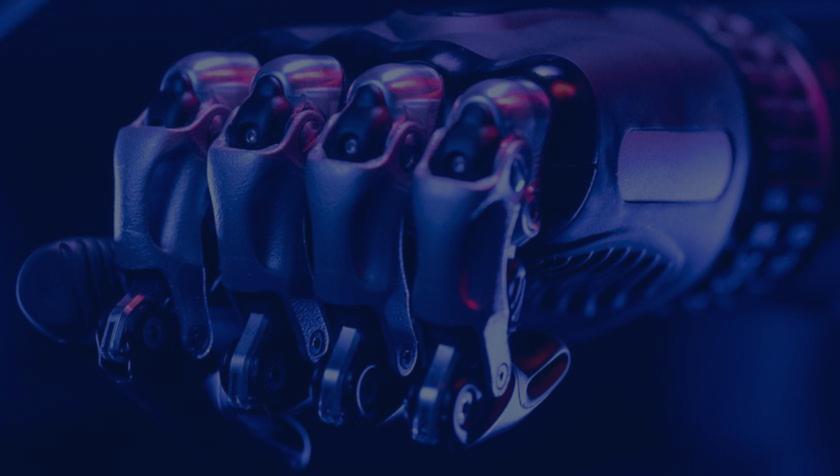
SIGN LANGUAGE DETECTION

USING YOLO V8



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Problem Statement

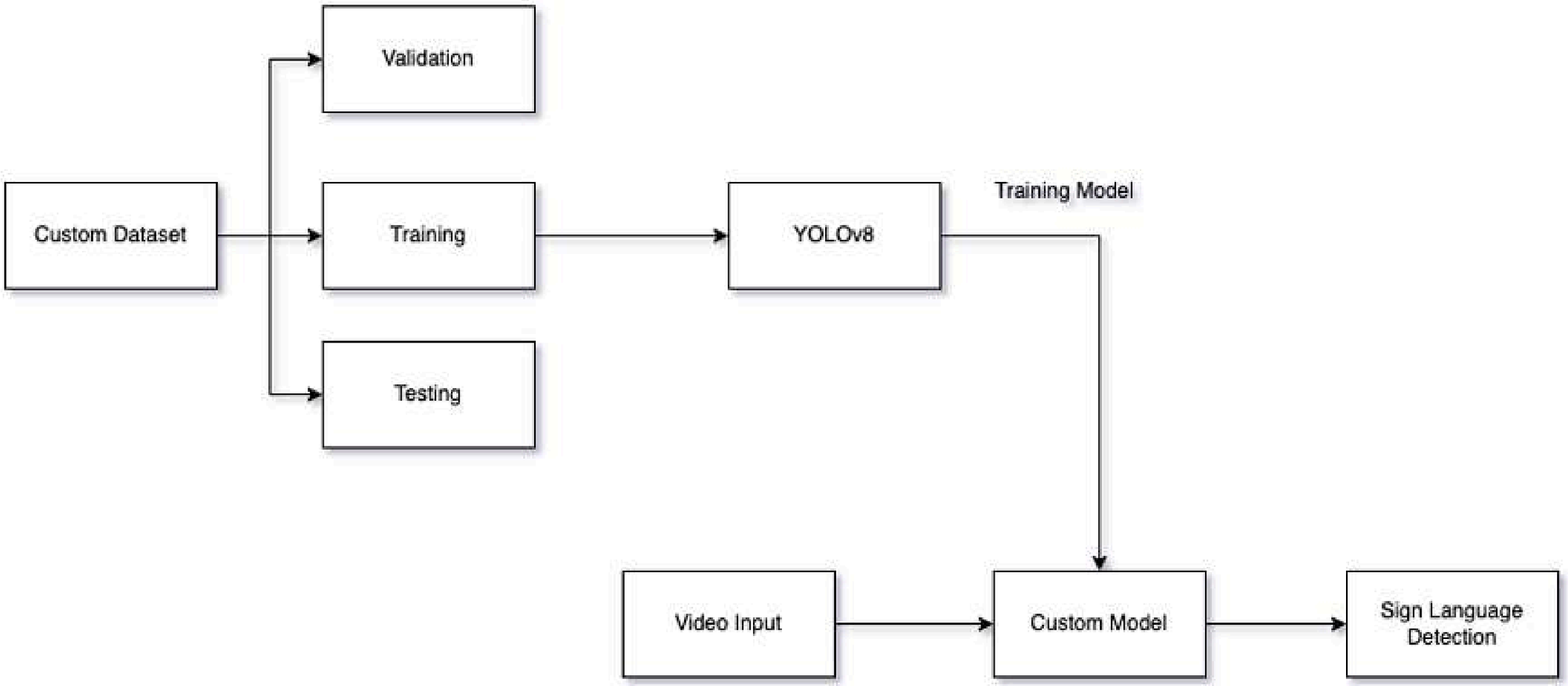
- Communication, the act of giving, receiving, and sharing information, is a fundamental aspect of human interaction.
- However, for individuals with disabilities such as those who are deaf or mute, effective communication can be particularly challenging.
- These individuals rely on hand signals and sign language to convey their messages, which can be difficult for others to interpret.
- This communication barrier highlights the need for innovative solutions to bridge the gap and foster better understanding between specially-abled individuals and the wider community.

Project Overview

Sign language serves as a vital bridge connecting the deaf community to the hearing world, facilitating communication and understanding. It primarily relies on hand articulations and non-manual gestures, which can be challenging for ordinary people to comprehend. Thus, a system is needed to recognize various signs and gestures, translating them into corresponding words to bridge the communication gap.

An end-to-end deep learning framework has been developed to efficiently process sign language using the YOLO model. The dataset, labeled and annotated with Roboflow, underwent pre-processing and post-processing techniques to ensure high performance.
This sign language recognition system demonstrates exceptional performance with a precision of 98.5%, recall of 99.0%, and a mean Average Precision (mAP) of 99.5% at IoU=0.50.

Methodology



Implementation

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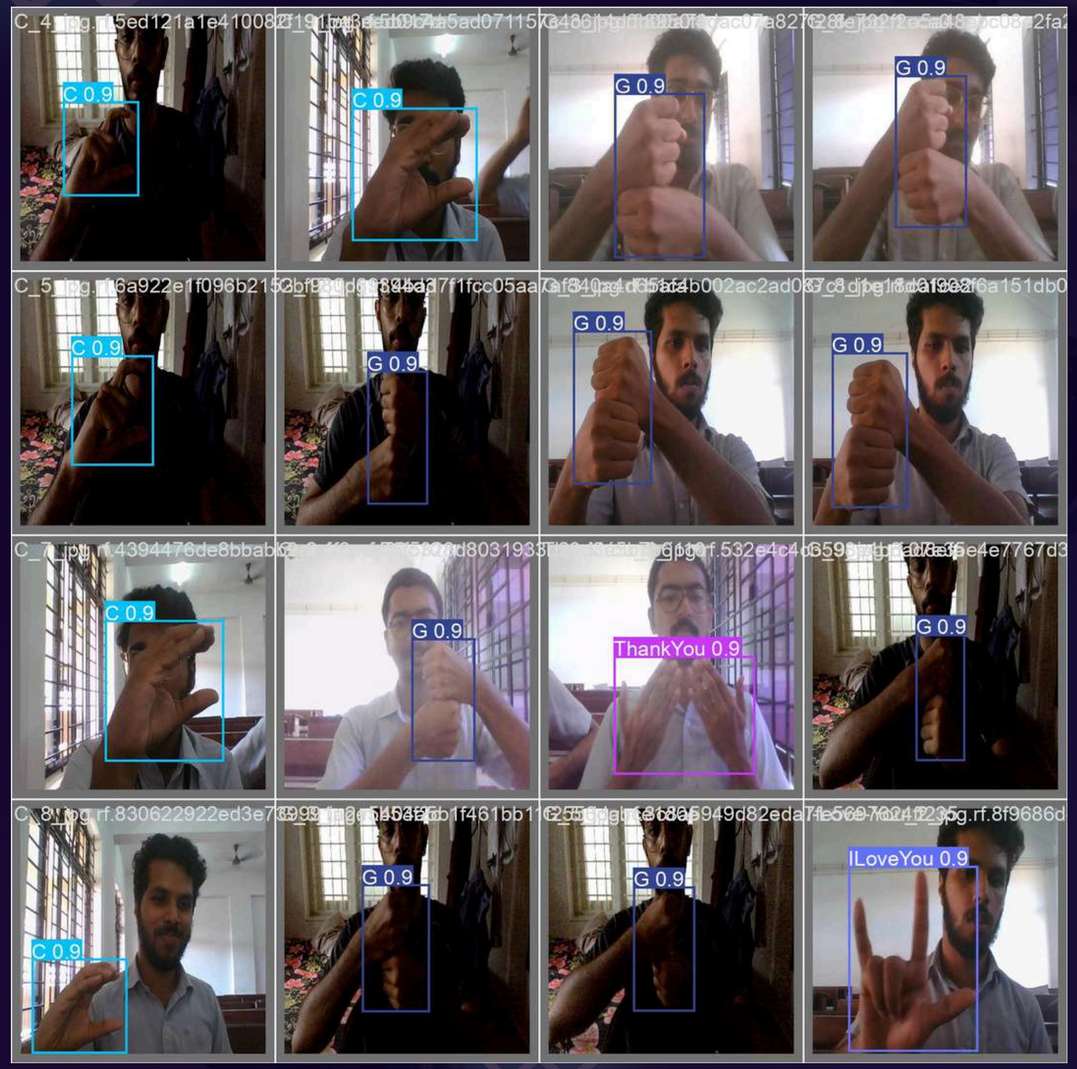
- Collected various images for different sign language representation.
- Collected images was labeled and grouped to different class for training
- Used YOLOv8 Object Detection algorithm to recognise the sign language
- A dataset of 1,200 labeled images was prepared with RoboFlow and split into training, validation, and testing sets. The model, trained in Google Colab for 200 epochs, achieved a mean Average Precision (mAP) score above 90%.
- Real-time recognition was enabled by integrating the trained model with a webcam, allowing it to capture and process sign gestures, display bounding boxes with labels, and confidence scores.

Results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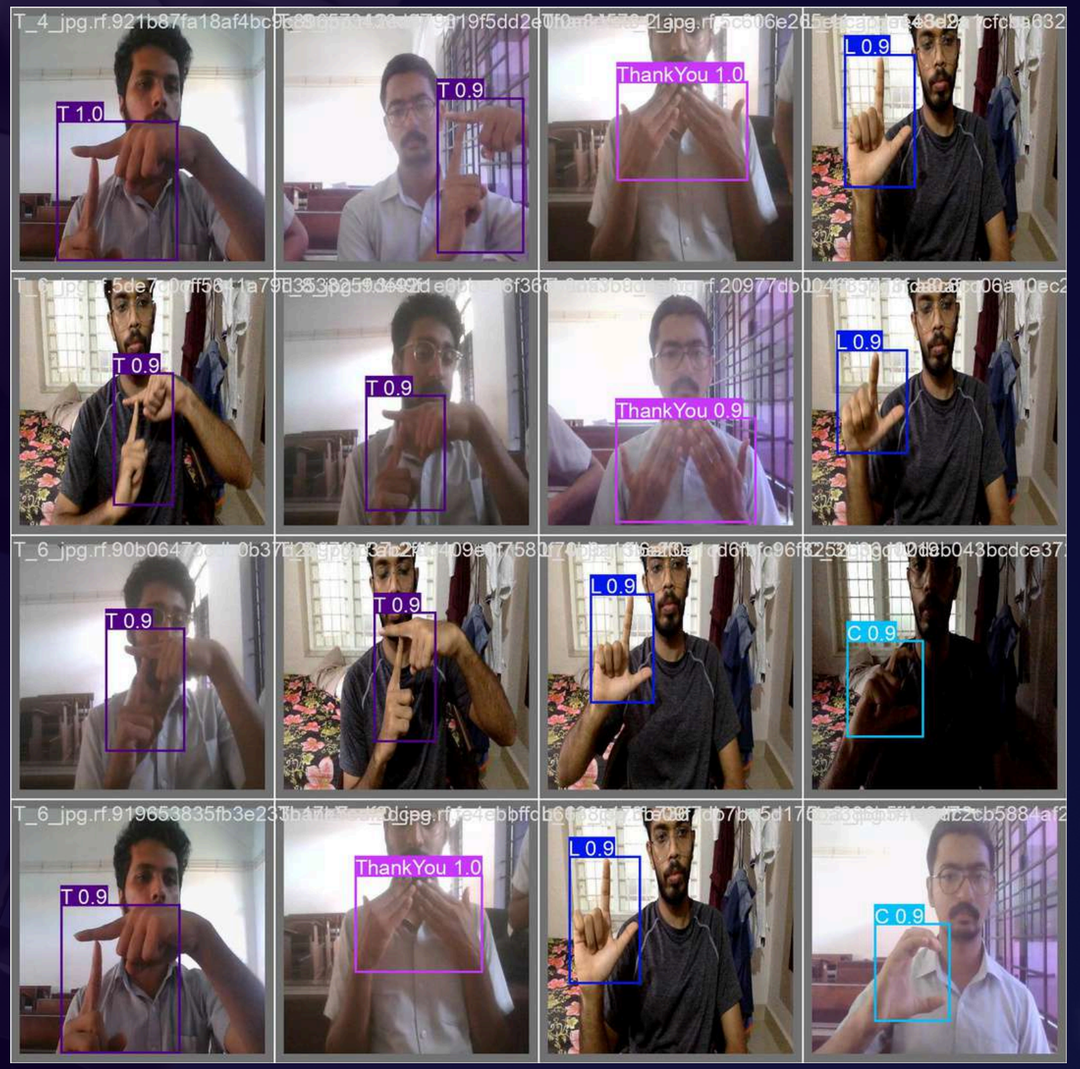
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