

Project : SignXpert - Sign Language to Text Converter

Bridging Communication Gaps with Technology

Cohort 5 - Women Engineers by TalentSprint supported by Google

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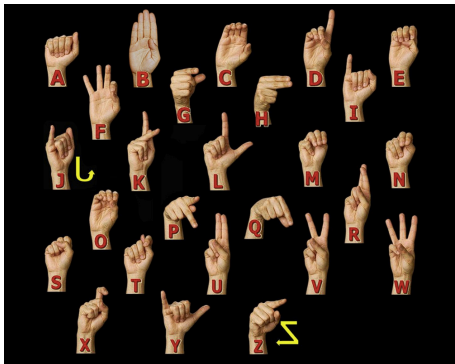
22 November 2023

Problem Statement

The current generation is not aware enough of the struggles faced by those who struggle with hearing and speaking. Thus, in an attempt to promote awareness we have tried to design a website which will appeal especially to the younger demographic and encourage them to learn sign language in a fun and engaging manner.

To address this issue, there is a need for a user-friendly and accurate Sign Language Detection Website that can seamlessly translate sign language gestures into text or speech.

American Sign Language



Written a Python script for capturing video from a webcam using OpenCV, processing hand gestures using the CVZone library for hand tracking, and then applying a pre-trained machine learning model for gesture classification. It also includes a Flask web application to stream the processed video with real-time sign language detection.

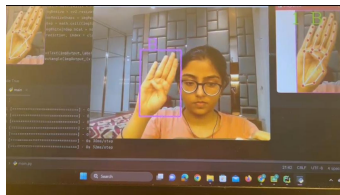
Tech Stack

- Back End:
 - Python
- Web Frameworks:
 - Flask
- Front End:
 - HTML
 - CSS
 - JavaScript
- Machine Learning Library:
 - TensorFlow
- Image Processing Library::
 - OpenCV
- Version Control:
 - Git
- UX design:
 - Figma

Machine Learning Model

Training the model :

- We implemented a sign language detection model using Google Teachable Machine. The task involved training a machine learning model to recognize and classify various sign language gestures. We gathered a dataset of sign language gestures, capturing different hand movements and positions. Each image in the dataset was carefully labeled with the corresponding sign language gesture.



SignXpert

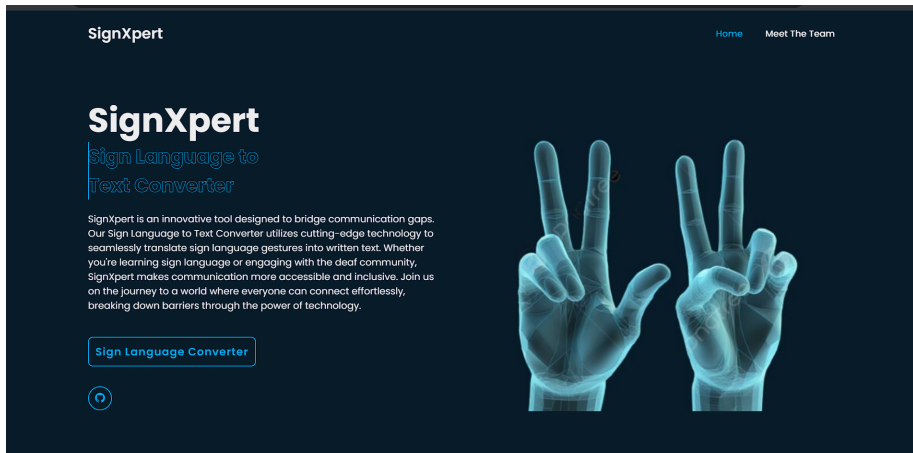


Figure: Home page

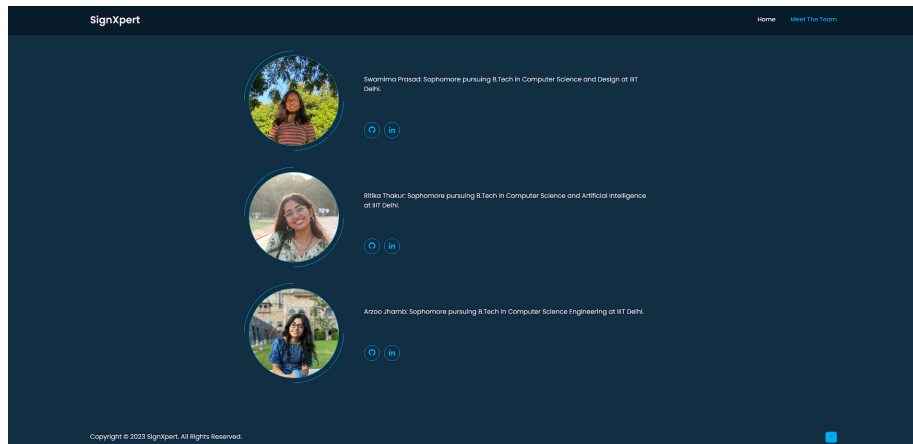


Figure: Meet The Team Page

Let us dive into our website

- Improving the accuracy of the model took time .
- Integrating backend machine learning python to front end website.

Technical Proficiency:

- Enhancement of technical skills, particularly in machine learning, image processing, and web development.
- acquisition of knowledge in Python, TensorFlow/PyTorch, OpenCV, and relevant web frameworks.

Collaboration and Communication:

- Effective collaboration within the development team.
- Learnt the importance of version control (Git) and collaboration platforms (GitHub) to facilitate smooth teamwork.

UX Design:

- Learnt to design website prototypes on Figma.

Gamification Elements:

- Introduce gamification elements to make learning sign language more engaging, such as achievements, challenges, or interactive quizzes.

Community Forums:

- Establish community forums where learners can connect, ask questions, and Encourage peer-to-peer learning.

Extending The Model:

- Expand the model to detect words and sentences.

Documentation:

- <https://docs.python.org/3/>
- <https://flask.palletsprojects.com/en/3.0.x/>
- <https://flask.palletsprojects.com/en/3.0.x/>
- <https://developer.mozilla.org/en-US/docs/Web/HTML>
- <https://developer.mozilla.org/en-US/docs/Web/CSS>
- <https://developer.mozilla.org/en-US/docs/Web/JavaScript>
- https://www.tensorflow.org/api_docs <https://docs.opencv.org/4.x/>

Thank You

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