

# Real-time Sign Language Recognition System Overview

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Explore the design and impact of a cutting-edge sign language recognition system

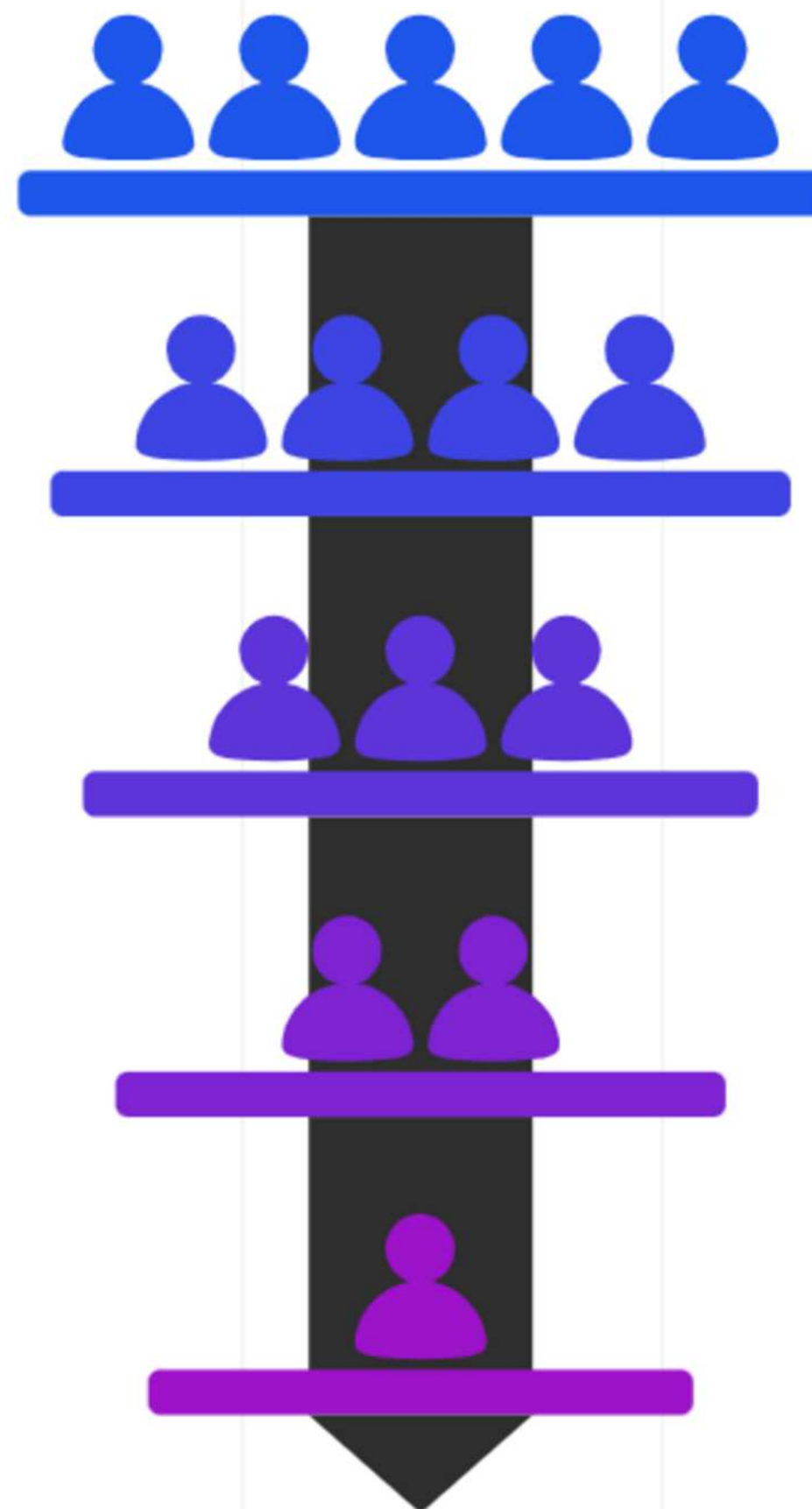
**Aarush**

Presenter



# System Architecture & Deep Learning Model

Modular real-time sign language recognition using TensorFlow and Keras



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## Video Capture via Webcam

Live video frames are captured to provide real-time input for processing.

2

## Preprocessing with OpenCV

Extracts region of interest and resizes frames to 224x224 pixels to fit model input requirements.

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## Hand Gesture Classification

Pretrained Keras model classifies hand gestures into specific letters using learned features.

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## Prediction Buffering

Stabilizes predictions across consecutive frames to enhance accuracy and reduce noise.

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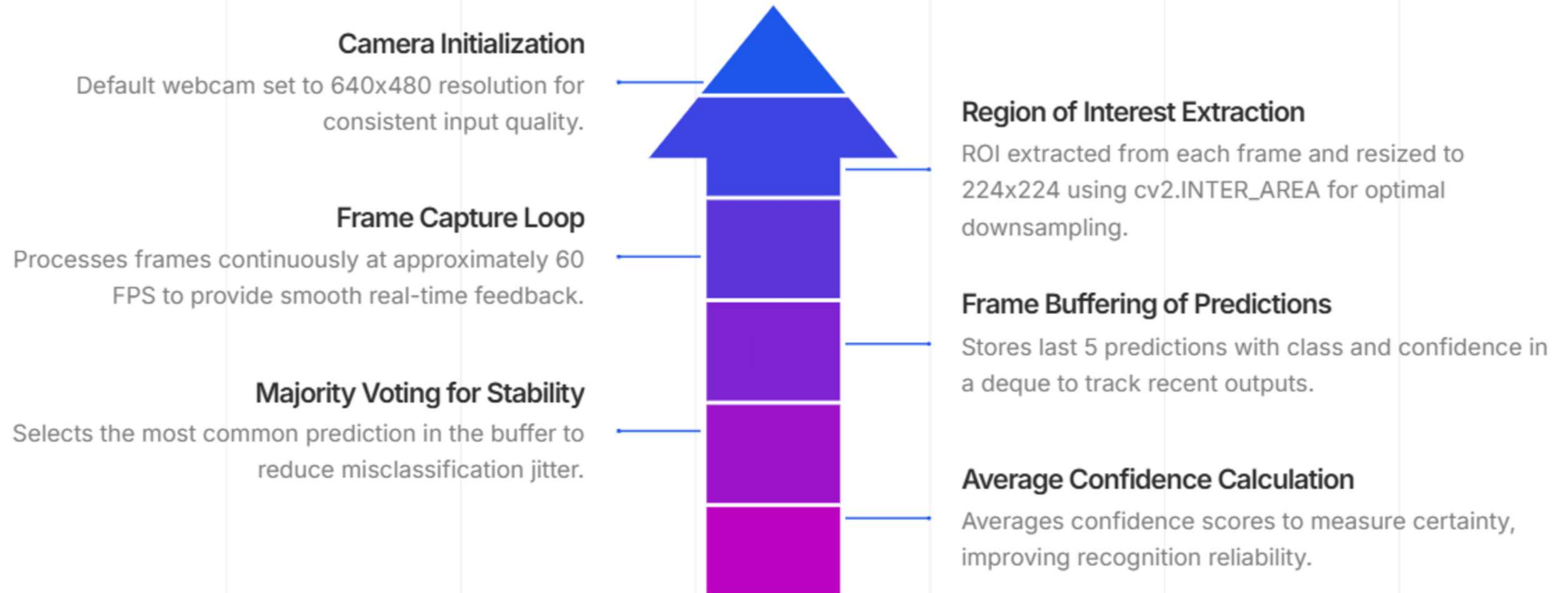
## Output Generation

Recognized letters form words which are vocalized using text-to-speech technology.

# Real-time Video Processing & Prediction

## Buffering

Enhancing gesture classification accuracy with stable predictions and smooth video input





# Word Formation & Text-to-Speech Integration

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Innovative logic and asynchronous speech synthesis empowering real-time communication



## Build Words From High-Confidence Letter Recognition

Letters Concatenate Into Words When Average Confidence Exceeds 0.90, At Least 2.5 Seconds Pass Since Last Letter, And Prediction Is Not 'Nothing'. This Ensures Accurate And Intentional Word Formation.



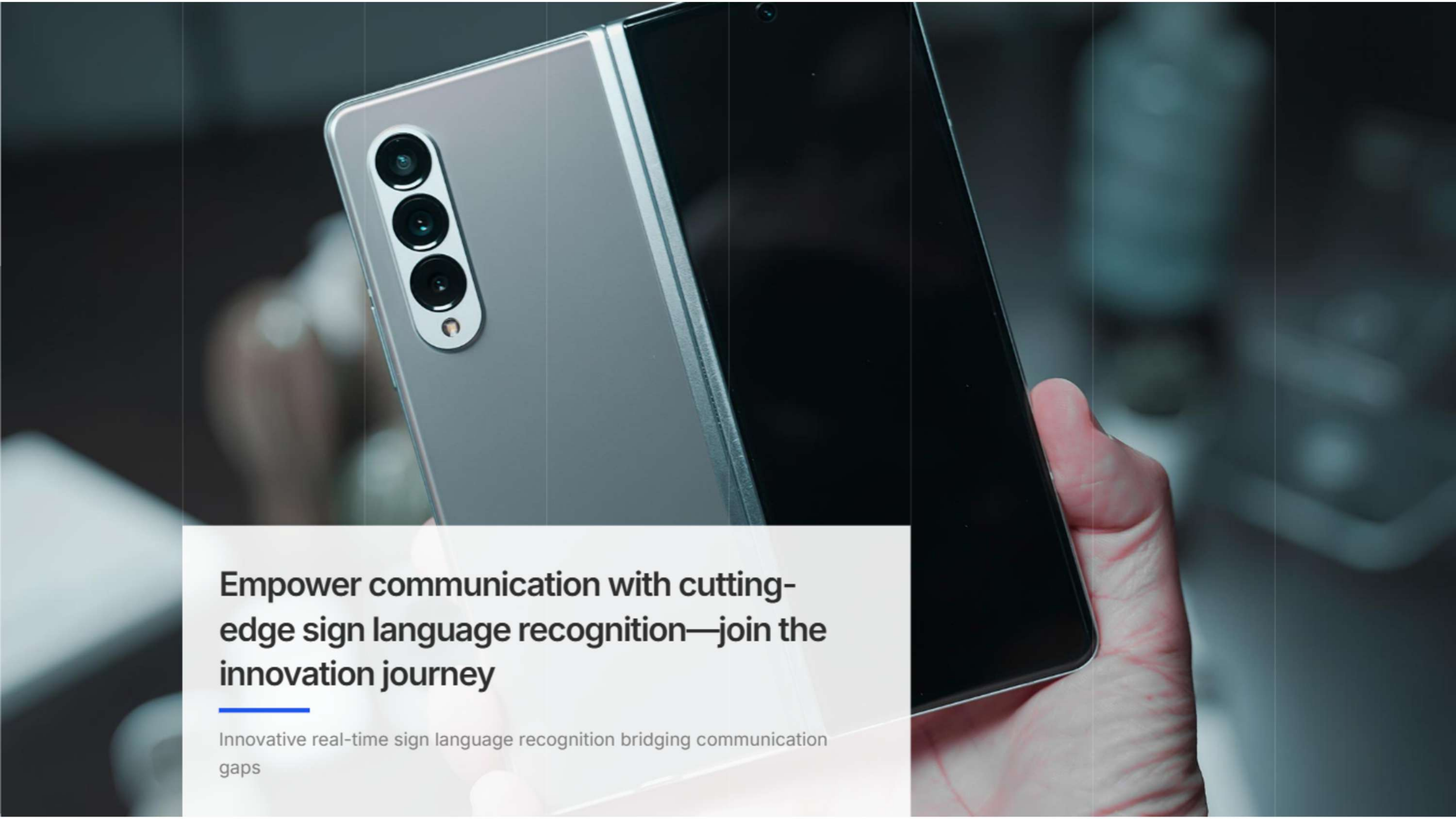
## Use Asynchronous PowerShell For Speech Synthesis

Formed Words Are Converted Into Audible Speech Asynchronously Via PowerShell Commands, Preventing UI Freezing And Maintaining Application Responsiveness During Text-To-Speech Conversion.



## Enhance Accessibility For Hearing-Impaired Users

Integrating Word Building And TTS Modules Empowers Hearing-Impaired Individuals To Communicate Effectively And Naturally, Highlighting The System's Impactful Inclusivity And Innovation.



## Empower communication with cutting-edge sign language recognition—join the innovation journey

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Innovative real-time sign language recognition bridging communication gaps



# Thank You and Future Scope to Sign Language Recognition

Discover how future improvements will boost accuracy, accessibility, and real-time communication



## Enhance model accuracy with expanded datasets

We will improve system precision by incorporating larger and more diverse datasets, enabling better recognition across varied sign language nuances and user demographics.



## Incorporate multi-language sign support

Future updates will allow seamless recognition of multiple sign languages, broadening usability and empowering a wider global audience to communicate effectively.



## Improve user interface accessibility

We aim to design more intuitive and accessible interfaces, making the system easier to use for people with diverse abilities and ensuring inclusive communication tools.



## Add real-time feedback mechanisms

Integrating instant feedback will enhance user interaction by providing immediate recognition results, improving learning and communication fluidity.



## Integrate with wearable communication devices

Planned integration with wearable tech will enable hands-free, seamless communication, making sign language recognition more intuitive and practical in everyday life.