INTERNATIONAL JOURNAL OF ENGINEERING INNOVATIONS IN ADVANCED TECHNOLOGY
ISSN [O]: 2582-1431 VOLUME-4 ISSUE-1 JAN-MAR 2022 pp: 83-86

Human Sign Language Recognition Using Deep Learning

B.Jyothi
Anurag Group Of Institutions, Department Of CSE, Hyderabad, India.
Email: bjyothicse@cvsr.ac.in

K.Divya, Malladi Pattabhi Rama Chandra Murthy, K.Rishwanth Reddy
Anurag Group Of Institutions, Department Of CSE, Hyderabad, India.
Email: divyareddy0031@gmail.com, malladipattabhi7@gmail.com, Rishwanthkp@gmail.com

***Abstract*—Human Sign Language Recognition can be used to identify the language expressed by hand movements of a person or can identify a sign from an image and express the movements in the form of text and speech. Our main focus is to recognize the hand signs of a person by using CNN model. Sign language is specially used by handicapped to pass on their thoughts. By implementing sign language recognition using machine learning, we can easily recognize, predict, and infer the meaning behind every single gesture in no time.**

***Index Terms*—Machine Learning, Convolutional Neural Network, Hand Gesture Recognition , Natural language Processing, Sign Language**

I.. INTRODUCTION

The Main challenge faced by a vocally impaired person is with effective communication. A large communication gap is found between - special person and normal person. Deaf and Dumb people always face difficulty in communicating with normal person. This is a huge challenge that makes them uncomfortable and is the reason for them to isolate themselves from the society and gatherings. It is due to this communication challenge that Deaf and Dumb people feel not to communicate and hence they struggle to express their feelings. A Hand Gesture Recognition and Voice Conversion system localises and tracks the hand gestures of the vocally and hearing-impaired individual in order to maintain a communication channel with the other people. The detection of hand gestures can be done using a web camera. The pictures are then converted into standard size with the help of pre-processing. As the number of people with vocal defects is increasing every day, it is essential for even a normal person to learn how to communicate using Human Sign Language. Sign language Recognition is an efficient way of bridging the communication gap between a vocal impaired person and a vocal communicator. We aspire to make sign language communication effective through Human Sign language Recognition.

Manuscript received February 13,2022; Revised March 23, 2022; Accepted March 27, 2022.

II.. LITERATURE SURVEY

A. Two Way Communicator between Deaf and Dumb People and Normal People.

Ahire, Prashant G., et al. One of the most precious gifts of nature to human beings is the ability to express himself by responding to the events occurring in his surroundings. Every normal human being sees, listens and then reacts to the situations by speaking himself out. But there are some unfortunate ones who are deprived of this valuable gift. This creates a gap between the normal human beings and the deprived ones. This application will help for both of them to communicate with each other. The system is mainly consists of two modules, first module is drawing out Indian Sign Language (ISL) gestures from real-time video and mapping it with human-understandable speech. Accordingly, second module will take natural languages input and map it with equivalent Indian Sign Language animated gestures. Processing from video to speech will include frame formation from videos, finding region of interest (ROI) and mapping of images with language knowledge base using Correlation based approach then relevant audio generation using Google Text-to-Speech (TTS) API. The other way round, natural language is mapped with equivalent Indian Sign Language gestures by conversion of speech to text using Google Speech-to-Text (STT) API, further mapping the text to relevant animated gestures from the database.

B. Development Of Hand Gesture Recognition System For Speech Impaired People.

Ms R. Vinitha and Ms A. Theerthana. The speech impaired people suffer from lack of communication which can be overcome by a hand gesture recognition system. The hardware module consists of a flex sensor and MEMS sensor which is arranged in a manner to

correctly get positioned in fingers. The concept of decoding of hand gesture movements is made possible by considering the axis orientation of the MEMS sensor with respect to gravity and it will generate some voltage values. The accelerations of a hand motion three perpendicular directions are detected by our MEMS sensor and get transmitted to the microcontroller. Gesture is recognized by comparing the acceleration values with the stored templates values and an automatic gesture recognition algorithm is developed to identify individual gestures in a sequential ord

III.. Hardware Components

A. External Web Camera

An external Webcam with a better resolution (1080px) and pixel is used in this process to increase the efficiency of the system in terms of reducing the noise values that frequently occur while analyzing a video. This webcam is attached to the machine in which the code is being run, and the video of hand gestures is taken through it. The whole idea of using this external webcam is that the built-in webcam quality in many machines is most likely to provide massive noises that can effect the accuracy of the prediction.

IV. Methodology

The first step in our project is model generation. We first upload a dataset that has all the necessary handmade signs and their corresponding meanings that are required for our output. The dataset is a mixture of text and images.

With the help of Gausian Blur and other preprocessing techniques, we will then decrease the noises that the live fed data has so as to increase the accuracy of the system.

The dataset now goes through different layers of CNN to extract the features required for the recognition of hand gestures. Several weights (or importance) is assigned to the given data and the model is trained according to it.

Now from the dataset provide, the preprocessing, and the training, a model is generated that is capable of predicting the signs made by a person's hand.

In our project, the activity of Predicting the hand gestures made by a person will be done through live feed of data in the form of video. The gesture made by a person in the live feed video will first be collected. Using computer vision, we will then be able to detect the most important portion of the fed video, which is the hand, and proceed to Preprocessing of the data received.

Convert image to binary or grey format and back ground removal. The divided frame is then preprocessed. The preprocessing is done to convert the image into binary format and also to remove the background noise or disturbance to get accuracy in the output.

The preprocessed image is compared with the train data set and the output is represented in the form of text and audio.

V. Architecture

A. *Block diagram*

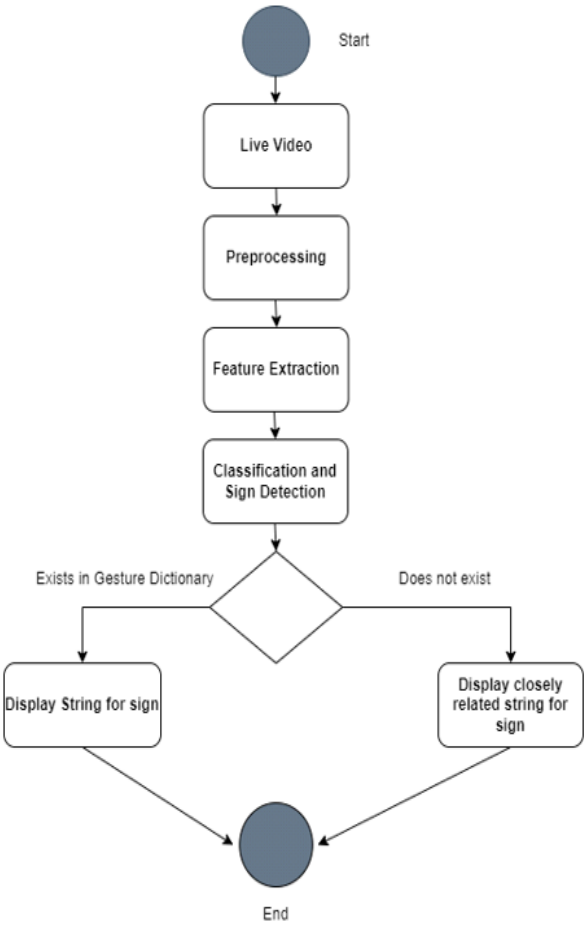
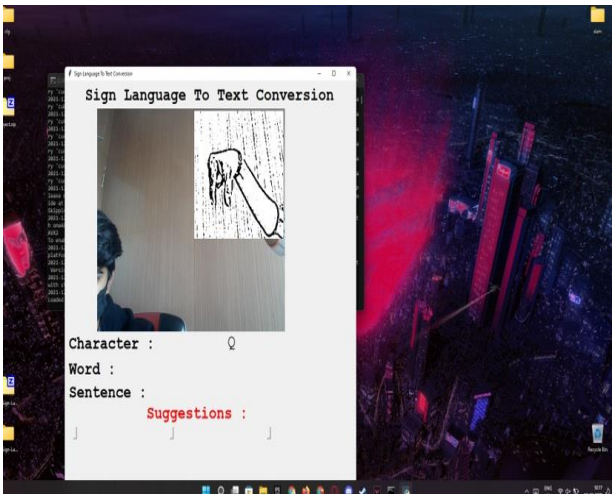


Figure 1 Architecture Block Diagram

B. RESULT



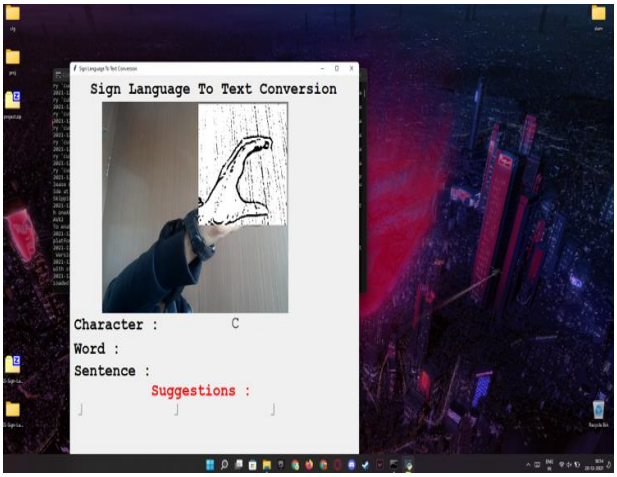


Figure 2 Sign Language to Text conversion

CONCLUSION

With this project, we can decrease the testing time for hand gesture recognition which lets us output the intended message even quicker. A lot of resources are saved. This is a much cheaper alternative to the existing mechanisms of testing. As the data increases, the accuracy shall increase. To conclude the project, hand gestures recognition which are widely used in mobile applications, sign language detection, etc are implemented here & the accuracy of the model is maintained.

FUTURE ENHANCMENT

A web-based application can be built where-in the user can directly upload the video or use web-cam to take the live feed and use the web app for the overall session and store it in the database. It can also be used in virtual meeting applications such as google meet and other services in identifying the gestures made by a vocally impaired individual and convert the same into text.

REFERENCES

[1] Shinde, Shweta S., Rajesh M. Autee, and Vitthal K. Bhosale. "Real time two way communication approach for hearing impaired and dumb person based on image processing." Computational Intelligence and Computing Research (ICCIC), 2016 IEEE International Conference on. IEEE, 2016.

[2] Shangeetha, R. K., V. Valliammai, and S. Padmavathi. "Computer vision based approach for Indian Sign Language character recognition." Machine Vision and Image Processing (MVIP), 2012 International Conference on. IEEE, 2012.

[3] Sood, Anchal, and Anju Mishra. "AAWAAZ: A communication system for deaf and dumb." Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO), 2016 5th International Conference on. IEEE, 2016.

[4] Ahire, Prashant G., et al. "Two Way Communicator between Deaf and Dumb People and Normal People." Computing Communication Control and Automation (ICCUBEA), 2015 International Conference on. IEEE, 2015.

[5] Ms R. Vinitha and Ms A. Theerthana. "Design And Development Of Hand GestureRecognition System For Speech Impaired People."

[6] Kumari, Sonal, and Suman K. Mitra. "Human action recognition using DFT." Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), 2011 Third National Conference on. IEEE, 2011.

[7] C. Linqin, C. Shuangjie and X. Min, "Dynamic hand gesture recognition using RGB-D data for natural human-computer interaction," Journal of Intelligent and Fuzzy Systems, 2017.

[8] V. Bheda and D. N. Radpour, "Using Deep Convolutional Networks for Gesture Recognition in American Sign Language," Department of Computer Science, State University of New York Buffalo, New York.

[9] A. Krizhevsky, I. Sutskever and G. Hinton, "Imagenet classification with deep convolutional neural networks," Advances in Neural Information Processing Systems.

AUTHORS PROFILE

B.Jyothi is one of the co-authors of this paper. She has received Master of Technology in computer science and Engineering from Jawaharlal Nehru Technological University, Hyderabad in 2010, and she is Pursuing Ph.D in computer science and Engineering with major specialization on Trajectory Data Mining from KLEF.
She is currently working as Assistant Professor in the field of computer science and engineering, from Anurag Group of Institutions, Hyderabad, Telangana, India. Her research interests are in the fields of Data Mining and Big Data Analysis. She had published papers on 'Education through soft learning in India' and 'Efficient load reblancing problem in hadoop distrubuted file system'.

Malladi Pattabhi Rama Chandra Murthy is one of the co-authors of this paper. He was born in Andhra Pradesh on March 22, 2001. He is currently pursuing my B.Tech. Degree in the field of computer science and engineering, from Anurag Group of Institutions, Hyderabad, Telangana, India. He is currently working at Cognizant Technology Solutions as an Intern in Hyderabad. He has authored a book on Marketing titled "Build Your Perfect Online Persona" (Hyderabad, Telangana: Amazon Kindle, 2021). Previous research interests of him are in the fields of Machine Learning and Artificial Intelligence. His current field of Interest is Blockchain Technology. He is an active participant in the paper presentation events conducted at his college and enjoy collaborative learning.

K.Divya is one of the co-authors of this paper. She was born in Telangana on March 2,2000. She is currently pursuing my B.Tech. Degree in the field of computer science and engineering, from Anurag Group of Institutions, Hyderabad, Telangana, India. She is currently working at Price WaterHouse Coopers as an Intern in Hyderabad. Previous research interests of her are in the fields of Machine Learning and Artificial Intelligence. Her current field of Interest is Blockchain Technology. She is an active participant in the paper presentation events conducted at her college.

K.Rishwanth Reddy is one of the co-authors of this paper. He was born in Telangana on April 20, 2000. He is currently pursuing my B.Tech. Degree in the field of computer science and engineering, from Anurag Group of Institutions, Hyderabad, Telangana, India. His previous research interests are in the fields of Machine Learning. His current field of Interest is Blockchain Technology. He is an active participant in the paper presentation events conducted at his college.