

# Real Time Sign Language Recognition Using Deep Learning

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**Abstract**—Sign language is used by deaf and hard hearing people to exchange information between their own community and with other people. The language, the use of gestures, for those who are deaf and hard of hearing individuals to share information among the community and for others. Computer recognition of sign language, to pursue the purchase of the deaf and hard of hearing will continue until the text/words. Hand gestures can be classified as static or dynamic. However, the static gesture recognition is much easier than for a dynamic, but in the two systems, is a system for the recognition of importance of the human community. The stages of language recognition, including the outline of this idea. Data collection, primary processing, transformation, feature extraction, classification, and the results are reviewed. There are several advances in technology and a great deal of research has been done to assist people who are deaf and dumb. In this project we are going to collect the photos of deep study with the help of a camera and OpenCV. Then, after having collected a set of photos, we see them discover, in sign language, using the Labellmg. After that, we are going to configure the build configurations of the Tensorflow object detection line. We can use the transfer learning to train a deep learning model, and to identify the signs of language in real-time using OpenCV. Help in the case of deep learning, computer vision, and it can be used as the impact of this work. In view of the similarity in the shape of a man's hand, the four fingers and the thumb of the program, the program seeks to represent the system in terms of the side of the recognition of real-time, based on the identification of some of the features of the form, such as the orientation, in the middle of the center of mass, the finger position, the thumb is in the raised position, or smart, fingers and hands.

**Keywords**—Deep learning, sign language, computer vision, Tensorflow.

## I. INTRODUCTION

Sign language recognition is a problem that the teams have been working with them for many years. However, we are still a long way off from that and find a solution for the present in our society. Sign language and gesture recognition is an important issue in computer vision and machine

learning, and there is a lot of research is ongoing in this area. Thanks to the advances in sensor technology, there is a rapid progress, and reliability, as well as the solutions. Recently, there has been a lot of work on the static and dynamic hand gestures, and text recognition.

Motivation: Whereas the sign is very important for the deaf and dumb people to communicate as normal people do to themselves, and that there is still a little bit of attention from regular people. We, as normal human beings, tend to ignore the importance of sign language and, if we do not have in the near future, they will be deaf. One of the ways to communicate with deaf people use sign language interpreter services. However, the use of a sign language interpreter can be very expensive. Low-cost solutions are required for the deaf and normal people to communicate normally.

## II. LITERATURESURVEY

In the recent years, there has been tremendous research on the hand sign recognition. The technology of gesture recognition is divided.

Vision Based: In vision based methods computer camera is the input device for observing the information of hands or fingers. These methods are based on the very eyes, computers, cameras, input devices, in order to observe the hands and fingers. Eye-based techniques are only to be used in the camera is, of course, at the same time allowing for the interaction between the human and the computer, without the use of any additional devices. In these systems, the normal complement of biologically explained the vision of an artificial vision system, which is implemented by software and / or hardware. This creates a complex problem, because of this, the system needs to be in the background, similar neglect of coverage, independent of man, and to of the camera, in order to achieve real-time performance. In addition, such a system needs to be optimized according to the requirements, including the accuracy and reliability of the information.

In another research, strategy, rather than a sign language recognition system with the use of a user's glove, the information is wearing gloves, which is composed of a flexible sensor and a motion tracker. The information directly from each of the sensor depends on the hands, fingers, and computer analysis of the static information of the sensors in order to produce a proposal. It makes use of a

neural network in order to determine the performance of the system. The main advantage of this approach is a non-computation time and the quick response time of real-time applications.

Their portable devices, and devices, the cost is also less. Another method is through the use of a portable accelerometer (ACC) and ground-based sensors, and an electromyogram (sEMG), which is used to measure from the point of view of the palms of the hands. The ACC is being used, in order to capture the details of the hand and arm movements. An EMG sensor is placed, it creates a variety of characters, their gestures. The sensor output signals are sent to the computer for the process, in terms of recognition, hand-writing, and voice to text expression. However, none of these methods provides a natural interaction. However, since this is an approach that makes use of the additional equipment, it is really not practical, then what you need is a pair of gloves, at any given point in time.

### III. METHODOLOGY

Steps to follow in Implementating the proposed ssystem are Data Gathering, Creating Model, Training Model and Testing Model. We elaborate the steps as follows and The block diagram of the method is shown in figure 1.

1. First of all, we need to upload a picture to capture the data, via a web camera.
2. Using TensorFlow, a recognition model to be created, which will provide real-time hand signs, the user displays the corresponding letter in sign language.
3. In order to be a model, we need to Tensorflow in order to determine in real time the hand sign in a user, enter the corresponding letter in sign language.
4. The next step is to learn about the information; this will help you remember how to write, think, and act, and you can use your hands to carry out in sign language.
5. At present, we have a ready-made model, the next step is to create a window in order to get access to the photos on our cameras.
6. Finally, the model is designed in order to test for, and the user is able to create a hand as a sign for a specific document, the model is able to recognize, and this gesture will show the letters in the lower left-hand corner of the screen.

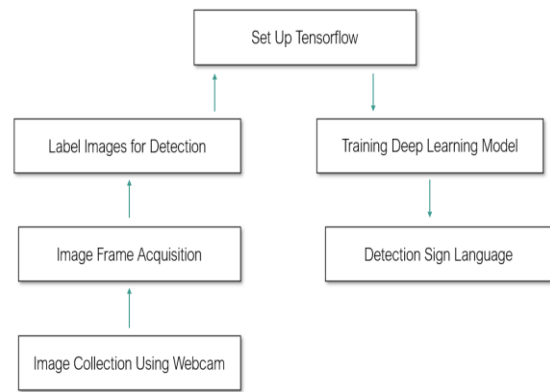


Fig 1: Block Diagram.

Sign languages are languages that use the standard manual method, in order to convey the meaning of the word. Gestures are a form of non-verbal communication, which is used to communicate to the visible body of the movement. This project is totally dedicated to the one prepared for the system interface, which allows the deaf, and the dumb to use a variety of voices, like the use of sign language. Most virtual assistants work based on the audio input, provide only the sound, but in my project we are going to build a mention of the engine as a success of a specific gesture with his hand, which is triggered by speaking to motor. The use of the concept of deep learning, tensorflow libraries, CNN, etc, Finally, the results will be presented in the text, and we are going to use the text-to-speak.

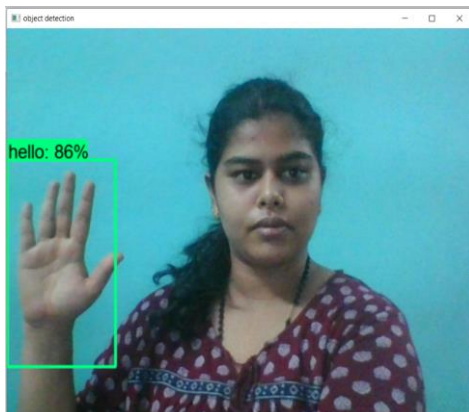
The program applies transfer learning to existing models, and retrains it to classify a new set of photos. Modern image recognition models, and there are millions and millions of parameters. To educate and train them from the ground up requires a large amount of labelled training data and big computing power (hundreds of Gpus, for an hour or more). Transfer learning is a method that can reduce a lot of this process is that part of the model has already been trained to the appropriate assignment, and to use it again, with a new model. Even though it's not as good as a workout for a full design, it is great for the effective mass of the programme, which runs with an average in the low speed, which are carried out in a volume that is full of data (in thousands, if not millions, is tagged b), and, possibly, the only run time on a laptop with a GPU.

The system was trained using 400 images, and was one of the Indian sign languages, taken with an RGB camera. The images are trained by the NVIDIA Ge Force 920m MX-GPU systems, 2 GB of ram, an i5 processor, 2.7 Ghz), the speed, and the 8 GB of RAM memory. Scheme of work for up to 2 hours. A thousand. for the training of the model 400, the images of the Indian languages. The system is loaded by using a batch size of 16, and an initial learning rate of 0.001. The accuracy of the system can reach to 94% for 20 periods. The system has been experimenting on different learning rates, variable from 0.01 to active the up-to-date position in education.

The system uses a Python implementation of deep learning. The method is to use Replicated the API with the tensor flow back, as a single. The model is tested in a static symbol, and showed a good result in the test, with 100 images of the test dataset. To present the results of the experiment is given in the form. The image is made up of 3 photos captured by the user using a bounding box, the 2nd is a duty of HSV-series, and the last one shows the segmented with a threshold. There are panels, a banana, a bar that can be used to set the previous day's range, which is available in the system in real-time. The GRAPHICAL user interface is created using the Kivy-open-source Python library for rapid application development, and application software for the integration of the code consists of two parts. The test is designed, and the other is designed as a real-time system. The app has two screens, the first of which has 3 buttons for real-time SLR system, the upload-and to predict the photos. The second screen shows the projected image to check it out and revert back to the previous screen.

#### IV. RESULTS

Different kinds of signs in sign language with accuracy percentage are shown in following figures



*Fig-2: Hello sign*



*Fig-3: I Love You sign*



*Fig-4: No sign*



*Fig-5: Yes sign*

#### V. CONCLUSION

There were several advances in technology and a great deal of research has been done to assist people who are deaf and dumb. Help in the case of deep learning, computer vision, and it can be used to address these causes. The experimental results shows that the proposed method is giving results with about 90% accuracy. It may be useful to the deaf and dumb, to be able to communicate with other people, because the sign is not something that is increasingly common and, in addition, it may spread to the creation of the automatic editor is where one person is it's easy to say, only a gesture. Perhaps an extension of this project will be a continuation of the gesture recognition system.

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