IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 4, April 2021

DOI: 10.17148/IARJSET.2021.8412

REAL TIME TRANSLATION OF SIGN LANGUAGE TO SPEECH AND TEXT

Mrs S CHANDRAGANDHI[1], AAKASH RAJ R[2], MUHAMMED SHAMIL ML[3], AKHIL S[4], PRABHASHANKAR PT[5]

Department of Computer Science and Engineering, JCT College of Engineering and Technology, Coimbatore, Tamil Nadu, India[1-5]

Abstract: Creating a desktop application that uses a computer webcam to capture a person signing gestures for Indian Sign Language (ISL) and translate it into corresponding text and speech in real time. The translated sign language gesture will be acquired in text which is further converted into audio. In this manner we are implementing a finger spelling language translator. To enable the detection gestures, we are making use of a Convolution neural network (CNN). A CNN is highly efficient in tackling computer vision problems and is capable of detecting the desired features with high degree of accuracy upon sufficient training. This project is about converting the hand gesture of sign language to voice or text using Machine Learning Techniques and vice versa. In this we are going to capture a real time translation of indian sign language using single and double hand gestures and recognize the words and convert it into text and then to speech. If the person gives speech as input it is first converted to text and then it displays the suitable sign as output and vice versa.

Keywords: Indian Sign Language, Hand Gesture Recognition, Convolution Neural Network, K- means algorithm, Open CV.

INTRODUCTION:

According to the World Health Organization, 466 million have a disability in hearing as well as speech. 80% of deaf people are illiterate or semi-literate [which means most of them are not able to access their native language or writable knowledge], and most of them exclusively use sign language to communicate.

DEEP LEARNING:

Deep learning is an Artificial Intelligence(AI) function that imitates the working of a human brain in processing data and creating approach-patterns for use in decision making. Deep Learning is a subset of machine learning in artificial intelligence that has network efficiency of learning unsupervised from data that is mutable or unlabelled. Also known as deep neural learning or deep neural network. Deep Learning however known as deep structured learning is part of a border family of machine learning methods built of artificial neural networks with representation learning. Deep Learning on the other hand, is a type of Machine learning, inspired by the structure of a human brain.

The first advantage of deep learning all-over machine learning is the needlessness of the so-called feature extraction. The result of Feature Extraction is a representation of the given raw data that can be utilized by these classic machine learning algorithms to perform tasks. For example, the sorting of the data into several categories or classes. Feature extraction is usually quite complicated and involves detailed knowledge of the problem domain. This preprocessing layer must be matched, tested and refined over several iterations for optimal results.

EXISTING SYSTEM:

The Voice Disorder and hearing loss people usually recognize the sign language through the charts and identify the sign language. There are some applications that are used to recognize the gestures with an AI interaction video platform which identify the hand gesture recognition with different types of sign language as text.

PROPOSED SYSTEM:

The proposed system will identify the expression of the voice disorder and hearing loss people and recognize the hand gestures and give the description as text. Our method is that we will also add a feature as Audio with voice for their easy understanding. Our project is application based and it can be easily accessed with the web camera. This will also provide a learning platform via online.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 4, April 2021

DOI: 10.17148/IARJSET.2021.8412

MODEL CONSTRUCTION:

A convolutional neural network is a feed-forward multilayer perceptron that is used for pattern classification and is inspired by the natural visual perception mechanism of living creatures. Such networks usually consist of an input, an output and multiple hidden layers. Hidden layers typically consist of convolution, pooling, fully connected and normalization layers. Convolutional neural networks can be used for various applications, including image classification, object detection, object tracking, text detection and recognition, speech and natural language processing. The emotion recognition model is based on a deep learning approach, which uses convolution neural networks (CNNs) which is one of the most effective deep learning structures. The CNN model is being trained and the forward-pass mechanism obtains a classification prediction based on the image it took as input. This prediction is compared to the images label and a loss of the estimation is measured. The data collection interface was created by first fine-tuning a CNN model that was pre-trained on an existing dataset of face expression images that we collected from the web. The users face images from the device camera running the game interface are then analysed by the CNN model, labelled and added to our new dataset. Using this approach, it collected approximately a dataset of 20,000 images, which were used to train a fine-turned CNN model, which forms the basis for the Emotion Training Platform.

Framework:

In order to succeed real-time sign language computing performance, we mapped and implemented a framework. Gesture expressions they are presented with on the screen. By incorporating our work in real-time sign language recognition from a web camera, the platform is able to track the user's gestures in real-time and judge if the user is performing those gestures accurately. It is demonstrated that training in sign language expression mirroring is necessary to improve the recognition skills. This sort of training allows us to improve the skills of individuals with Indian sign language hand gestures recognition.

Gesture Expression Training Platform:

Gesture Train is a platform that is projected to target deficits in recognizing and marking sign expressions, and reciprocating language. When playing gestureTrain , users are involved to attempt to match the images of upper left corner OpenCV and landmark detector are utilized to track the user's gesture on the screen.

Contribution of this research:

We aim to recognize sign language expressed by voice disorder and hearing loss children from hand gestures. The angle, distance, velocity and acceleration are features calculated from head to sign points. The extracted features are given to the input of the Random Forest (RF) classifier and Support Vector Machine (SVM) classifier. Based on the gesture expressed by the deaf and dumb people and this helps them to communicate easily with normal people.

CONCLUSION:

This project aims to predict sign language recognition using machine vision with the help of deep learning. The performance of this tool is on part with that of humans for distinguishing the sign language gesture with real-time image.

FUTURE WORK:

In the future we tend to help the autistic children with the need of real information as a classroom environment to test the actual scenario. After we collect the autistic children's real data, future work can be carried out. The current research mainly identifies the emotions of the person, but the teaching process is a one-to-one interaction process. If teachers behaviours are included in the scope of recognition, it will be more realistic. Then after recognizing the emotional performance of auistic children, we can consider evaluating the score for the emotions expressed and the result will be displayed. If the score is less, it will motivate the person to practice more. In addition, we will include anxiety, surprise, and much more emotions.

REFERENCES:

[1] Badhe P.C. and Kulkarni V.(2020), "Artificial Neural Network based Indian Sign Language Recognition using hand crafted features," 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kharagpur, India, 2020, pp. 1-6, doi: 10.1109/ICCCNT49239.2020.9225294.

[2] Ghotkar, A.S. Khatal, R. Khupase,S. Asati, S. and Hadap, M.(2012) "Hand gesture recognition for Indian Sign Language," 2012 International Conference on Computer Communication and Informatics, Coimbatore, India, 2012, pp. 1-4, doi: 10.1109/ICCCI.2012.6158807.

[3] Heera, S. Y. Murthy, M. K. Sravanti, V. S. and Salvi, S.(2017) "Talking hands — An Indian sign language to speech translating gloves," 2017 International Conference on Innovative Mechanisms for Industry Applications (ICIMIA), Bengaluru, India, 2017, pp. 746-751, doi: 10.1109/ICIMIA.2017.7975564.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 4, April 2021

DOI: 10.17148/IARJSET.2021.8412

[4] Shenoy,K. Dastane, T. Rao,V. and Vyavaharkar,D. (2018) "Real-time Indian Sign Language (ISL) Recognition," 2018 9th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Bengaluru, India, 2018, pp. 1-9, doi: 10.1109/ICCCNT.2018.8493808.

[5] Tripathi,K. Baranwal, N. and Nandi,G. C. (2015) "Continuous dynamic Indian Sign Language gesture recognition with invariant backgrounds," 2015 International Conference on Advances in Computing, Communications and Informatics (ICACCI), Kochi, India, 2015, pp. 2211-2216, doi: 10.1109/ICACCI.2015.7275945.

[6] Baranwal,N. Singh,N. and Nandi,G. C. (2014) "Indian Sign Language gesture recognition using Discrete Wavelet Packet Transform," 2014 International Conference on Signal Propagation and Computer Technology (ICSPCT 2014), Ajmer, India, 2014, pp. 573-577, doi: 10.1109/ICSPCT.2014.6884971.

[7] Deora,D. and Bajaj,N. (2012) "Indian sign language recognition," 2012 1st International Conference on Emerging Technology Trends in Electronics, Communication & Networking, Surat, India, 2012, pp. 1-5, doi: 10.1109/ET2ECN.2012.6470093.

[8] Divya,B. Delpha, J. and Badrinath,S. (2017) "Public speaking words (Indian sign language) recognition using EMG," 2017 International Conference On Smart Technologies For Smart Nation (SmartTechCon), Bengaluru, India, 2017, pp. 798-800, doi: 10.1109/SmartTechCon.2017.8358482.

[9] Kadam,S. Ghodke,A. And Sadhukhan, S. (2019) "Hand Gesture Recognition Software Based on Indian Sign Language," 2019 1st International Conference on Innovations in Information and Communication Technology (ICIICT), Chennai, India, 2019, pp. 1-6, doi: 10.1109/ICIICT1.2019.8741512.

[10] Nanivadekar,P. A. and Kulkarni,V. (2014) "Indian Sign Language Recognition: Database creation, Hand tracking and Segmentation," 2014 International Conference on Circuits, Systems, Communication and Information Technology Applications (CSCITA), Mumbai, India, 2014, pp. 358-363, doi: 10.1109/CSCITA.2014.6839287.