



# PROJECT REPORT

Prepared By  
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Under Supervision of  
**Monika Mam**



# Team



**Rohit Kumar**  
**2401010255**

Founder

The visionary behind the project. Leads the development process and ensures every component aligns with the goal of real-time sign language recognition.



**Khushi Chauhan**  
**2401010263**

Engineer

Responsible for building and optimizing the machine learning models. Brings accuracy and intelligence to gesture recognition.



**Mukul**  
**2401010256**

Integration Developer

Handles the real-time video processing, user interface, and integration with hand tracking tools like MediaPipe.



**Aman**  
**2401010261**

Mobile Deployment Expert

Focuses on converting and deploying the model using TensorFlow Lite and integrating it into a mobile-friendly environment.

# BRIDGING THE GAP

Real Time Sign Language



# INTRODUCTION



 Sign language is the primary mode of communication for millions of people with hearing or speech impairment.

 This project aims to develop a real-time sign language translation application using machine learning enabling seamless communication by converting fine gestures into text or speech.

 Reduces dependence on human interpreters, making communication more Independent and efficient.

# OBJECTIVES:



Real-Time Gesture  
Recognition

Accessibility &  
Inclusivity

High Accuracy  
& Efficiency

User-Friendly  
Interface

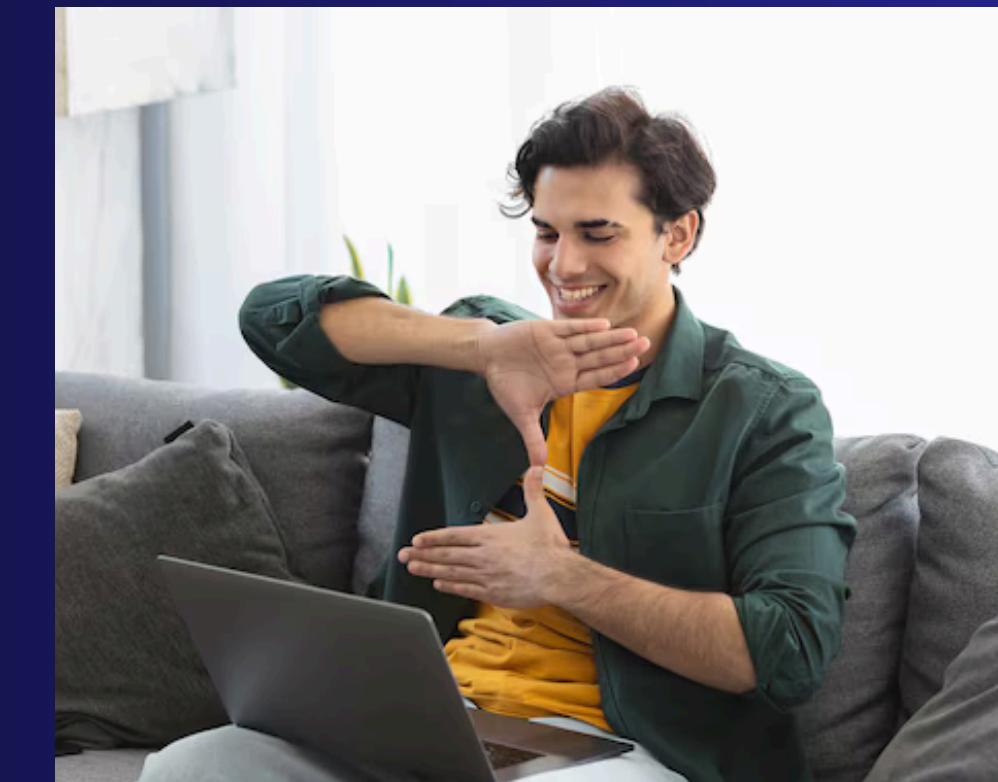


# PROBLEM STATEMENTS:

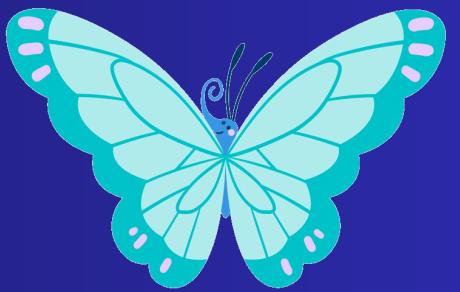
Communication barriers between sign language users and non-sign language users create significant challenges in everyday interactions.

**The project aims to develop a real-time sign language translation application using machine learning to bridge this gap.**

**By leveraging AI-driven gesture recognition, the application will convert sign language into text or speech instantly.**



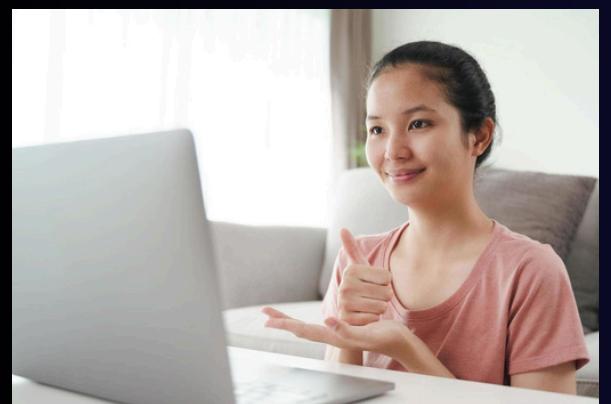
# METHODOLOGY



**DATA  
COLLECTION**

**GESTURE  
RECOGNITION**

**MODEL  
DEVELOPMENT**



**DISPLAY  
OUTPUT**

**USER  
INTERFACE**



**DEPLOYMENT**



# SOFTWARE USED

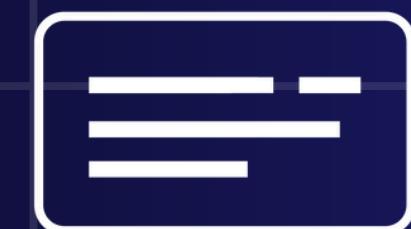
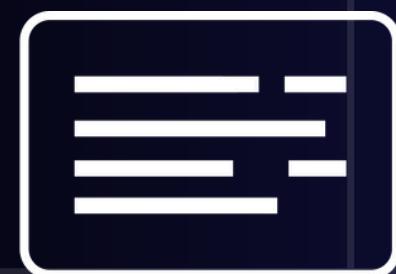
- ➔ Python: Programming Language
- ➔ Mediapipe: Hand tracking
- ➔ OpenCV: Video processing
- ➔ Tensorflow / Keras : Model training
- ➔ Numpy/ Pandas: Data handling
- ➔ Matplotlib: Visualization
- ➔ TensorFlow Lite: Mobile deployment
- ➔ Jupyter Notebook: Development network

## EXPECTED OUTCOMES:



- 01 Accurate Sign Language Recognition
- 02 Seamless Text & Speech Recognition
- 03 User-Friendly Interface
- 04 Multi-Language Support
- 05 Robust Machine Learning Model
- 06 Real Time Processing
- 07 Hardware Compatibility
- 08 Scalability & Future Enhancements

# Applications



## Healthcare:

Enables doctor and nurses to understand patient using sign language Where interpreters are unavailable in emergency.

## Workplace & Employment:

Encourages inclusivity by allowing Employees with hearing impairments to communicate with colleagues.

## Emergency Situation:

Helps first responders and law enforcement communicate quickly with individuals using sign language.

## Education:

Helps students with hearing impairments communicate with teachers and peers.

## Customer Service & Business:

Enhances interactions in banks, retail stores and government offices.



# CONCLUSION

The development of a real-time sign language translation application using machine learning represents a significant step towards bridging the communication gap between the Deaf and the hearing communities.

By Leveraging advanced Technologies such as computer vision, deep learning and natural language processing these application can accurately recognise and translate sign language into spoken or written text in real time.

Despite the promising advancements, challenges such as data set limitation, variations in sign language across region and real time processing constraints remain areas force further research.

Overall, real time sign language translation powered by machine learning has the potential to create a more inclusive and accessible society, fastering better communication and social integration for individuals with hearing in impairments.

Thank you

