Sign Language Recognition

Based on Hands Symbol Classification using ASL Dataset

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Why Sign-Detection Model?

- Accessibility: Sign language is the primary mode of communication for many deaf and hard-of-hearing individuals. By creating a sign language detection model, we can improve accessibility for these individuals by enabling machines to understand sign language.

- Communication: Sign language is an important means of communication not only for the deaf and hard-of-hearing community but also for individuals who may have difficulty speaking due to conditions such as cerebral palsy or stroke. A sign language detection model can help these individuals communicate more effectively.

NEED FOR ASL

- Recognition and acceptance: ASL is recognized as an official language in the United States and is widely accepted in many parts of Canada. This recognition and acceptance has led to increased resources and support for ASL users, including interpreter services, education, and employment opportunities.
- Historical context: ASL has a rich history that is closely tied to the deaf community in the United States. It has been used as a means of communication among the deaf community since the early 1800s and has evolved over time to become an important part of communication.

Platforms Used

- **Visual Studio Code**
- **StackOverFlow**
- **OpenCV Documentation**
- **Google Teachable Machine**

OBJECTIVE

To develop a model that can accurately detect and interpret sign language gestures in real-time. The model recognizes a range of sign language gestures corresponding to alphabets from American Sign Language (ASL). The project aims to achieve high accuracy in recognizing sign language gestures, while also being scalable and able to perform in real-world scenarios. Ultimately, the goal is to create a tool that can improve accessibility and communication for deaf and hard-of-hearing individuals, as well as enable more efficient and effective interactions between humans and machines.

Impact of Sign Language Recognition

1. Education: Sign language is often taught in schools and educational institutions as an alternative or additional language. By creating a sign language detection model, we can make it easier for teachers and students to learn and use sign language in their classes.
2. Automation: With the advent of new technologies such as virtual assistants and smart homes, it's becoming increasingly important to create sign language detection models that can be integrated into these systems. This can help deaf and hard-of-hearing individuals to interact with these technologies more easily and effectively.
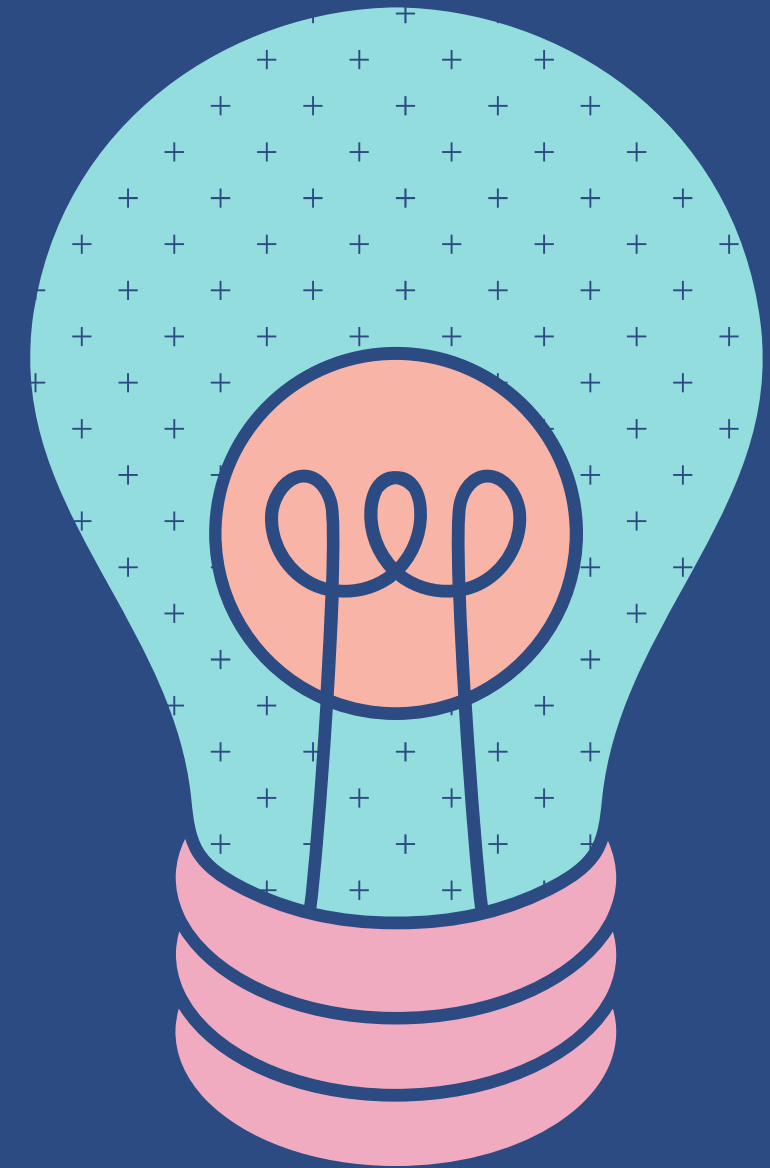
JOURNEY

1 — **2** — **3** — **4** — **5**

Learning Phase

Learning new Technologies associated with the Sign-Language detection.

Start from basics

Preparing the data model by training it with the basic datasets like 1, 2, 3 etc.

Advancing to better

After clarification with the basics, we advanced to using complex hand signals.

Accuracy check

In the early stage, Accuracy was 66.67%. After improving the datasets, the Accuracy of the data model became 85%.

Finalizing with the best

Finally we started working with the complete dataset. Tweaking the model training parameter to get the required results.

Conclusion:-

Concluding,We would like to say that this has been an innovative and insightful experience working with OpenCV and machine learning,creating something that has practical use and scalability. Our team enjoyed working on the project and overcoming the various challenge that arose while developing a classification model for a variety of hand signals.

References

Result

The classification model can identify and present the ASL alphabet corresponding to the hand signal captured from the webcam.

Murtaza's Workshop to recognize hand signals

ASL detection using scikitlearn

OpenCV Documentation

Google's Teachable Machine

StackOverFlow

ASL Dataset