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## REAL-TIME SIGN LANGUAGE RECOGNITION SYSTEM WITH OBJECT DETECTION

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### ABSTRACT

The only points human beings use to speak with every other are speech and vocabulary. Because of our potential to hear, we can see one another's feelings. In order to supply instructions proper now, we can even use speech recognition. But what if it can not be heard and you can not sooner or later talk about it. Visual conversation continues to be the fundamental contact approach of people with developmental disabilities and deaf people, and computerized comprehension of signal language is, therefore, a complete location of learn about supposed to make sure their unbiased lives. With the use of image recognition and artificial intelligence, a quantity of methods and innovations have been proposed in this field. To understand or convert the signs into an fabulous sequence, each easy sign detection system is built. In this project, the sign language is accrued as a series of images and interpreted with the aid of Python, and then converted into text. The proposed method is meant to provide voice to speechless persons.

**Keywords:** Python, Machine Learning, Object Detection, Tensorflow, Keras, Opencv, Dataset Gathering.

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### I. INTRODUCTION

In our progressive society, it is vital to socialize with all people to whether for activity or for a purpose. Communication is necessary for every human being. However, humans who have a hearing disability and/or a speech incapacity need a exceptional way to communicate different than vocal communication. They depend on signal language to communicate with every other. However, Sign Language requires a lot of training to be understood and learn, and not each and every person may recognize what sign language gestures mean. Learning sign language is also time-consuming as there are no effective, portable tools for recognizing sign language. Hearing or Speech disabled human beings who be aware of Sign Language require a translator who additionally is aware of Sign Language to give an explanation for their ideas to different human beings in a high-quality manner. To assist overcome these problems, this system helps listening to or speech-disabled humans to analyze as well as translate their sign language.

### II. METHODOLOGY

#### Dataset

The dataset is created by collecting images of hand gestures. It is fairly possible to get dataset from internet but in this project , we created the dataset on our own. A python script was written to collect the images of hand gestures shown in front of camera using OpenCV. 15 images per hand sign were collected. Images were divided into different folders on the basis of hand sign.

#### Image Labelling

For labelling the images we used the library called labelImg by TzuTa (Darren) Lin. LabelImg is a graphical image annotation tool. It is written in Python and uses Qt for its graphical interface. Annotations are saved as XML files in PASCAL VOC format, the format used by ImageNet. Besides, it also supports YOLO and CreateML formats.

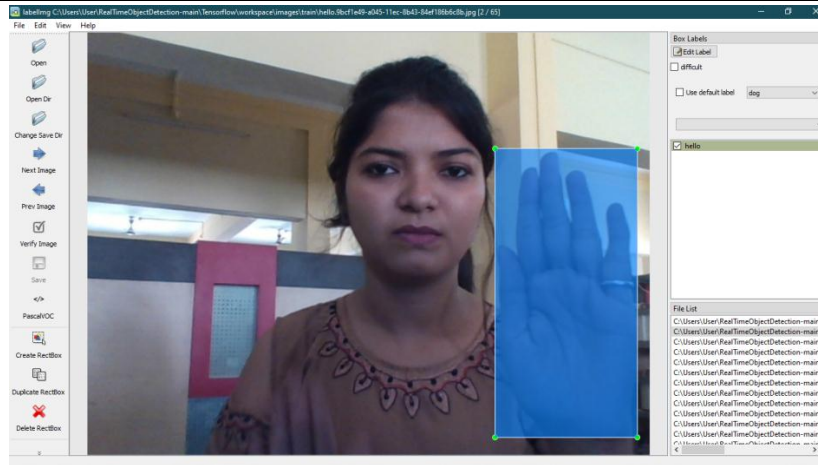


Figure 1: Image Labelling for Hello Hand Sign

**Model Training**

After image labelling it is time for model training. In this phase, the model is trained using tensorflow.

**III. MODELING AND ANALYSIS**

Supervised machine learning is one of the way of machine learning where the model is trained by input data and expected output data. To create such a model , it is necessary to go through following phases:

1. Dataset gathering
2. Model training
3. Model testing
4. Model Prediction

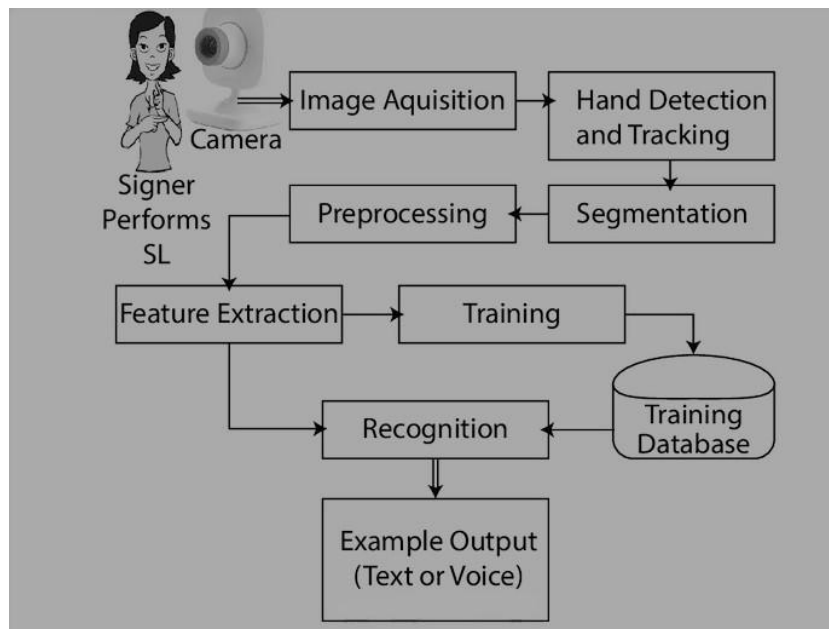


Figure 2: Flow Of Data For Sign Language Detection

The development of computer-based information system includes the system analysis phase which produces or enhances the data model which itself is to creating or enhancing a database. There are a number of different approaches to system analysis. The analysis is the process which is used to analyze, refine and scrutinize the gathered information of entities in order to make consistence and unambiguous information. Analysis activity provides a graphical view of the entire System. System Analysis is the process of gathering and interpreting facts, diagnosing problems and using the facts to improve the system. System analysis chapter will show overall

system analysis of the concept, description of the system, meaning of the system. System analysis is the study of sets of interacting entities, including computer system analysis.

#### IV. RESULTS AND DISCUSSION

Results show the actual result of the project. Hand Signs are being detected by the application. Hand Sign which can be detected are "Hello", "Thank You", "I Love You", "Yes", "No". Accuracy of the application is low because very less data set was provided to train the algorithm. 15 images per Hand Sign took 5 Hours to train, which tells us that we need resourceful Computer to train the Model. Once the Model is trained the application can detect hand signs on any device, even a Low-end Device.

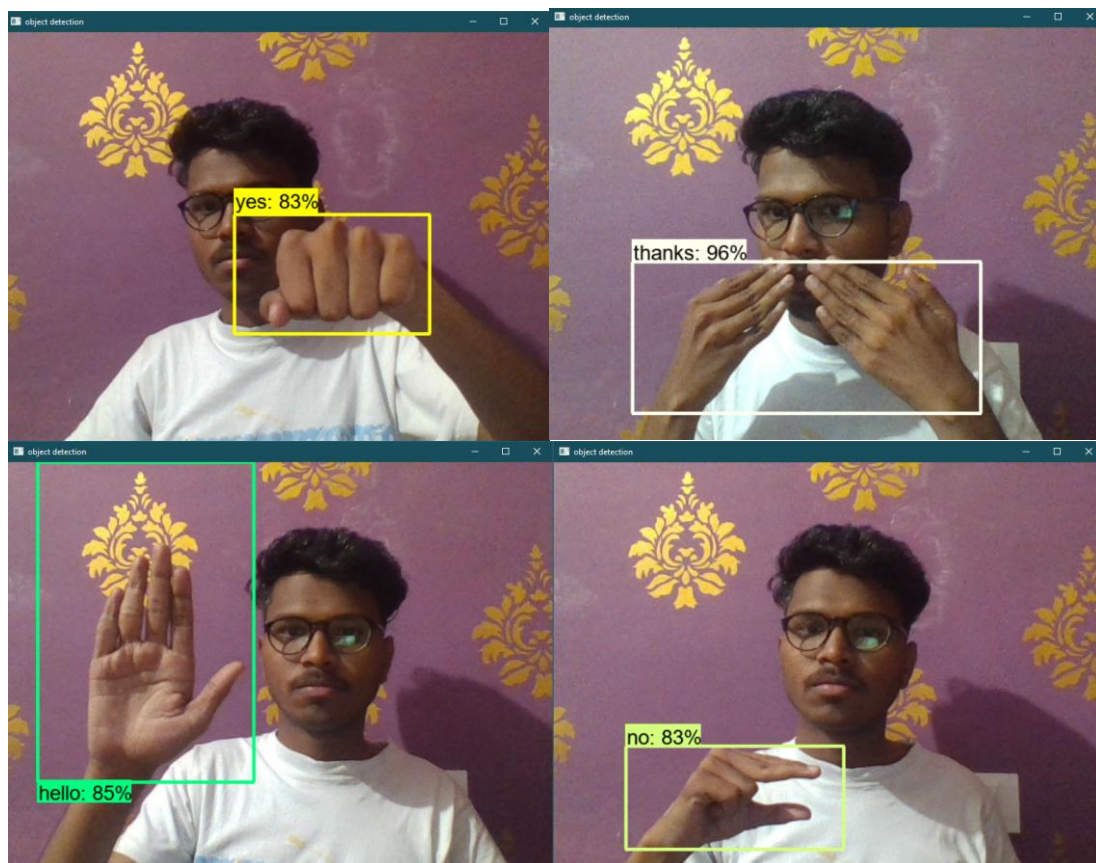


Figure 3: Output Prediction

#### V. CONCLUSION

A Sign language recognition could be a exhausting drawback if we have a tendency to think about all the doable mixtures of gestures that a system of this sort must perceive and translate. That being same, in all probability the most effective thanks to solve this drawback is to divide it into easier issues, and also the system given here would correspond to a doable resolution to at least one of them. The system didn't perform too well however it had been incontestable that it will be designed a first-person linguistic communication translation system victimization solely cameras and convolutional neural networks. It was discovered that the model tends to confuse many signs with one another, like U and W. however thinking a touch regarding it, perhaps it doesn't have to be compelled to have an ideal performance since victimisation associate writing system corrector or a word predictor would increase the interpretation accuracy. The next step is to research the answer and study ways in which to boost the system. Some enhancements might be carrying by aggregation additional quality information, making an attempt additional convolutional neural network architectures, or redesigning the vision system.

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