Myanmar Text Typing with Numeric Keypad

(Applying the Concept of Positional Mapping)

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1. Introduction

Almost all current mobile phones have 12-key numeric keypad for SMS\MMS emailing. We can find it everywhere such as PC Keyboards, ATMs, ticket vending machines and security doors etc. Myanmar language keyboard mapping for numeric keypad is based on our proposed Positional Mapping concept [1], [2], [3]. In this paper, we present user study results of Myanmar text typing speed with Positional Mapping numeric keypad. Average typing speed of five native users with current prototype is 19.33 characters per minute (CPM). And the average result of four Likert Scales (1-5) questionnaires on numeric keypad with Positional Mapping is 4.65. From these results, it is proved that Positional Mapping with numeric keypad is accessible even for first time users, which can be a possible typing method for Myanmar language.

2. Myanmar Language

Myanmar language has various types of characters comparing with English i.e. consonants, dependent vowels or medials, independent vowels, finals, tones and subscript characters or conjunction alphabets etc. And Myanmar language contains many Pali (one of the Prakrits of ancient India and the language in which Gautama Buddha preached) words especially for religious things such as praying.
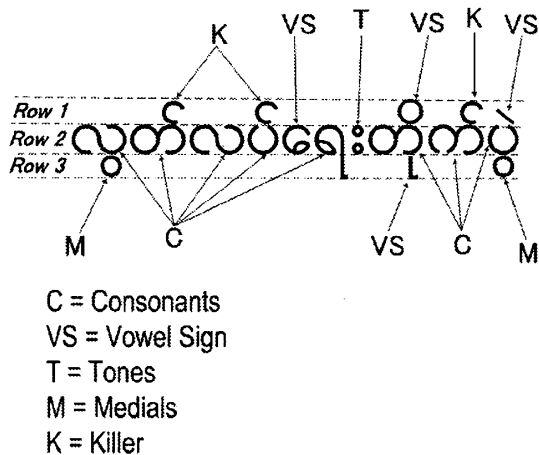

C = Consonants
VS = Vowel Sign
T = Tones
M = Medials
K = Killer

Fig.1 an Example of Myanmar word "Lout Let Ye Tight Pwe" ("Fight for Freedom" in English)

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Overall writing direction is from left to right, and the word order is SOV (Subject+Object+Verb). In a Myanmar sentence, spaces are used to mark phrases, not dividing words. An example of Myanmar word formation for the word "Lout Let Ye Tight Pwe" can be seen in Fig.1.

3. Positional Mapping and Numeric Keypad

Positional Mapping is a concept of key mapping for small mobile devices (e.g. mobile phones, PDAs) based on syllabic scripts writing system such as Myanmar, Bangla and Khmer language [1], [2], [3]. We held user study for Myanmar text typing with Positional Mapping numeric keypad in our previous work [2], however, the prototype does not mention the key mapping or key assignment on the screen (see in Fig.2a). In this paper, we gave key mapping information of each button to users through prototype (see in Fig.2b) and held new user study.

4. Prototype Development

The prototypes were developed using Microsoft Visual Studio .Net 2003 as shown in Fig.2.
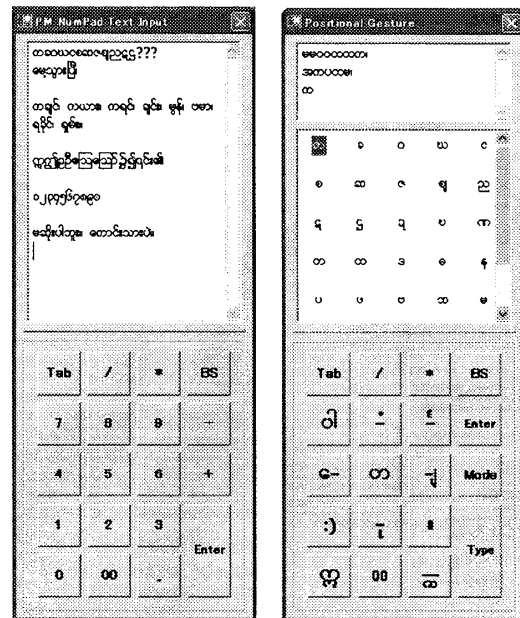
(a)   (b)

Fig.2 Positional Mapping text entry prototypes for numeric keypad (a) prototype without showing key mapping (b) prototype with showing key mapping

Key mapping on the previous prototype (Fig.2.a) and current prototype (Fig.2.b) are almost the same except for the button number 1 and 2. In the former prototype, we put characters "ႄ", "ႄ", "ႄ", "ႄ" on the button number 1 and characters "ႄ", "ႄ", "ႄ" on the button number 2. And in the latter prototype, we put all of the down vowels ("ႄ", "ႄ", "ႄ", "ႄ", "ႄ", "ႄ" and "ႄ") on the button number 2 and assigned emoticons on the button number 1.

5. User Study and Results

5.1 Subjects

We made a small user experiment to evaluate the performance of our PM text entry method for numeric keypad. We recruited 5 native subjects (between 26-32 years old) who usually send SMS message in Japanese, English or Romanized Myanmar language, and are familiar with mobile phone keypad. No subject had any prior experience with Positional Mapping numeric keypad text typing.

5.2 Apparatus and Procedures

We conducted a test in our university laboratories using a 1.90GHz Intel Pentium 4 Toshiba notebook (Dynabook E8/X19PDE model) running Windows XP OS with 512MB RAM. Screen size is 15 inch and set to 1280X1024 resolution and 32 bit color. Users were required to use a numeric keypad for text input experiments with prototype.

Throughout the experiment, we briefly explained the idea of Positional Mapping key mapping on numeric keypad. Then, we demonstrated how to type and edit Myanmar text with our developed prototype. We allowed 5 minutes practice time for each user to learn Positional Mapping text input method with numeric keypad. Then, we recorded the total time spent to type 6 sentences of Myanmar SMS message (including error correction time) for 5 times. We also conducted a small questionnaire (four Likert scales 1-5) to participants after typing experiments, in order to know their impression of Positional Mapping text input with numeric keypad (see Table.1). The Myanmar SMS message used for this user study can be seen in [1], [2] and [3].
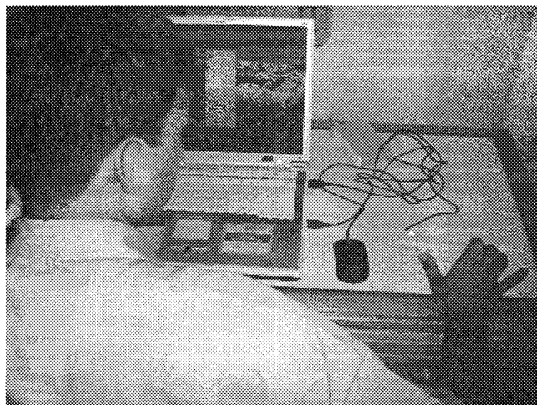

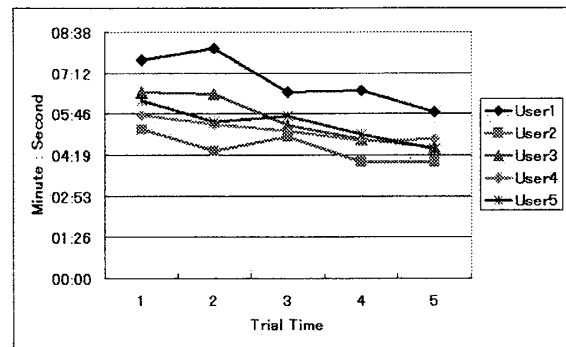Fig.3 User study with a native user

Fig.4 Users' typing speed with numeric keypad for 5 trial times

Table.1 Users' evaluations for Positional Mapping text input with numeric keypad (here, S1, S2 means Subject1, Subject2 etc. and higher values are better)

Likert Scales (range 1-5)	S1	S2	S3	S4	S5	avg
Difficult-Easy	4	5	5	4	5	4.6
Painful-Enjoyable	5	5	5	5	4	4.8
Slow-Fast	4	5	4	4	5	4.4
Dislike-Like	5	4	5	5	5	4.8

6. Conclusion

From the results of the mentioned two experiments, we have found that the average typing speed of current prototype (19.33 CPM) is only 3.43% slower than the previous one (19.81 CPM). And thus, we can say that the average typing speed of Positional Mapping with numeric keypad is 19.57 CPM. Its user-friendliness can be also proved from the average Likert scales questionnaires result 4.65.

References

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[3] Ye Kyaw Thu and Yoshiyori URANO, "Positional Mapping: Keyboard Mapping Based on Characters Writing Positions for Mobile Devices", in *proc. of the 9th International Conference on Multimodal Interfaces (ICMI 2007)*, November 12~15, Nagoya, Japan, Page 110–117