

Sign Language Recognition of Static Gestures Using Kinect™ and Convolutional Neural Networks

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Abstract : This work proposes a supervised framework with deep convolutional neural networks (CNNs) for vision-based sign language recognition of static gestures. Our approach addresses the acquisition and segmentation of correct inputs for the CNN-based classifier. Microsoft Kinect™ sensor, despite complex environmental conditions, can track hands efficiently. Skin Colour based segmentation is applied on cropped images of hands in different poses, used to depict different sign language gestures. The segmented hand images are used as an input for our classifier. The CNN classifier proposed in the paper is able to classify the input images with a high degree of accuracy. The system was trained and tested on 39 static sign language gestures, including 26 letters of the alphabet and 13 commonly used words. This paper includes a problem definition for building the proposed system, which acts as a sign language translator between deaf/mute and the rest of the society. It is then followed by a focus on reviewing existing knowledge in the area and work done by other researchers. It also describes the working principles behind different components of CNNs in brief. The architecture and system design specifications of the proposed system are discussed in the subsequent sections of the paper to give the reader a clear picture of the system in terms of the capability required. The design then gives the top-level details of how the proposed system meets the requirements.

Keywords : sign language, CNN, HCI, segmentation

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