

ABSTRACT

With time, computing and neural network has become more sophisticated and can be applied for various uses. One common and vital use of this technology is for computer vision. Just like a human brain, which the neural network imitates, computer vision can be used to classify and detect objects for various reasons. This ranges from smart systems to quality control in factories.

An up-and-coming usage of computer vision is to help those with impaired hearing and users of sign language communicate with those who can't. This is done by detecting the sign language and converting it to other forms of communication such as text, audio output, and more.

In this project, a two-way translator application is made with 3 features: gesture detection, text-to-speech, and speech-to-text translator. Convolution Neural Network (CNN) is used as the model for the gesture detection and the language used is English for verbal and American Sign Language (ASL) for the signed. Confusion matrix and loss and accuracy evolution were analysed to see the effectivity of the model. The accuracy of the model was found to be 82.6% with certain independent variable factors (bright lighting, single-coloured background, using front-facing left hand, and fully covering the ROI box for gestures). The application Graphical User Interface (GUI) was made using Tkinter in python. Although not directly translated to speech due to coding limitations, having the detection feature is an important part as it shows potential of what the translator could be.

Keyword: Convolution Neural Network, American Sign Language, Python, Object Classification, Object Detection, Impaired Hearing Translator, Tkinter, Graphical User Interface.