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Entitled

INTERACTIVE EMIRATE SIGN LANGUAGE E-DICTIONARY BASED ON DEEP LEARNING RECOGNITION MODELS

by

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Abstract

According to the ministry of community development database in the United Arab Emirates (UAE) about 3065 people with disabilities are hearing disabled (Emirates News Agency - Ministry of Community Development). Hearing-impaired people find it difficult to communicate with the rest of society. They usually need sign language interpreters (SL) but as the number of hearing-impaired individuals grows the number of sign language interpreters can almost be non-existent. In addition, specialized schools lack a unified sign language (SL) dictionary, which can be linked to the Arabic language being of a diglossic nature, hence many dialects of the language co-exist. Moreover, there are not sufficient research work in Arabic SL in general. Hence, presenting an Emirate Sign Language (ESL) electronic Dictionary (e-dictionary), consisting of four features, namely Dictation, Alpha Webcam, Vocabulary, and Spell, and two datasets (letters and vocabulary/sentences) to help the community in exploring and unifying the ESL. The vocabulary/sentences dataset was recorded by Azure Kinect and includes 127 signs and 50 sentences, making a total of 708 clips, performed by 4 Emirate signers with hearing loss. All the signs were reviewed by the head of the Community Development Authority in UAE for compliance. ESL e-dictionary integrates state-of-the-art methods i.e. Automatic Speech recognition API by Google, YOLOv8 model trained on our dataset, and an algorithm inspired by bag of words model. Experimental results proved the usability of the e-dictionary in real-time on laptops. The vocabulary/sentences dataset will be publicly offered in the near future for research purposes.

Keywords: Emirate Sign Language, Automatic speech recognition, ESL data set, ESL electronic dictionary, YOLO, Automatic Speech Recognition.