Sign Language Recognition and Speech Synthesis Device

IDEA

Sign language is a means of communication for individuals with hearing impairments. However, a barrier arises when communication with those who do not understand sign language is required. Similarly, individuals who rely on spoken language may struggle to understand sign language. The objective of this project is to bridge the communication gap people with hearing/speech impairments face by developing a device capable of both recognizing sign language and converting it to speech. This project could be useful in professional settings like hospitals or banks.

How do we propose to achieve this idea?

We wish to create an embedded system smart device for this project. Along with an appropriate microcontroller, it will use a camera to capture the hand signs as form of input.The device will give output in the form of speech(possibly through a sound speaker) and also through a interface app that displays the transcript of the sign language detected. This app could also translate this transcript into different languages. We will be making use of machine learning model library to detect the hand sign gestures with a good confidence score. (using mediapipe library in python).

Possible components to be used for the project

We are planning to use a esp-32S mcu primarily because of its inbuilt wifi and bluetooth modules. We also wish to use a camera module for capturing input.We also plan to use the Wifi client secure library.It is the library which actually handles TLS-encrypted WiFi connections to a remote server or client. This will help in displaying the captured hand signs onto the app that displays transcript.

Block Design