SONARA

BRIDGING HEARTS PAVING WAYS

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THE PROBLEM

In India, more than **Six Crore** people suffer from hearing problems, and more than **Ten Crore** people suffer from speech related problems to some order.

A Majority of communication-impared population use the ***ASL or ISL,** but the **non-signers struggle** to communicate with them.

Existing solutions like human interpreters or text-based methods are not always **accessible or efficient,** and sometimes **impractical**

The observation was made that the needs of those troubled by **communication barriers** are not always catered. So, there exists a need for a **real-time, speech assistant** solution powered by **modern AI-technologies** such as vision model.

*ASL: (American Sign Language) and ISL: (Indian Sign Language)

THE SOLUTION

Sonara is an web-based accessibility platform, designed to provide inclusivity to people with communication-impairments of varying orders.

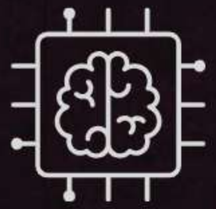
The project features real-time ASL-to-speech and speech-to-ASL conversion, through video-call. It also speech-recognition, ASL-tutoring and custom gesture recognition as additional features.

Sonara will recognize various signs using the live web-cam footage, to detect the holistic landmarks on the hands, face and body and use those points as data to translate it into text (or to speech) using LSTM.

The solution aims to bring the people a quality of life application, and enabling seamless-communication for all, **no matter their predicament.**

CHALLENGES AND MITIGATIONS

Challenge 1: Understanding the ground-demand in India-
Conducted multiple surveys and project pitches at seperate locations, and carried feedback rounds.



Challenge 2: Lack of a Database-
Developed a custom-made database by collecting gesture video-samples from various people.

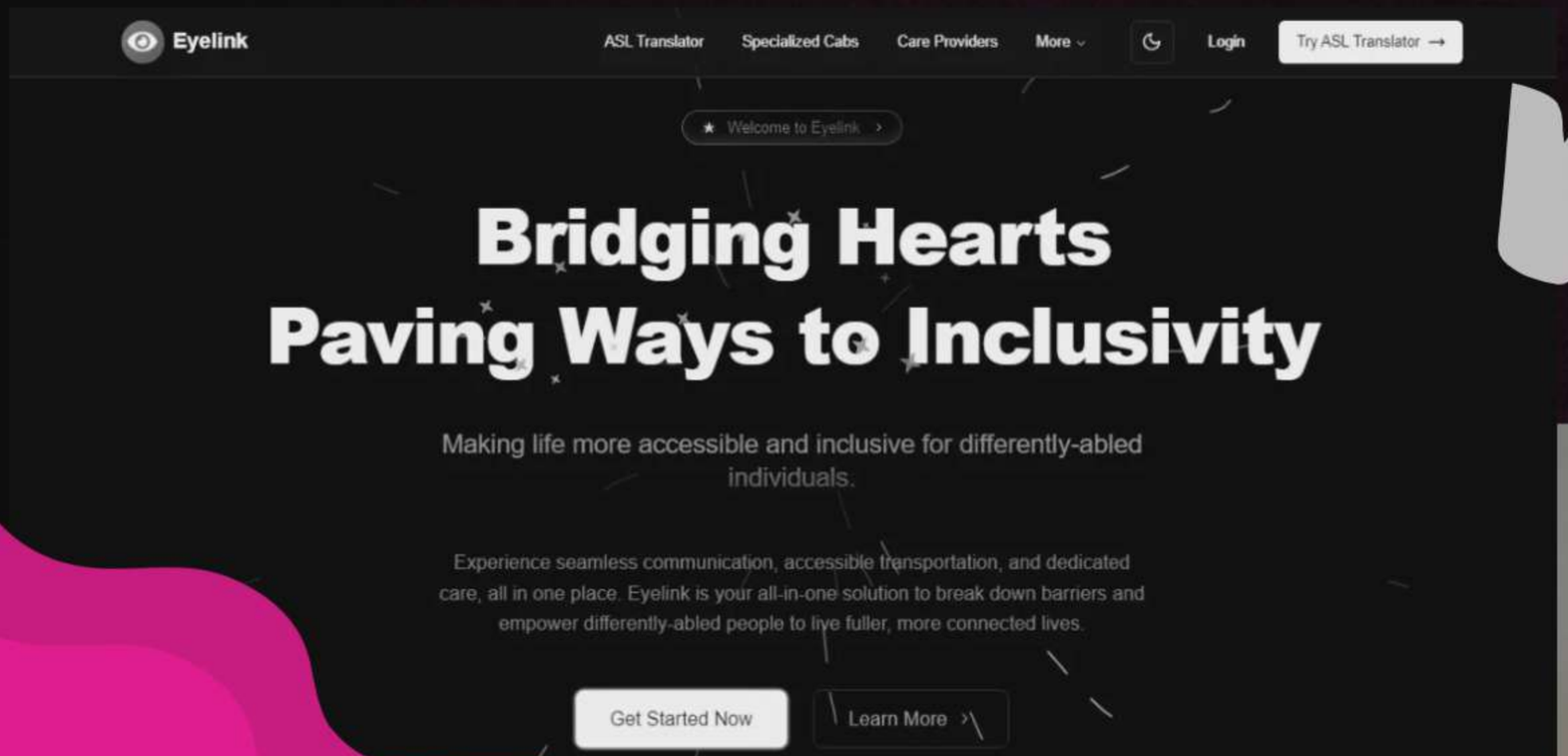
Challenge 3: Limited Gesture Vocabulary- Implemented a dynamic learning approach where new gestures can be added over time with user feedback-loop and transfer learning.

Challenge 4: Real-Time Performance and Latency- Optimized the project and implemented parallel architecture instead of generic sequential. Also implemented use GPU or TPU acceleration.

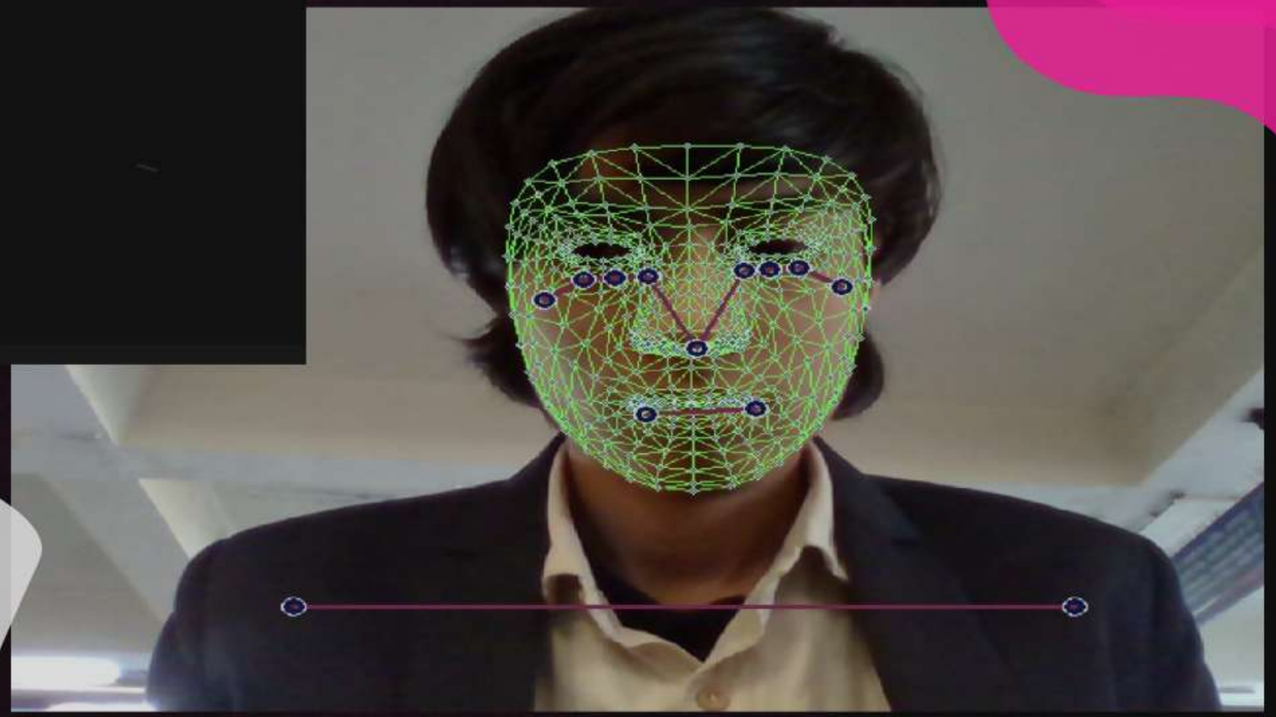
TECH STACK

- **Frontend:**
  Next.js
- **Languages:**
  JavaScript
  TypeScript
- **Tools:**
  Git & GitHub
  Vercel
  Heroku
- **Components:**
  shadcn/ui
  Aceternity UI
- **Database:**
  Supabase
  PostgreSQL
- **Libraries:**
  Mediapipe
  Tensorflow

THE WEBSITE



SIGN DETECTION WINDOW



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