

Project details

ASL → ML → Text

Key features of the project and some description

Model

The model or models need to perform the following features accurately.

Hand detection and tracking (Webcam)

Implement robust hand detection and tracking algorithms to identify and isolate the hand(s) from the background in real-time webcam feeds. Techniques like skin color detection, contour analysis, and convolutional neural networks (CNNs) can be employed for this purpose.

Gesture recognition (Conversion)

Develop a deep learning model (such as a CNN or a recurrent neural network (RNN)) capable of recognizing ASL gestures from the segmented hand images. Transfer learning from pre-trained models like ResNet or MobileNet can be beneficial for achieving better accuracy with smaller datasets.

Contextual understanding (Context)

Incorporate context awareness into the model to improve the accuracy of word prediction based on preceding and subsequent signs. This could involve using recurrent neural networks (RNNs) or transformers to capture temporal dependencies and contextual information.

Data

Ensure that the dataset of ASL signs is comprehensive, accurately labeled, and covers various hand shapes, orientations, and movements. Consistency in lighting conditions, background, and hand positioning is crucial for model performance.

User feedback system

Collect user feedback to continuously improve the model's accuracy and usability. Incorporate mechanisms for user feedback and model retraining to adapt to variations in ASL gestures and user preferences over time.

UI design

Design an intuitive user interface that provides feedback on recognized signs, potentially displaying both the interpreted text and the corresponding ASL sign for confirmation by the user.