

Augmentative and Alternative Communication Application for Adults with Language Difficulties: An Application Developed in Sinhala Language

D.A.Y.K. Gunawardana, R.M. Jayathunaga, A.H.H.G. De Silva, E.M.U.W.J.B. Ekanayake and R.L.S. Wilson

Department of Computer Science and Technology, Uva Wellassa University, Badulla, Sri Lanka

Many adults can experience acquired disorders such as stroke, Parkinson, amyotrophic lateral sclerosis that can interfere with their ability to communicate with others. Currently, adult individuals who experience these kinds of difficulties need to rely on low-technology options such as printed out alphabet boards to express themselves. The number of words that a person used to communicate with others is much larger than the number of words printed on the boards, hence they face difficulties in communicating with the others. To address this issue, a text-based Augmentative & Alternative Communication system was developed in the Sinhala language for adult persons with speech disorders. The system comprises of three components keyboard layout for Sinhala fonts, next word prediction, and the text-to-speech converter. The methodology of the study was applied as follows. The requirements of the patients were collected from the Disability Rehabilitation Department at the Ragama Base Hospital. The requirements were analyzed case by case and a keyboard layout was designed by taking all the requirements into consideration. The most important module of this system is the next word predictor. This module assists a patient to predict the next word once he selects a word. The RNN neural network model was trained with a typical set of words that such a person often used. The word sequence was constructed from the requirements identified from the interviews with such patient and the health care professionals who have been working in this field for a significant period. A model was trained to perform text-to-speech using TensorFlow libraries. Once, the word predictor constructs the sentence, the whole sentence is converted into voice at once. The initial evaluation of the system was conducted only with patients who are being received treatments at the Ragama Hospital. The test results show that the system is able to communicate easily with patients in decent accuracy.

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