



# **Sign Language Recognition and Translation System**

Bridging the communication gap for the deaf and mute community

**Cyber Sparks | Netweb AI for Public Good Hackathon**

# The Silent Struggle: A Communication Crisis

Communication between hearing-impaired individuals and non-sign language users presents a significant daily challenge.



## Public Dependency

In critical public places like hospitals, schools, and government offices, the absence of real-time sign language support fosters dependency and miscommunication.



## Costly & Limited Solutions

Existing solutions are often expensive, offer limited language support, or are not universally accessible.



## Urgent Need

There's a pressing need for an affordable, real-time solution to facilitate seamless two-way communication.

# Our Vision: Inclusive Communication for All

## Real-time Translation

Enable instant translation of sign language into text and speech, empowering deaf and mute individuals.

## Barrier Reduction

Significantly reduce communication barriers, fostering greater understanding and connection.

## Accessible & User-Friendly

Provide an easy-to-use solution, requiring no specialized hardware, accessible to everyone.

## Promote Inclusivity

Actively promote inclusivity across vital sectors like education, healthcare, and public services.



# Introducing Our Smart Translation System

We propose a camera-based sign language recognition system designed to transform hand gestures into understandable text and audible voice output.

This innovative solution is built for simplicity, cost-effectiveness, and broad accessibility, available as a web or desktop application.



# Seamless System Workflow

Our system processes gestures in real-time, providing immediate translated meaning.

01

## Gesture Capture

A camera captures hand gestures with precision.

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## Feature Extraction

Vision techniques extract key features from the captured gestures.

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## Pattern Matching

Extracted gestures are matched with predefined sign language patterns.

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## Text Display

The corresponding translated text is instantly displayed on screen.

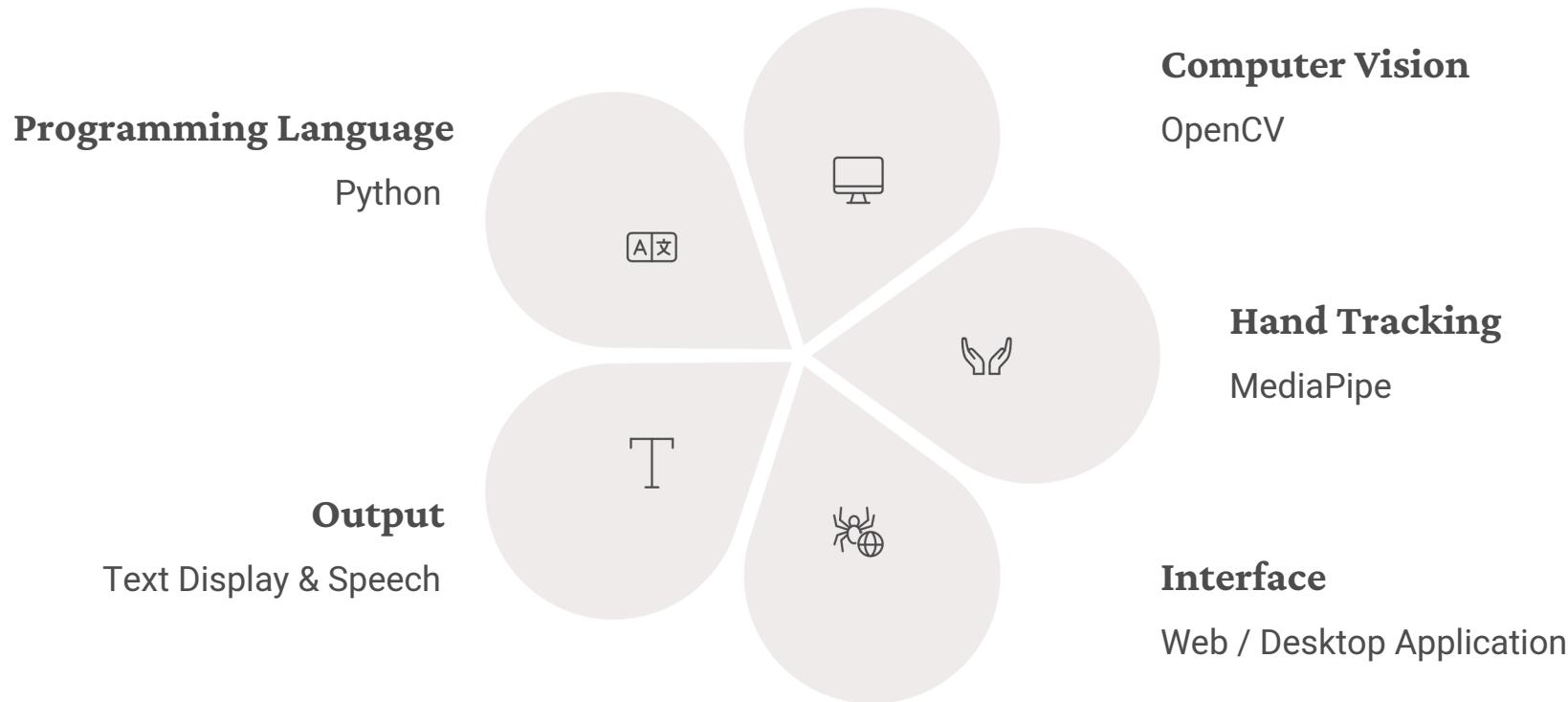
05

## Optional Speech Output

An optional text-to-speech component provides an audible translation for comprehensive communication.

# The Power Behind Our Solution: Technology Stack

Our system is built on robust and accessible technologies, ensuring clarity and performance.



- Clarity over buzzwords: We prioritize effective communication through proven technologies.

# Impactful Applications: Where Our System Shines

Our sign language recognition system has diverse applications, enhancing accessibility in everyday scenarios.

## Hospitals & Medical Desks

Facilitates clear communication during critical medical consultations.

## Classrooms & Learning

Supports inclusive education, ensuring every student can participate and learn.

## Public Service Counters

Ensures equal access to essential services and government interactions.

## Customer Support

Improves customer experience for hearing-impaired individuals seeking assistance.



# Transformative Impact & Benefits

## Enhanced Accessibility

Bridges communication gaps, making public and private services more accessible.

## Reduced Dependency

Lessens reliance on human interpreters, offering greater independence.

## Affordable & Scalable

A cost-effective solution that can be easily scaled to various environments.

## Digital Empowerment

Empowers the deaf community with digital tools for active participation.

# Future Horizons: Expanding Our Reach

Our journey doesn't end here. We envision continuous development to make communication even more seamless and comprehensive.

- **Full Sentence Recognition:** Moving beyond individual signs to understand complete sentences.
- **Multi-language Translation:** Supporting various sign languages and spoken languages.
- **Mobile Application:** Bringing accessibility to users' fingertips with a dedicated mobile app.



- **Two-Way Communication:** Enabling speech-to-sign language translation for truly bidirectional conversations.
- **Improved Accuracy:** Continuously enhancing recognition through expanded gesture data and machine learning.



# Conclusion: Bridging Divides, Building Inclusivity

Our project is more than just a technological endeavor; it's a commitment to a more inclusive society.

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## Practical Impact

A tangible solution for inclusive communication.

## Intelligent Design

Combines computer vision and smart gesture recognition.

## Equal Participation

Empowering the deaf and mute community to participate fully in society.