International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE)
ISSN: 0976-1353 Volume 28 Issue 6 – JUNE 2021.

Hand Gesture Recognition Using CNN

N.Manaswi[#1] and V.Sushma[#2] and V.PavanVarma[#3]

[#]B.Tech, Computer Science and Engineering,Dhanekula Institute of Engineering & Technology, Vijayawada, Andhra Pradesh 521139

***Abstract*— Communication is the main communication channel between people. The number of sour and stupid deaths due to birth defects, accidents and oral conditions has increased rapidly in recent years. Because sour and stupid people are unable to communicate with normal people, they have to rely on visual communication. Sometimes those messages are misinterpreted both through signal language or through lip studying or lip syncThis project helps these people with special challenges to stay in society on an equal footing.**

***IndexTerms*—CNN,Keras,TensorFlow,Opencv,Sign lanuage**

I. INTRODUCTION

We always hear about new technology that improves our lifestyle and makes our lives easier these days. Humankind has been transformed by technological advancements. Mankind has made a great contribution. They have a technology gear and are not in the mood to move it.away from this gear with the pedals There is a lot of research on this subject.Artificial Intelligence, for example, is a diverse technology area.Smartphones are only a few examples. This research resulted in the development of new technologies.

Inventions and making one's life easier are two things that come to mind while thinking about inventions. However,there has been a There is a scarcity of research for Deaf and Dumb persons. This subject has in comparison to other industries, they receive less attention. The transmission gap between -special person and normal person is one of the main obstacles that this unique person faces. Deaf and dumb humans have a difficult time speaking with ordinary humans. This enormous challenge makes them uneasy, and they believe they are being discriminated against in society. Due to a lack of communication, Deaf and Dumb people believe they are unable to communicate and, as a result, they are unable to express their feelings. The HGRVC(Hand Gesture Recognition and Voice Conversion) technology locates and tracks the hand motions of deaf and dumb persons so that they can communicate with others.

Hand motions may be detected with the usage of an internet camera. With the help of pre-processing, the images are then converted to normal size. This project's goal is to make a system which will translate hand motions into text. The goal of this project is to save the images in a database and then convert them to text using database matching. Hand motion is determined as a part of the detecting technique. The technology generates text output, which aids in bridging the communication gap between deaf-mutes and humans.[1]

II. LITERATURE SURVEY

In recent years, birth defects, accidents and oral diseases have led to an increase in the number of deaf-mute people.. Because deaf and dumb persons are unable to speak with normal people, they must rely on visual communication.

Gestures are expressive movements of body parts that convey information, such as movements of the head, face, arms, hands, or torso. The mathematical interpretation of a human motion by a computing equipment is known as gesture recognition. The finest communication platform for hearing impaired and deaf people to communicate with normal people is sign language. The goal of this study is to create a real-time hand gesture recognition system that recognises hand gestures as well as hand attributes such as peak computation and angle calculation, and then converts gesture images into voice and vice versa. We use a simple night vision webcam with a 20 megapixel intensity to construct this solution. The concepts included creating and implementing a system that used hand gestures as input and generated recognised outputs in the form of text and voice with 91 percent accuracy using artificial intelligence, image processing, and data mining principles. Deaf and dumb people use sign languages to interact with one another, but they have a hard time exposing themselves to the outside world. This research presents a system for translating hand motions in Indian Sign Language (ISL) into relevant text messages. Hand moves similar to ISL English alphabets are captured the usage of a webcam on this work.The hand is split in the collected frames, and the state of the fingers is used to recognise the letters.[2]

III. EXISTING SYSTEM

We always hear about new technology that improves our lifestyle and makes our lives easier these days. Humankind has been transformed by technological advancements. The human race has placed a gear in technology and is not in the mood to shift the pedals away from it.This research resulted in new inventions and made life easier for people. However, research on Deaf and Dumb persons has been scarce. In comparison to other sectors, this problem has received less attention. The communication gap between -special person and normal person is one of the main obstacles that this unique person faces. In this SVM technique is used.[3]

IV. PROPOSED SYSTEM

Due to a scarcity of communication, deaf and dumb people believe they're unable to speak and, as a result, they're unable to precise their feelings. the hgrvc (hand gesture recognition and voice conversion) technology locates and tracks the hand motions of deaf and dumb persons in order that they will communicate with others. Hand movements are usually recorded with a webcam. with the assistance of pre-processing, the pictures are then converted to normal size. this project's goal is to make a system which will translate hand motions into text. the goal of this project is to save lots of the pictures during a database then convert them to text using database matching.Here CNN Technique is used.[20]

V. WORK FLOW

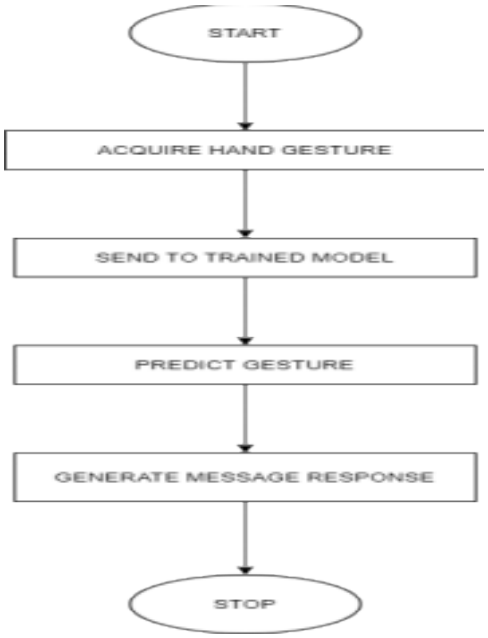


Figure 1:Flow Chart

5.1 Functional Requirements:

In software engineering, a functional requirement defines a function of a software or its component. The function is described as a set of inputs, behaviors and departures Functional requirements may be calculations, technical details, data manipulation, processing and other specific functionality that define what a system is supposed to accomplish.[5]

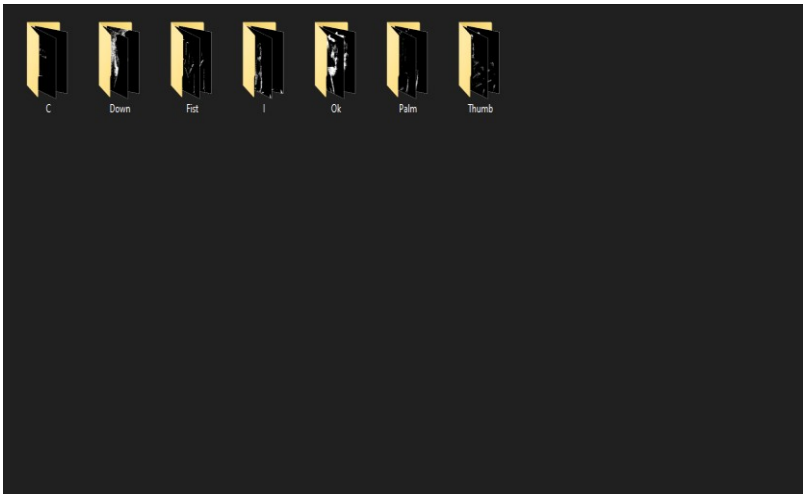
5.2 Non-Functional Requirements:

In software engineering and requirements engineering a non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system rather than specific behaviours.
The project non-functional requirements include the following:
• Perform gestures with precision in the correct posture.
• Basic knowledge on the sign language.
• Listen to the instructions issued by the system and respond seriously.

1) Scalability
2) Portability
3)Ease of use
4) Usability

5.3 Datasets and Data

Data plays an important in the area of Data science, Artificial Intelligence. The accuracy depends on the data provided to the algorithm.. Our dataset contains different gestures.[7].here we taken the dataset as C,Down,I,Ok,Palm,Thumb up and down.



VI. ALGORITHMS

The process of taking an input (such as a photograph) and Its category, or the possibility of belonging to that category, is called image classification.The following steps are used to apply the neural network:
1. **The data is hot encoded by one person**: The integer representation can be encoded with a one-hot encoding. For each unique integer value, the integer encoded variable is removed and a new binary variable is added.
2. **Establish the model:** In its most basic form, a model is nothing more than a function that takes in specific input, performs certain operations to the best of its ability on the provided input (learning and then predicting/classifying), and produces the appropriate output.
3. **Compile the model:** The optimizer regulates the rate of learning. Our optimizer will be called 'Adam.' For the most part, Adam is a nice optimizer to employ. During training, the Adam optimizer changes the learning rate. The learning rate controls how quickly the model's optimal weights are calculated. A slower learning rate may result in more accurate weights (up to a point), but it will take longer to compute the weights.
4. **Train the model:** Learning (determining) good values for all of the weights and the bias from labelled samples is what training a model entails. A machine learning algorithm generates a model in supervised learning by studying numerous examples and tries to find a model that minimises loss; this process is known as empirical risk minimization.
5. Test the model
A convolutional neural network convolves learned featured with input data and uses 2D convolution layers.[10]

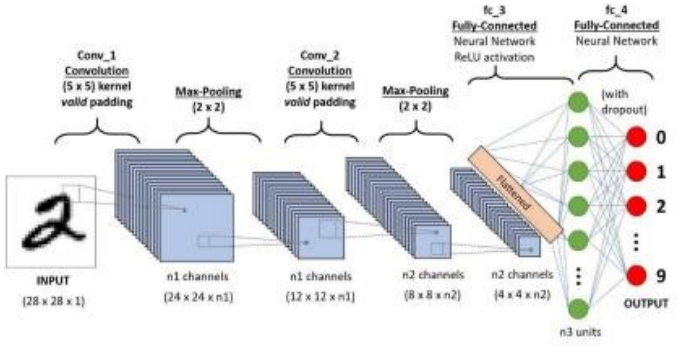
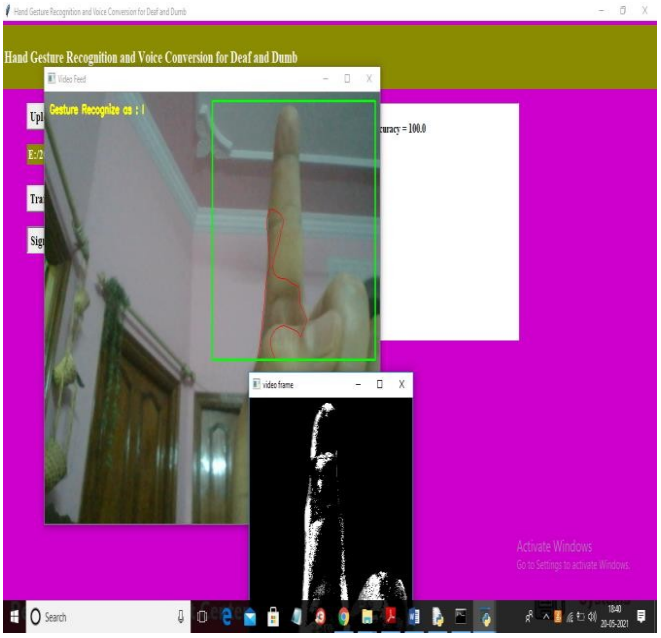
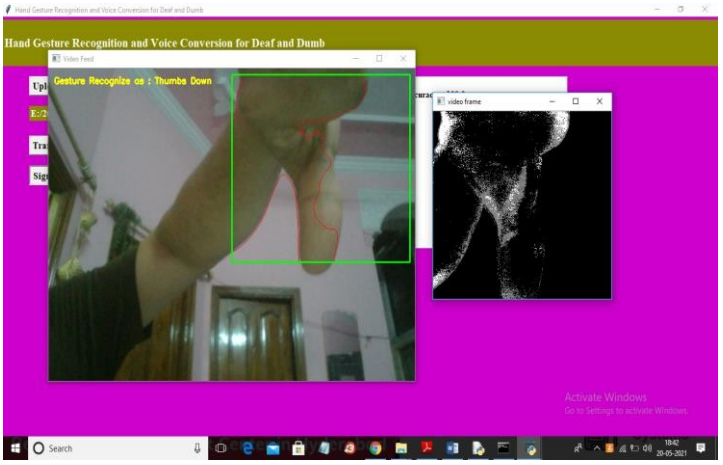


Figure 2:cnn layers

VII. RESULTS

Here just you need to show gesture properly as shown in above screen and while adjusting your hands you may get wrong prediction but when you correct you correct your gesture then prediction will go accurate.





VIII) CONCLUSION

Hand Gesture recognition using cnn for dumb and deaf person was successfully executed using image processing. The method takes image as input and gives text and speech as an output. Implementation of this system gives up to 90% accuracy and works successfully in most of the test cases.

IX) 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 Gesture Recognition 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] http://cs231n.stanford.edu/reports/2016/pdfs/214_Report.pdf

[8] http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.734.8389&rep=rep1&typ e=pdf

[9] https://medium.com/@RaghavPrabhu/understanding-of convolutional-neural-network-cnn-deep-learning 99760835f148

[10] https://adeshpande3.github.io/adeshpande3.github.io/A-Beginner's-Guide-ToUnderstanding-Convolutional-Neural-Networks

[11] Rupesh Prajapati, Vedant Pandey, Nupur Jamindar, Neeraj Yadav, Prof. Neelam Phadnis "Hand Gesture Recognition and Voice Conversion for Deaf and Dumb"

[12] S. Vigneshwaran; M. Shifa Fathima; V. Vijay Sagar; R. Sree Arshika "Hand Gesture Recognition and Voice Conversion System for Dump People" in IEEE.

[13] Syed Raquib Shareef, Mohammed Mannan Hussain "Hand Gesture Recognition System for Deaf and Dumb" in International Journal of Multidisciplinary and Current Educational Research (IJMCER).

[14] B.G. Lee and S.M. Lee, "smart wearable hand devices for sign language interpretation system with sensor fusion", IEEE sensor Journal.

[15] Merin ary koshi, "a survey on advanced technology communication between deaf/dumb people using eye blink and flex sensor", IEEE Journal.

[16] Yang, H., An, X., Pei, D. and Liu, Y., 2014, September. Towards realizing gesture-to-speech conversion with a HMM-based bilingual speech synthesis system. In 2014 International Conference on Orange Technologies.

[17] Liang, R.H. and Ouhyoung, M., 1998, April. A real-time continuous gesture recognition system for sign language. In Proceedings third IEEE international conference on automatic face and gesture recognition.

[18] Vishal, D., Aishwarya, H.M., Nishkala, K., Royan, B.T. and Ramesh, T.K., 2017, December. Sign Language to Speech Conversion. In 2017 IEEE International Conference on Computational Intelligence and Computing Research.

[19] Vijayalakshmi, P. and Aarthi, M., 2016, April. Sign language to speech conversion. In 2016 International Conference on Recent Trends in Information Technology (ICRTIT).

Darshan Keny. Mousumi Karmakar, Nilesh Kamtekar,

[21] Akshay Mehta, Mohan Kumar "Hand Gesture Recognition and Voice Conversion System for Speech Impaired" in International Journal of Engineering Research & Technology (IJERT).

[22] Mr.P.V.Krishna Rao, V.Niharika, V.Prashanthi, V.Akhila, V.Gayathri "HAND GESTURE RECOGNITION AND VOICE CONVERSION SYSTEM FOR DUMB AND DEAF PEOPLE" in Journal of Emerging Technologies and Innovative Research (JETIR).

[23] M. Wald, "Captioning for Deaf and Hard of Hearing People by Editing Automatic Speech Recognition in Real Time", Proceedings of 10th International Conference on Computers Helping People with Special Needs.

[24] V.Padmanabhan, M.Sornalatha "Hand gesture recognition and voice conversion system for dumb people" in International Journal of Scientific & Engineering Research.

[25]Amarjot, S., Devinder, K., Phani, S., Srikrishna, K., and Niraj, A. "An intelligent multi-gesture spotting robot to assist persons with disabilities", International journal of computer theory and engineering.

X) Authors of this article

N.Manaswi

B.Tech final year student at

Dhanekula Institute of Engineering and Technology,

Ganguru, Vijayawada, India

V.Sushma

B.Tech final year student at

Dhanekula Institute of Engineering and Technology,

Ganguru, Vijayawada, India

V.Pavan Varma

B.Tech final year student at Dhanekula Institute of Engineering and Technology,

Ganguru, Vijayawada, India