

A complete end to end system for increasing the communication between the deaf and dumb people

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Abstract

Most of the people in this world are lucky enough to be a healthy person, and achieving heights in their life. But unfortunately few are unlucky with their disabilities and this limits their opportunities and thus they have very hard times to achieve what they want. We need to solve this problem. As we cannot help all the disabled people in one go, we are going to mainly focus on deaf and dumb people, that is who are unable to hear and speak. We are going to build a communication system for them which is completely relayed on Artificial Intelligence. As most of the deaf and dumb people know the sign language, this system can recognize the hand signs as English alphabets and converts them into a sentence. This complete system will be an android application so as to increase the user adaptability. Our aim is to increase the communication of deaf and dumb people between each other and among the society, their disability should not lead them back. This project can leverage the power of Artificial Intelligence and solve the real problems which are based on humanitarian grounds.

1 Keywords:

Hand Sign Language, Disabled people, Communication, Computer Vision, Machine Learning, Android application.

2 Problem Statement:

Many people who are deaf learn Sign Language to communicate with each other and with society. But as of a perspective of a common healthy person, there is no need to learn sign language for him, but that's not the scenario in the case of the disabled people, it's their only one way to communicate. As a result, individuals with disabilities face various challenges such as lack of respect in society, low self-confidence, and limited opportunities. These difficulties stem from communication barriers.

3 Solution:

To address this issue, our team is developing a solution aimed at bridging the communication gap for individuals with disabilities. We are going to utilize the power of Artificial Intelligence and Machine Learning by building a complete end to end system for them. We're approaching the challenge by focusing on converting sign language gestures into letters or sentences, simplifying communication complexities, but how? That's where we are going to use computer vision techniques to recognize the hand signs and then by using ML techniques we are going to detect

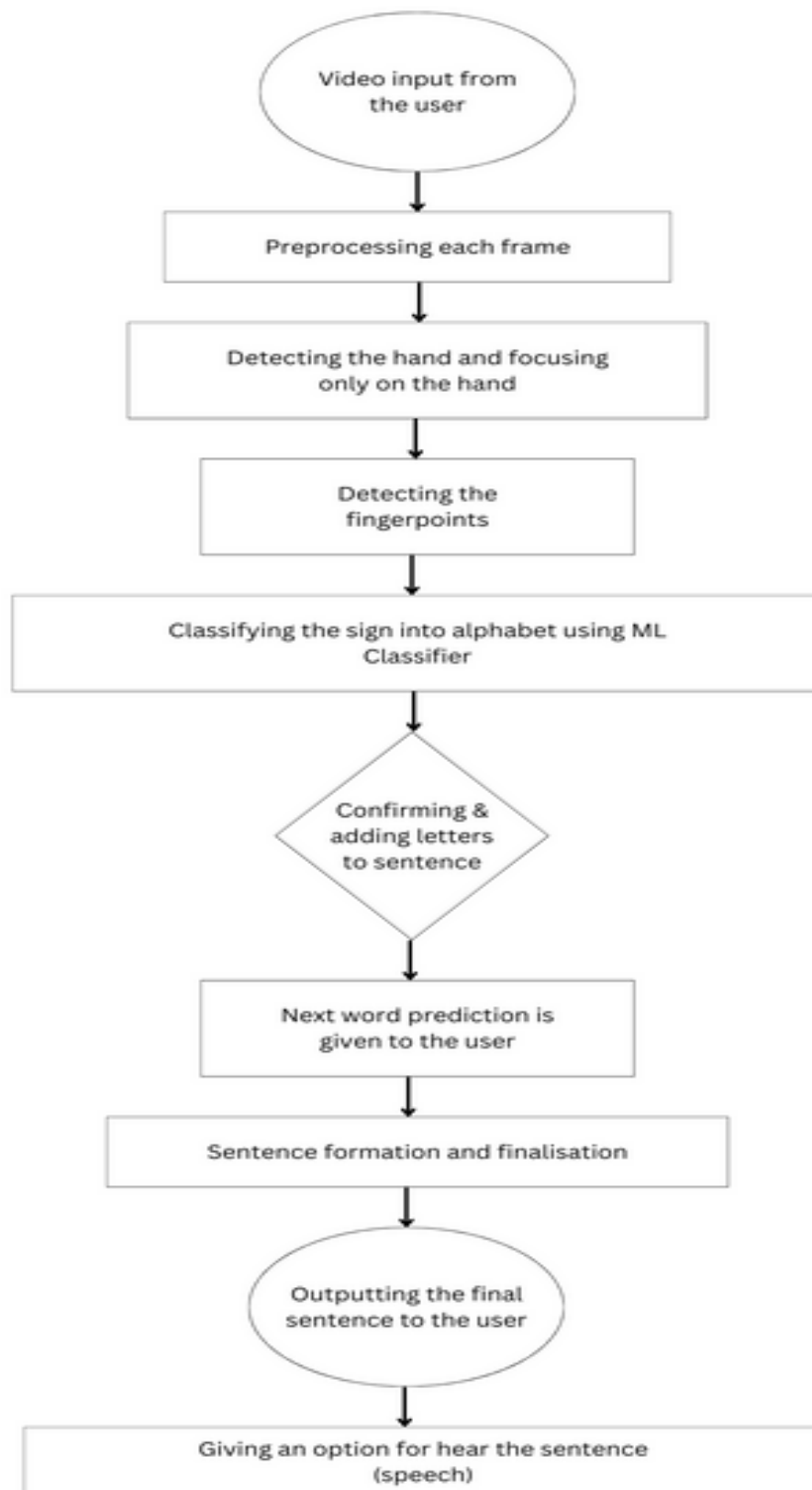
the alphabet and thus forming a meaningful sentence, with which they can communicate. This will be totally deployed as an android application in the production level.

4 Technical Approach:

Users utilize our application on their smartphones, and by accessing the front camera on the device we can get the video input of the user showing hand signs. Rather than recognizing the complete frame, we are going to find whether there is hand in the frame or not.

If yes, then the recognizing algorithm will be limited to a bounding box space of the hand and from that the hand sign input data will be collected. By using the hand points concepts we are going to classify the letters. In the actual sign language, letter 'J' and 'Z' are gestures, so we are excluding those. After recognizing the letter, the output is shown to the user if he confirms then the process continues. The letters concatenate to each other and at last using Natural Language Processing, we are going to form a sentence which is finally shown to the user. We are going to include few features like auto correction of the words- which can auto correct the wrongly spelled words, next word prediction- which can predict the next word and the next word can be selected by the user. This is the complete Technical approach of this project.

5 Flowchart:



6 Prototype:

The project prototype is ready and we are working on the final version of the project. This prototype can recognize the alphabets by the hand sign. Here are few image of the working of the prototype.

Here is the link of the video of our project prototype:[Click here](#)

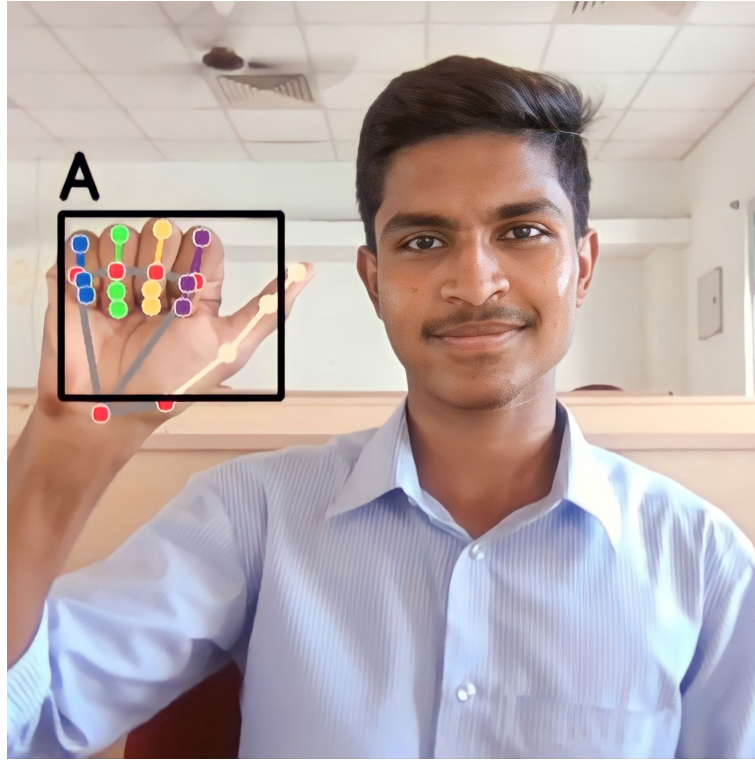


Figure 1: Prototype of our project