Approach to Design a Thai Universal Design Font

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Abstract of Dissertation

This dissertation aimed to study and develop a Thai Universal Design font which has a high capability for low visual acuity conditions. The first step of the dissertation investigated issues involving the advantages and disadvantages of several Thai typefaces via the printed-blurred characters. The first study has suggested the assumptions and approaches as a hypothesis, the idealistic key features for improving Thai legibility.

Second, to prove the assumptions, Thai letterforms (thirty-five character sets) were designed based on the idealistic key features. They have been tested the hypothesis on low visual acuity conditions with a blur simulation test (using a blurred glass) and short-exposure test (presented on parafoveal region). Specifically, the jutting out of the tail of characters and inclusion of a loop-with-serrated-line, together with sufficient character width have been found to improve legibility. The findings have suggested several practical improvements by modifying the specific features of each letter. Although results of the short-exposure and blur simulation approaches showed similarities and differences, the findings of both studies suggest possibilities for developing optimal letterforms using a combination of both methodologies.

Third, the most appropriate letterforms in each character set (thirty-five character sets) which were examined in the previous study, were considered to select as the parts of the glyphs to modify and digitize as a Thai font, then the selected characters were fine-tuned their glyphs. Also, in order to complete a set of the Thai characters, the additional characters were designed so that they can be digitized and generated as a font file which is available for composing as any Thai word. To facilitate visibility (inter-letter space) while the Thai UD font is typed into words or sentences, an arrangement of characters inside the structure of the Thai UD font was arranged divergent from general Thai text font. This approach has been assumed that may encourage superior visibility in a situation of low visual acuity.

Finally, to prove performance of the Thai UD font on visual word recognition, the final study employed a blur simulation method and a short-exposure method for measuring the effectiveness of the Thai characters with the real words and pseudo words, comparing them with the Thai conventional text fonts. The results revealed that overall effectiveness on low visual acuity conditions of the Thai UD font has advantage over the conventional text fonts. However, the findings have suggested that providing sufficient inter-letter space with specific particular character pairs may enhance greater visibility, especially in those letterforms which have jutted out parts (e.g., a tail, a terminal, and a loop-with-serrated-line).