD.
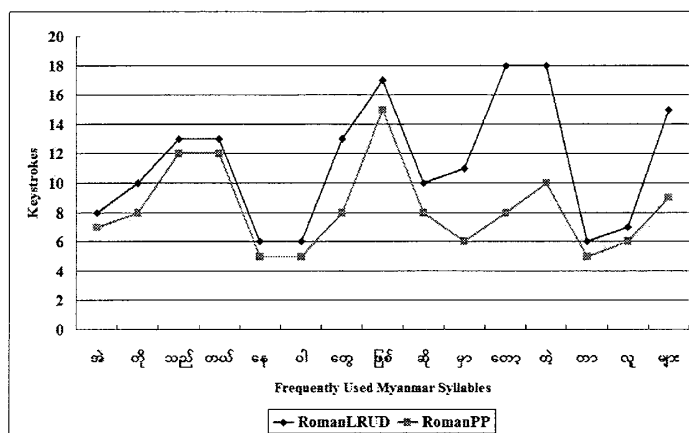
Fig.2 Keystroke requirement comparison between RomanLRUD and Roman4DAK

5. Pilot Study Result for RomanPP

We conducted short pilot study to access the typing performance with three native users. All of them were familiar with QWERTY keyboard and mobile phones. We used small wireless QWERTY keyboard (Logicool diNovo Mini) for the simulation of using a mobile device with QWERTY keyboard (see Fig.3). We recorded their typing speed of six Myanmar sentences (106 characters in total) for six times and took their feedbacks [2]. We made typing speed evaluations with Characters per Minute (CPM) instead of Word per Minute (WPM) [9]. This is because there is no standard definition for a word in Myanmar like in English (i.e. a word = 5 characters, including spaces) (Yamada, 1980) [9]. The average CPM of the three users is 14.15.
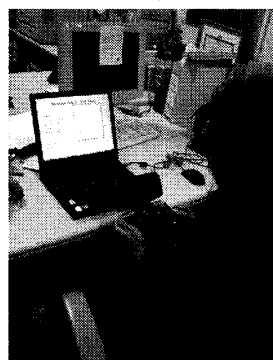

Fig.3 User study of RomanPP with small QWERTY keyboard

6. Conclusion

This research is in progress, and we have introduced just RomanPP text input interface in this paper. From the pilot study, we can prove that RomanPP is a possible text input interface for Myanmar language, and it is applicable for mobile devices with small QWERTY keyboard. We received positive feedbacks from the three native users such as "very good for the users who are already familiar with QWERTY keyboard", "much simpler than Romanization for the whole word" and "suitable for mobile phone" etc. On the other hand, with the RomanPP approach,

users have to input each consonant separately. We will make further refinements on the current prototype, follow-up analysis and experiments with mobile phone keypad layout.

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