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Convolutional Neural Network Based Bidirectional Sign Language Translation System

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Abstract: *This paper focuses on experimenting with different segmentation approaches and unsupervised learn- ing algorithms to create an accurate sign language recognition model. To more easily approach the problem and obtain reasonable results, we experimented with just up to 10 different classes/letters in our self- made dataset instead of all 26 possible letters. We collected 12000 RGB images and their corresponding depth data using a Microsoft Kinect. Up to half of the data was fed into the auto encoder to extract features while the other half was used for testing. We achieved a classification accuracy of 98selected set of test data using our trained model. In addition to the work, we did on static images, we also created a live demo version of the project which can be run at a little less than 2 seconds per frame to classify signed hand gestures from any person. The problem we are investigating is sign language recognition through unsupervised feature learning. Being able to recognize sign language is an interesting computer vision problem while simultaneously being extremely useful for deaf people to interact with people who don't know how to understand American Sign Language (ASL). Hand gesture is one of the methods used in sign language for non-verbal communication. Various sign language systems have been developed by many makers around the world but they are neither flexible nor cost-effective for the end users.*

Keywords: Image processing, Noise removal, Feature extraction and matching, Static and dynamic gesture

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