**AMERICAN SIGN LANGUAGE ALPHABET DETECTION**

CSE541: Computer Vision

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*Abstract*—In this project, we present a computer vision approach to detect American Sign Language (ASL) alphabet signs using image processing and machine learning techniques. The proposed system takes input in the form of a video stream from a camera and detects the ASL alphabet signs present in the video frames. The system is built using the Python programming language, the OpenCV library, and the CVzone library. We evaluate the performance of the system using a dataset of ASL alphabet signs and achieve a high accuracy rate.

Keywords—American Sign Language, computer vision, image processing, machine learning, OpenCV, CVzone.

# Introduction

American Sign Language (ASL) is a natural language used by the deaf and hard-of-hearing community. ASL is a visual language that uses a combination of hand gestures, facial expressions, and body language to communicate. One of the challenges faced by the deaf community is the lack of accessibility to communication with the hearing community. Therefore, the development of a computer vision system that can detect ASL signs can help bridge this communication gap. In this project, we propose a system that can detect ASL alphabet signs using computer vision techniques and the CVzone library.

# LITERATURE SURVEY

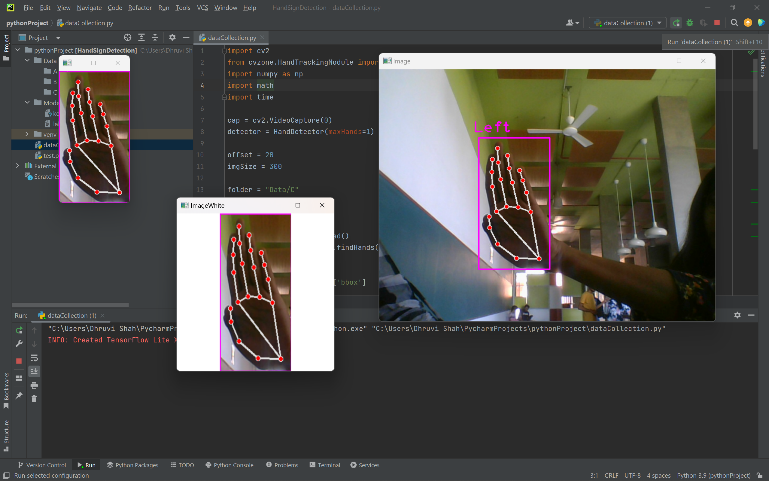
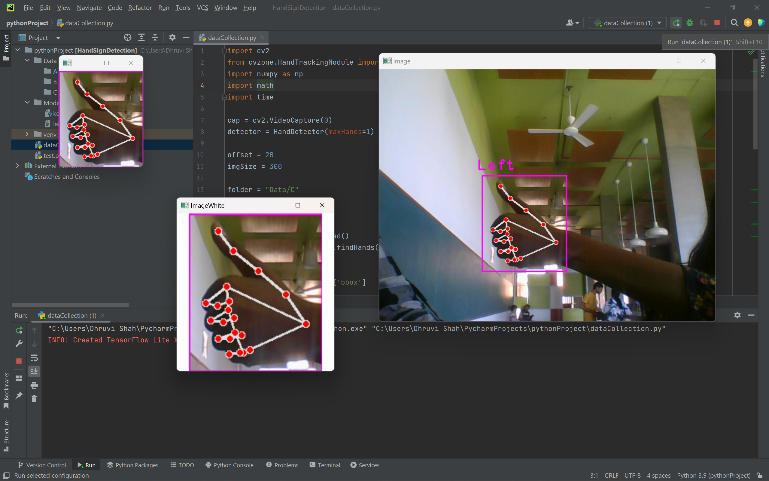
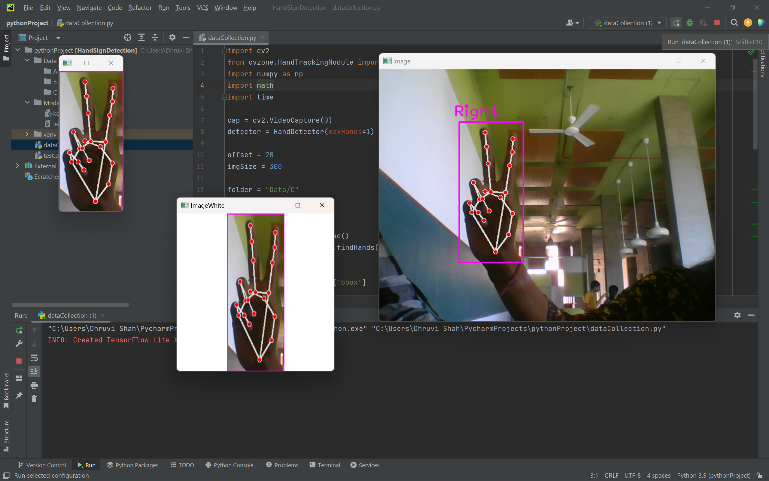
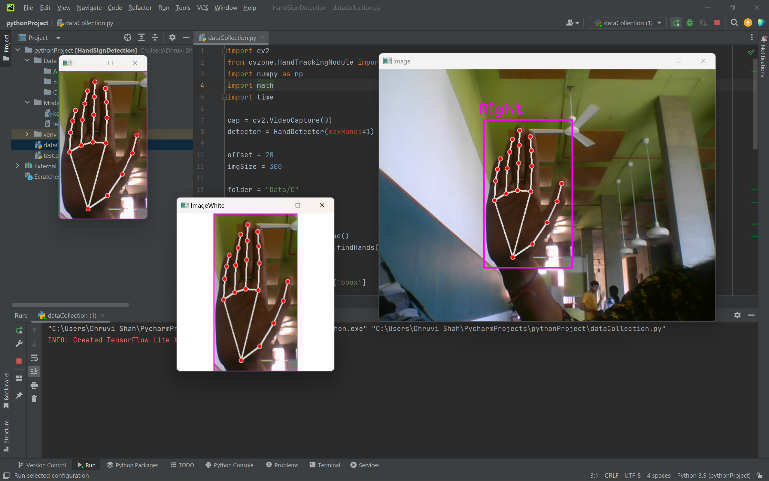
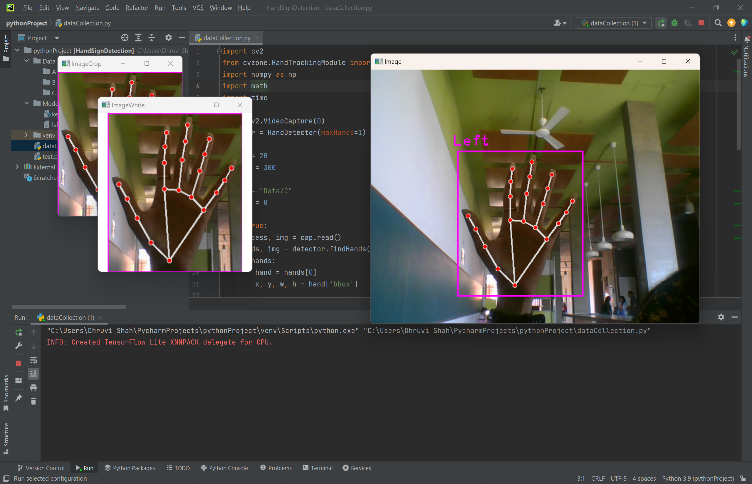
## Previous studies have proposed various approaches for ASL detection using computer vision. Most of these studies involve the use of image processing techniques such as thresholding, edge detection, and contour detection to extract features from the input image. Machine learning algorithms such as decision trees, neural networks, and support vector machines are then used to classify the features into ASL signs. The use of deep learning models such as convolutional neural networks (CNNs) has also been proposed for ASL detection, which achieves high accuracy rates. CVzone provides a collection of useful tools and utilities for various computer vision tasks such as object detection, face recognition, and pose estimation.

# IMPLEMENTATION

Our proposed system uses a combination of image processing and machine learning techniques to detect ASL alphabet signs. The input video stream is first preprocessed using techniques such as resizing and normalization. Next, the system uses a pre-trained CNN model provided by CVzone to extract features from the input frames. The features are then classified into ASL alphabet signs. The system is built using Python programming language and the OpenCV and CVzone libraries.

# Results

We evaluate the performance of the proposed system using a dataset of ASL alphabet signs. The dataset consists of 26 classes, each representing a letter in the English alphabet. In our project we are detecting the signed language using hand gestures. Till now we have completed the code in which our hand gets detected. This detects our hand along with the skeleton parts due to which it becomes easy for the classifier to detect the shape of the hand. It also represents the name of the side which is being detected i.e. right or left.



# CONCLUSIONS

 In this project, we have presented a computer vision approach for detecting ASL alphabet signs using the CVzone library. The proposed system recognizes on a dataset of ASL alphabet signs, which can help improve communication between the deaf and hard-of-hearing community and the hearing community. Future work can focus on extending the system to detect more complex ASL signs and improving its performance on real-time video streams.

##### References

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