Sign Language Translation Using Neural Network And Machine Learning

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Overview

Sign Language Translator is a Machine Learning Web-based solution system to provide deaf people ease of communication with the world. According to WHO 466 million people across the world have hearing loss. Our tool uses computer vision, machine learning and Deep learning methods. To solve a problem that should be solved to give everyone an equal chance of being heard. Our tool helps recognize multiple dataset like ASL Sign and also helps us to train our own model which would be beneficial for everyone trying to get their own languages heard

Problem Statement

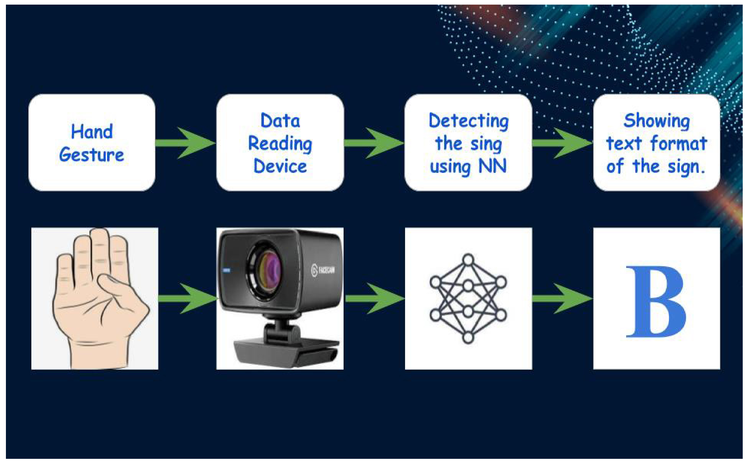
Socializing with everyone is essential in our forward-thinking society, whether for fun or work. Every human needs to be able to communicate. However, because of conditions like being deaf or dumb, millions of individuals nowadays have trouble interacting. Nevertheless, individuals with speech or hearing issues require a different form of communication than vocalization. The obvious solution to this issue is technical because it can be implemented globally with little investment in time or money.

To encourage deaf people to participate more worldwide, our team wants to develop a project. The problem statement revolves around a camera-based sign language recognition system that would be utilized by the deaf to translate sign language movements to text. Our project will primarily serve the deaf community, but anyone who wants to learn sign language can also utilize it as an educational tool.

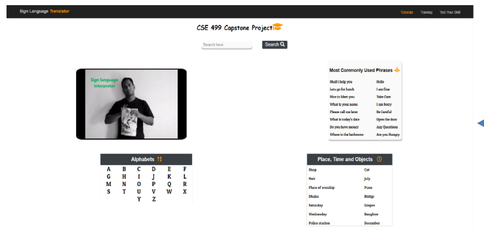
Project Goals

- ❑ Researching works and products various data set like American Sign Language
- ❑ Building a real-time Sign Language Recognition model which is on Picture Recognition based
- ❑ Sign language production for general people to learn and use our word generator to generate signs accordingly
- ❑ Detection of a real-time sign with the help of a web camera on web-based devices or a camera on android devices
- ❑ Characterize sign language Translation
- ❑ Sign Language Translator is a tool to assist people with speaking disabilities
- ❑ It eliminates the need for a translator by translating sign language
- ❑ It enables the opposite person to understand what is being conveyed
- ❑ It also helps with spoken language by displaying it in text
- ❑ It can assist in both directions: sign language to text and text to sign language
- ❑ Training our own model using custom dataset that were produced for this project.

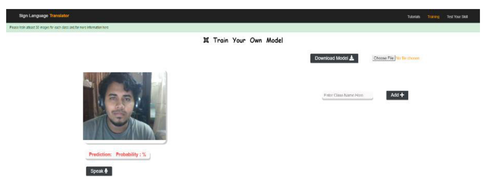
Main Architecture of Our Prototype



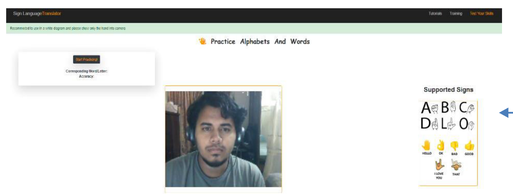
User Interface of Web App



Landing Page



Training Page

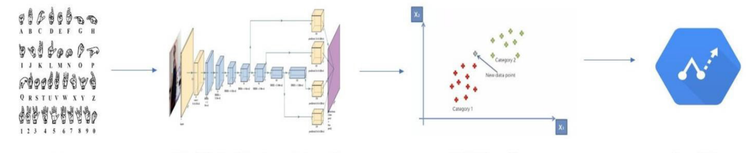


Translator for ASL

Technologies Used

HTML CSS JS TensorFlow TensorFlow.js

Infrastructure of Model Building



Limitations and Future Growth

Since we had limited time to work on the prototype the user has to have a white Background for it work on. We also wished to include a larger dataset but due to financial constraints we had to settle with this amount.

The model and text to speech can be embedded into a video calling system. Thereby allowing the user to show the gestures and the receiver on the call will receive the message in the form of text or speech. While the receiver responds, the message will be relayed to the hearing/speech impaired user via text (subtitles).

Conclusion

This project was undertaken to solve the underlying issue faced by speech-impaired people. This tool, however, helps in eradicating the social stigma of them not being able to participate in many domains and successfully gives them the confidence to stand upright in any field they want. The application provides the necessary platform to communicate with much ease and gives them the ability to interact without any external help. The need for an interpreter is eradicated and the smooth flowing of a conversation is well-developed.