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SIGN LANGUAGE DETECTION FOR DEAF-DUMB PEOPLE

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ABSTRACT

For people who cannot speak or hear anything, the only way to communicate is through language. Sign language is a useful tool for people with disabilities to express their thoughts and feelings. In this study, a new language recognition system is proposed for the recognition of letters and gestures in the language. With the help of computer vision and neural networks, we can capture the signals and provide the corresponding tags. Nonverbal people use descriptive words and gestures to communicate. It is difficult for people to understand their language. Therefore, a system must recognize different signs, gestures and convey information to people. It bridges the gap between disabled and healthy people. Effective interpreters are an important way for the deaf to communicate with the public. Therefore, we present here the development and implementation of a convolutional neural network-based finger writing translator for American Sign Language (ASL). We use pre-trained Google.Net architecture for training. For first-time users, we are making a strong model that distributes the letters a-z correctly, and another model that shows the difference between the letters a-k in general. Due to the limitations of the dataset and the support provided, we are confident in further research and further information.

KEYWORDS

Sign LanguageRecognition1, Convolution Neural Network2, Image Processing3, Edge Detection4, Hand Gesture Recogniton5

1. INTRODUCTION

Over 3 million people are "hard of hearing". In contrast, the National Deaf Association of India figures at 18 million people about 1% of India's population. These statistics are the driving force of our project. Because of these language issues there is a need for a way for deaf people to communicate with normal people, there has to be a system. Not everyone can understand sign language. Therefore, our project aims to transform sign language into human text. It is very difficult to communicate with deaf people. In addition, people who are muted face many problems during the intervention. These people communicate using gestures, so ordinary people have trouble understanding their language with gestures. Therefore, there must be a system that recognizes different characters and sends information to ordinary people. India census 2011 mentions about 1. Most of these investigations use depth maps produced by depth cameras and high-resolution images. The aim of this study is to see if a neural network can classify the American Notes signature using simple hand images taken from a personal device such as a laptop webcam. This is motivational as this will make future use of ASL real for translators to speak/write in everyday use.

2. RELATED WORK

2.1 Overview

As information technology continues to evolve, computers also interact with humans. Much work has been done in this area to help deaf and hard of hearing people communicate better. We plan to test various history extraction algorithms to achieve greater accuracy even with complex history. We are also considering improving the progression for more accurate directional estimation in low light conditions. In addition to the many developments in the ASL field, the Indians began working at the ISL.

Like image key point detection using SIFT and then compare the key points of the new image with the key points of the model image for each letter in the file to classify the new image with the latest text. The created a real-time vision for the original alphabet for the Spanish language in the D&M people. Using algorithms we can use, we can improve our prediction and predict similar characters. This way we can check almost any symbol as long as it is displayed correctly, there is no background noise and the lighting is good.

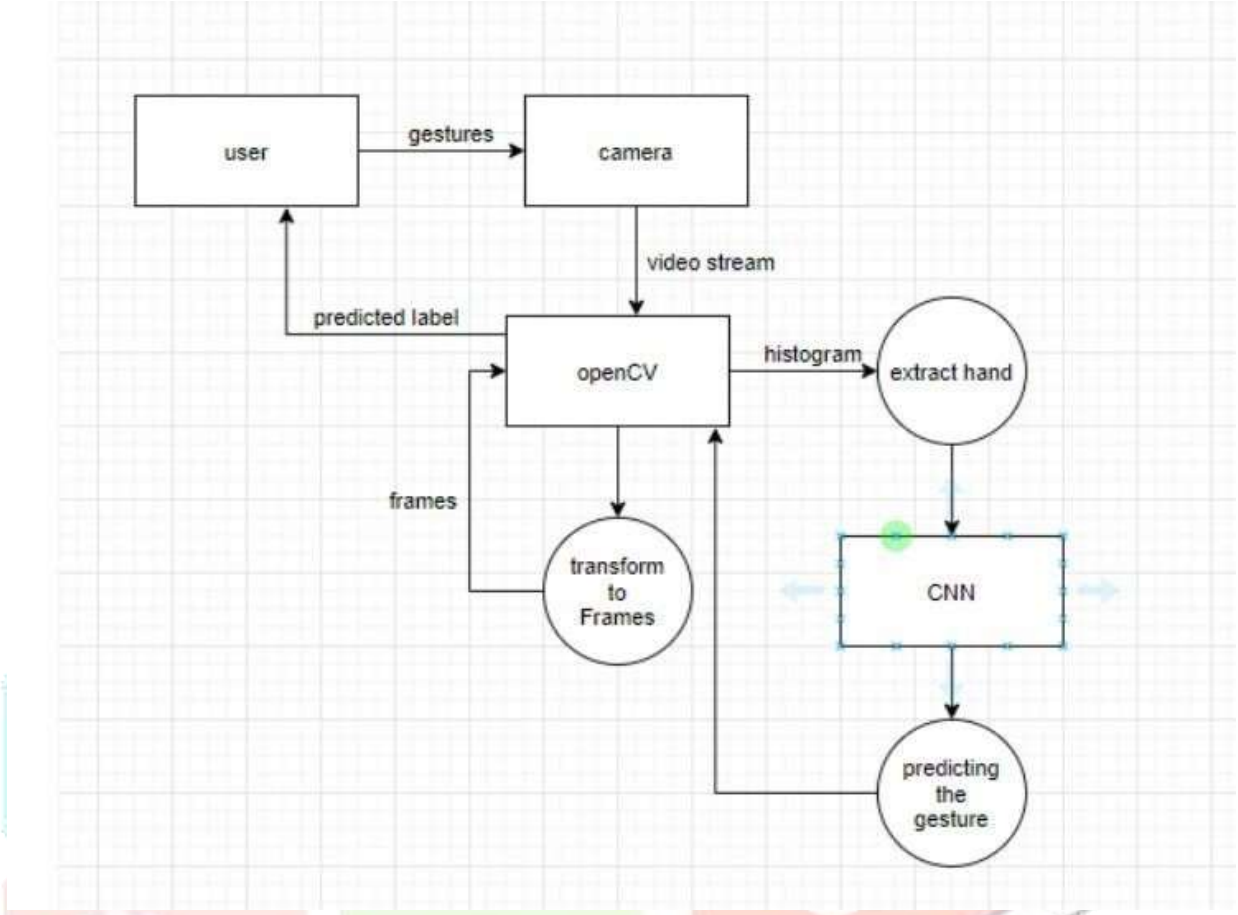

Fig 2.1 Dataflow Diagram for Sign Language Recognition

2.2 Image Processing

Image processing is a method of performing some operations on images to get better images or extract some important information from them. It is a type of signal processing where the input is an image and the output can be an image or objects and properties associated with that image. Image processing is one of the fastest growing technologies today. It also constitutes an important field of study in engineering and computer science disciplines.

2.3 Digital Image Processing

Digital image processing uses a computer to process images. Digital image processing can be defined as performing a series of operations on a digital representation of an object to achieve the desired result. Digital image processing involves converting physical images into corresponding digital images and extracting useful information from digital images using various algorithms.

2.4 Picture Recognition

According to image processing, objects in the image must be separated by pattern recognition technology and then these objects must be identified and classified by technology science through scientific decision making.

3. STEPS AND OBSERVATIONS

According to reports, about 5% of the world's population is deaf and hard of hearing. They use hand, head and body movements to convey their thoughts and feelings. So almost every country has its own language. The development of the language is different in each country or subcontinent. In previous research papers including.

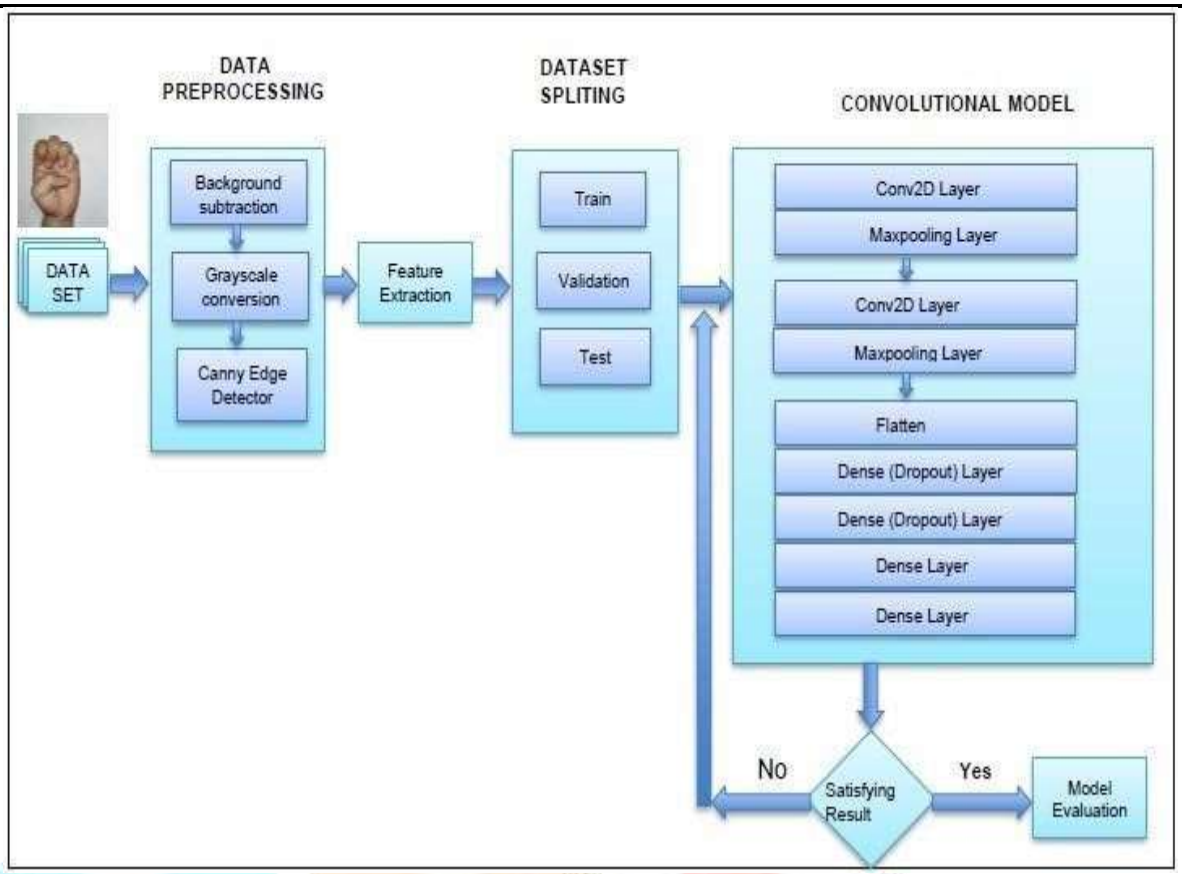

Fig 3.0 Class diagram of sign language recognition system

3.1 Neural Network Design

The neural network is first modelled, where the process can be evaluated to generate output from the input vector described by the variable x. Training information is stored in the set of synaptic weights in the neural network, and neurons are limited to a certain set of values. The uses a multilayer neural network and back propagation algorithm in its design. The structure of the network consists of three layers, namely the input layer, the hidden layer and the output layer; The basic equipment is shown in figure 3, using simple graphical representation. Hyperbolic tangent activation functions are used for the input and hidden layer neurons, each neuron has 5 neurons and the output layer has a neuron with a linear activation function.

3.2 Training Process

Back propagation algorithm is used during initial training. The supervised learning method changes the weight of the difference gradient of the error function to minimize the squared error in all examples used to train the neural network.

3.3 Pre-Training CNN Model

Use the concept of adaptive learning, where the model is first introduced to the data and then different from the original model. In this way, the information obtained from the model can be transferred to other neural networks. Models are saved in the form of "weights" that can be loaded onto other models. For feature extraction, a pretrained model is used with a fully connected layer added on top of it. After loading the weights, train the model using the original data.

3.4 PCA (Principal Analysis Component)

PCA (Principal Component Analysis) Using PCA, data is plotted in a lower order to reduce residuals. Most importantly, it is the one that has the widest spread or encodes the most information because it corresponds to the largest entropy. So keep the size where the biggest difference is and minimize the other sizes.

3.5 LBP (Local Binary Pattern)

Calculates the local representation of the texture created by comparing each pixel with surrounding or neighboring pixels. The result is stored as an array, then converted to a number and stored as a two-dimensional LBP array.

3.6 HOG (Histogram of Gradients)

A feature descriptor is a representation of an image or image patch that simplifies the image by extracting useful information and discarding unimportant or useless information. Pig is an annotation that calculates a gradient histogram of image pixels, which is

a vector of 9 boxes (numbers) for corresponding angles (such as 0, 20, 60 ... 160). This image is split into cells (usually 8x8) and the gradient size and gradient angle are calculated for each cell and used to generate a histogram for the cell. Normalize the histogram of the cell block and calculate the final eigenvector for the whole image.

4. RESULT AND CONCLUSION

Today's applications need many images to process data for explanation and analysis. To make many applications, a few features need to be removed. Where images are digitized, scanned, transmitted, stored, etc. Damage occurs when transferred from one form to another, such as Therefore, the output image must be followed by a process called image enhancement, which consists of a process aimed at improving the appearance of the image. Image magnification basically enlightens human listeners on the interpretability or awareness of information in images and provides better ideas for other automated image processing machines. Various methods are used to extract features from images to make them easier for computers to read. The Sign Language Recognition System is a powerful tool for preparing expert information, detecting edges, and combining misinformation from different sources. The purpose of the convolutional neural network is to get the correct classification.

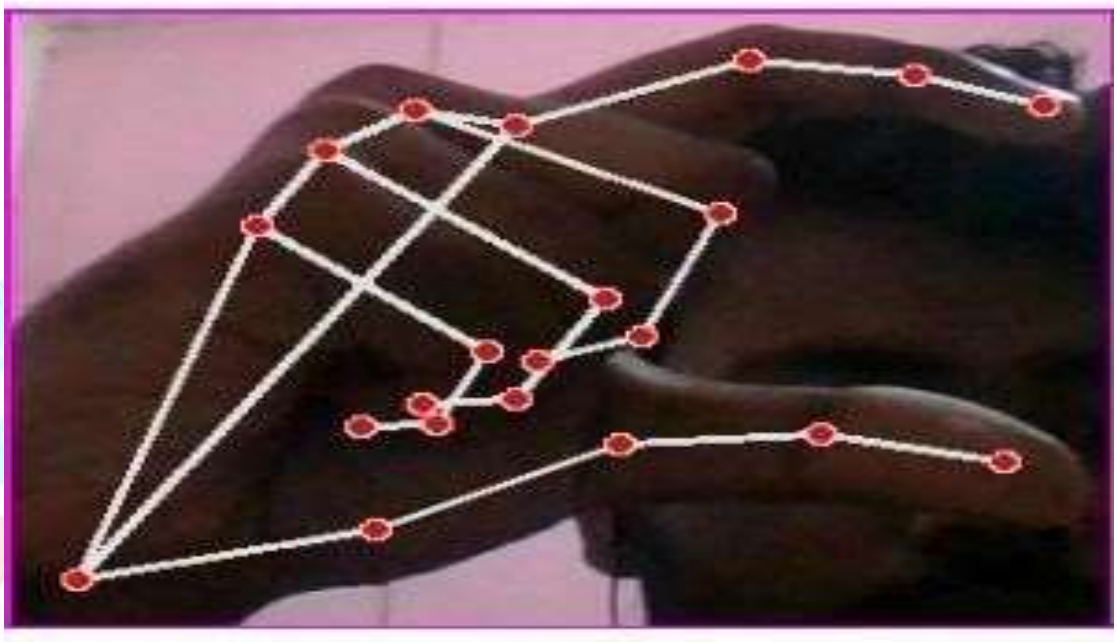

Fig.4 C Structure In ASL

5. FUTURE SCOPE

The concept of sign language recognition for recognizing signatures can be extended to recognize gestures and faces. Instead of displaying the text, the sentence is displayed as a more appropriate translation. This increases reading can be made in many different languages. Additional training data can be added to accurately describe the text. This project can be extended to convert characters into speech. Implementation of three sign language standards such as Indian Sign Language or American Sign Language. Continue training the neural network to recognize good characters. o Develop the model to recognize the sentence.

REFERENCES

[1] H. Badi, Recent methods in vision-based hand gesture recognition. International Journal of Data Science and Analytics. 2016 Jul 1;1(2):77- 87.

[2] R. Elakkiya, K. Selvamani, enhanced dynamic programming approach for subunit modelling to handle segmentation and recognition ambiguities in sign language. Journal of Parallel and Distributed Computing. 2018 Jul 1; 117:246-55.

[3] Tao W, Lai ZH, Leu MC, Yin Z. American sign language alphabet recognition using a leap motion controller. In Proceedings of the 2018 Institute of Industrial and Systems Engineers Annual Conference (IISE 2018) 2018 Jan.

[4] Z. Zhou, Dai Y, Li W. Gesture recognition based on Global Template DTW for Chinese Sign Language. Journal of Intelligent & Fuzzy Systems. 2018 Jan 1;35(2):1969-78.

[5] S. Hayani, M. Benaddy, O. El Meslouhi, M. Kardouchi, Arab Sign language Recognition with Convolutional Neural Networks. In2019 International Conference of Computer Science.

[6] A. Tyagi, S. Bansal, Feature Extraction Technique for Vision-Based Indian Sign Language Recognition System: A Review. Computational Methods and Data Engineering. 2020 Aug 19:39-53.

[7] R. Sharma et al. Sign Language Gesture Recognition, International Journal of Recent Research Aspects ISSN: 2349-7688, Vol. 7, Issue 2, June, pp. 14-19,2020.

[8] M. M. Kamruzzaman, Arabic Sign Language Recognition and Generating Arabic Speech Using Convolutional Neural Network, JOUR, SP - 3685614, VL - 2020.

[9] V. Hernandez, T. Suzuki, G. Venture, Convolutional and recurrent neural network for human activity recognition: Application on American sign language 2020. PLoS ONE 15(2): 0228869. https://doi.org/10.1371/journal.pone.0228869.

[10] E. K. Elsayed, D. R. Fathy, Sign Language Semantic Translation System using Ontology and Deep Learning, (IJACSA), Vol.11, No.1,2020. Guide To Understanding-Convolutional-Neural-Networks. https://adeshpande3.github.io/adeshpande3.github.io/A-Beginner's-