IMPLEMENTATION OF KANNADA SIGN LANGUAGE RECOGNITION FOR DEAF AND DUMB

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College ***:*** *APS College of Engineering, Somanahalli, Bengaluru*
Branch ***:*** *Department of Computer Science and Engineering*
Guide(s) ***:*** *Mrs. Bhagyashree R*
Student(S) ***:*** *Mr. Shreyas K*
Ms. Nayana R
Ms. Varsha S
Mr. Vikas L

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Introduction:

A sign language may be a collection of gestures, movements, postures, and facial expressions similar to letters and words in natural languages. So, there should be the way for the non-deaf people to recognize the deaf language (i.e., sign language). Such process is understood as a sign language recognition. The aim of the sign language recognition is to supply an accurate and convenient mechanism to transcribe sign gestures into meaningful text or speech so communication between deaf and hearing society can easily be made. to achieve this aim, many proposal attempts are designed to create fully automated systems or Human Computer Interaction (HCI) to facilitate interaction between deaf and non deaf people.The Indian sign language lag its American counterpart as the research in this field is hampered by the lack of standard datasets. Unlike American sign language uses single hands for making gesture. Indian sign language is subjected to variance in locality and the existence of multiple signs for the same character.

Objectives:

The main objective of our project is to make the communication experience as complete as possible for both deaf and dumb people. The work presented in Indian Regional language, Kannada, the goal is to develop a system for automatic translation of static gestures of alphabets in Kannada sign language. Sign of the deaf individual can be recognized and translated in Kannada language for the benefit of deaf & dumb people. The training set consists of 70% of the aggregate data and remaining 30% are used as testing. We concentrate more on developing ISL (Indian Sign Language) along with Indian regional language, Kannada. KSL (Kannada Sign Language) uses single hand for text recognition, provided in KSL Swaragalu, is in under research and implementation. Implementing both Swaragalu, and vyanjanagalu, We totally implement 49 Varna male() letters and Try recognising with the higher accuracy. we are also trying to implement in complex background and have to achieve more accuracy.

- This project proposes a new efficient method for user independent sign language recognition based on depth images.
- Through this sign to text conversion, we can also send the message to the respective recipient.

Methodology:

Methodology is a specific procedure or a technique used to identify, select, process and analyse the information about the topic. Flowchart of proposed system workflow is as shown in the below figure.

- The first step in implementing a sign language recognition system is to collect a large and diverse dataset of video recordings of Kannada sign language gestures made by a diverse set of signers.
- Once the dataset is collected, the video data needs to be preprocessed to enhance image quality, remove noise or interference, and segment the signs from the background.
- After preprocessing the video data, the next step is to use the Hand Tracking module of the Mediapipe library to track the movement of the signer's hand in the video frames.
- Then training a machine learning model, such as a convolutional neural network (CNN), on the preprocessed data to recognize different signs.
- The trained model needs to be optimized and fine-tuned to recognize signs with higher accuracy.
- After training, the model's performance needs to be tested and validated on a separate set of test data to measure its accuracy and ensure it generalizes well to unseen data.
- Once the model is trained and validated, it can be deployed into an application.
- The final step in implementing a sign language recognition system is to continuously monitor the system's performance and improve the model's accuracy.

Modules Implemented:

- Data Acquisition(KSL)
- Data Preprocessing
- Image Segmentation
- Feature Extraction
- Classification Using CNN
- Deployment to an application

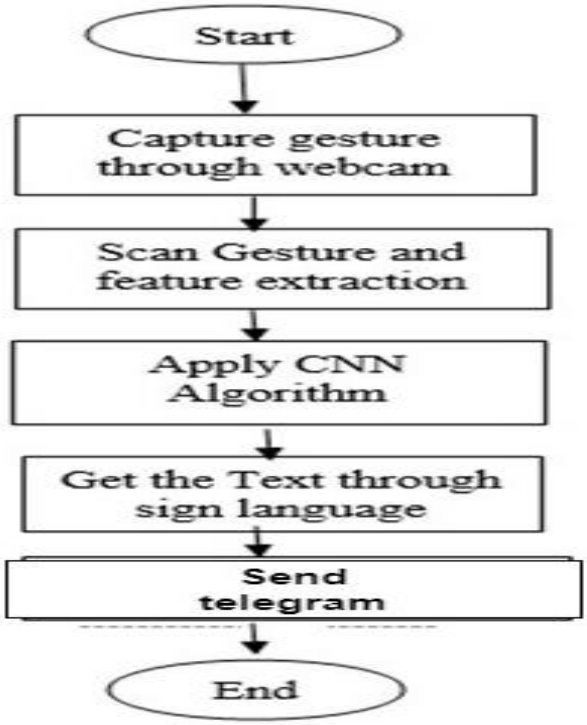

Figure 1. Flowchart of proposed work

Result and Conclusion:

The project aims to recognize the hand gestures used in Kannada sign language and convert them into text enabling better communication between the deaf and dumb communities. The implementation of the project involves several key steps, including data collection, pre-processing, feature extraction, model training, and real-time gesture recognition using the Mediapipe library. Mediapipe provides a range of tools and utilities for multimedia processing, including hand tracking, pose detection, face detection, and object detection, making it a powerful and versatile library for computer vision and machine learning applications. With the increasing adoption of digital technologies and the need for inclusive communication, Kannada Sign Language Recognition using Mediapipe has the potential to make a significant impact in the lives of people with hearing disabilities.

Scope For Future Work:

There can be number of future advancements that can be associated with the project work and some of which are described as follows:

• We are planning to achieve more accuracy even in case of complex backgrounds by trying out various background subtraction algorithm.

• We are also thinking of improving the pre-processing to predict gesture in low light conditions with a high accuracy.

• The system can be further expanded for kagunitha of Kannada Language and also add grammatical structure for sign language.

Reference:

[1] Simões, G. L., & Freitas, C. M. (2021). “Brazilian Sign Language Recognition Using Deep Learning Models”. In International Joint Conference on Neural Networks. IEEE.

[2] Wu, X., Li, Y., Zhou, F., & Li, J. (2021). “Recognition of Chinese Sign Language Based on YOLOv5 and CNN”. IEEE Access, 9, 42625-42636.