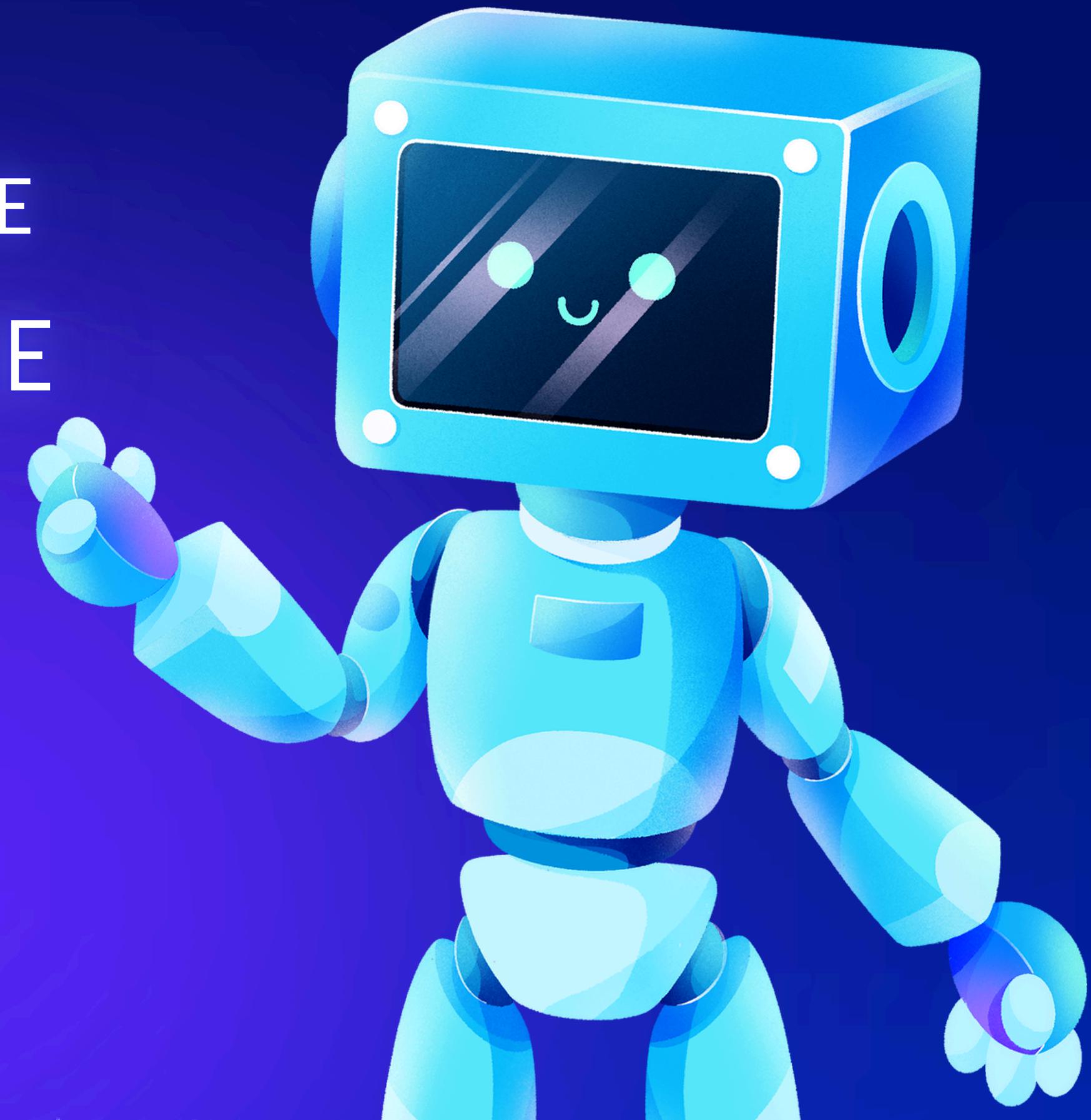




# ARTIFICIAL INTELLIGENCE BASED SIGN LANGUAGE INTERPRETER



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# INTRODUCTION

In recent years, advancements in artificial intelligence (AI) and machine learning (ML) have paved the way for innovative solutions to long-standing communication barriers. One such barrier is the communication gap between individuals who use sign language and those who do not.

This tool aims to enhance inclusivity and accessibility, allowing for smoother communication between the deaf or hard-of-hearing community and the general public.



# MACHINE LEARNING



## Automation

Automation in the AI-based Sign Interpreter allows the system to operate seamlessly from gesture capture to output without manual intervention. The system automatically processes hand gestures in real-time, translating them into text instantly.

## Algorithm

The AI-based Sign Interpreter leverages the Random Forest Classifier, a powerful machine learning algorithm, to recognize and classify sign language gestures. The Random Forest Classifier works by constructing an ensemble of decision trees during the training phase, each of which contributes to the final classification decision.

# AUTOMATION PROCESS



The system automatically processes hand gestures in real-time without manual intervention, providing instantaneous translation from sign language to text or speech.



The system can be designed to automatically update its model with new gestures and variations, improving accuracy over time through automated retraining.

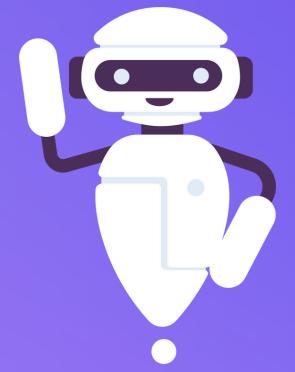


Automated processes detect and handle errors in gesture recognition, such as providing feedback when an unrecognized gesture is detected, prompting the user to retry.



The automated processes reduce the need for manual updates or adjustments, making the system easier to maintain over time.

# PROJECT OBJECTIVES



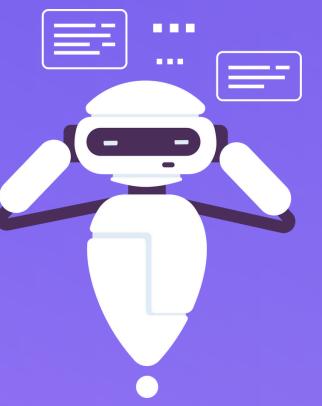
## OBJECTIVE 01

The primary objective of this project is to develop an AI-based system capable of interpreting sign language gestures and converting them into human-readable text.



## OBJECTIVE 02

Develop an accessible tool that can be used in various environments such as schools, workplaces, public services, and healthcare, thereby aiding individuals with hearing impairments in their daily interactions.



## OBJECTIVE 03

Encourage broader awareness and understanding of sign language by making the technology accessible to the general public, fostering a more inclusive society.

# PROJECT SCOPE



## GESTURE RECOGNITION

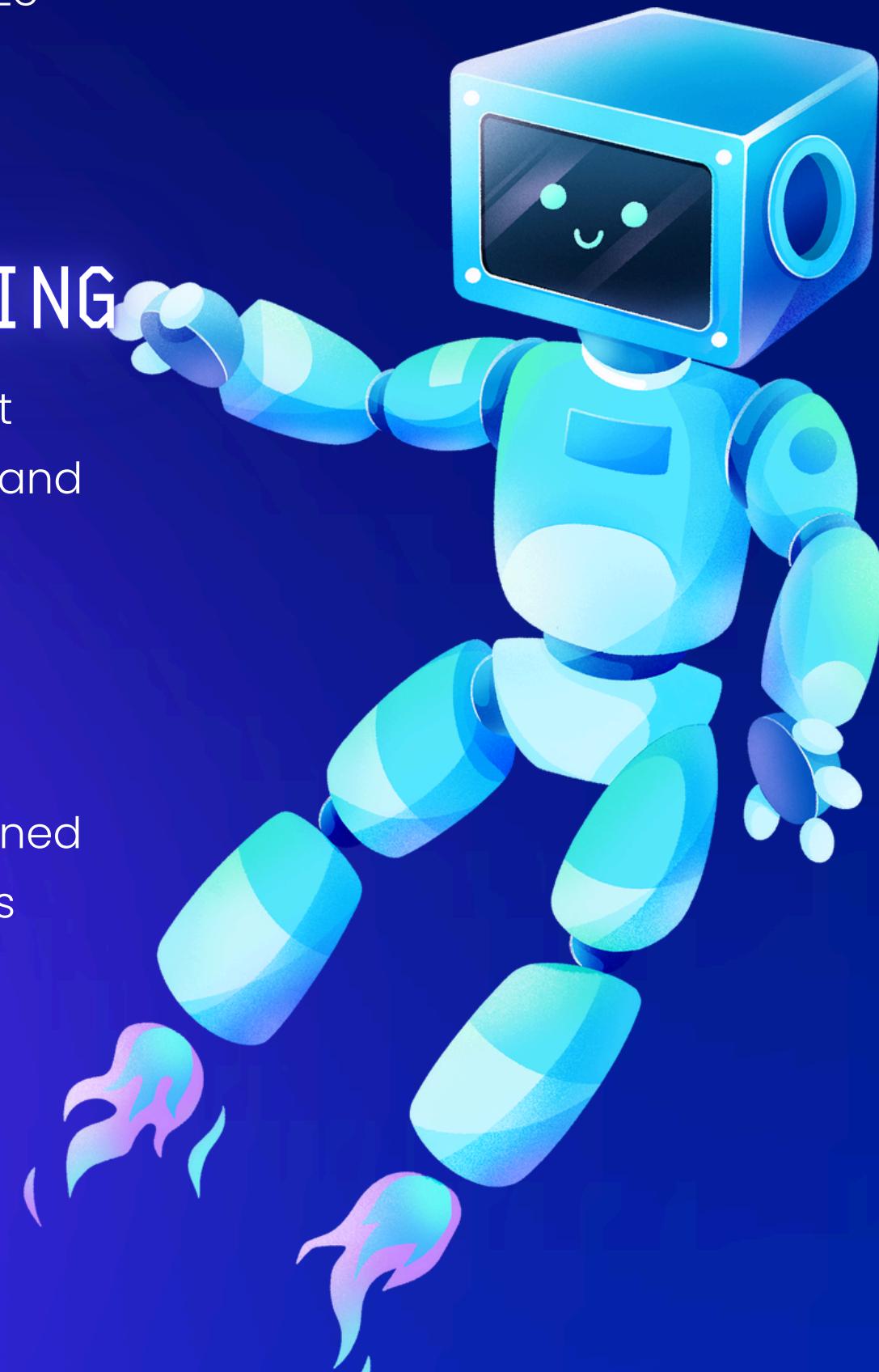
The system will be trained to recognize a predefined set of sign language gestures.

## REAL-TIME PROCESSING

The system will process and interpret gestures in real-time, ensuring quick and accurate translations.

## SCALABILITY

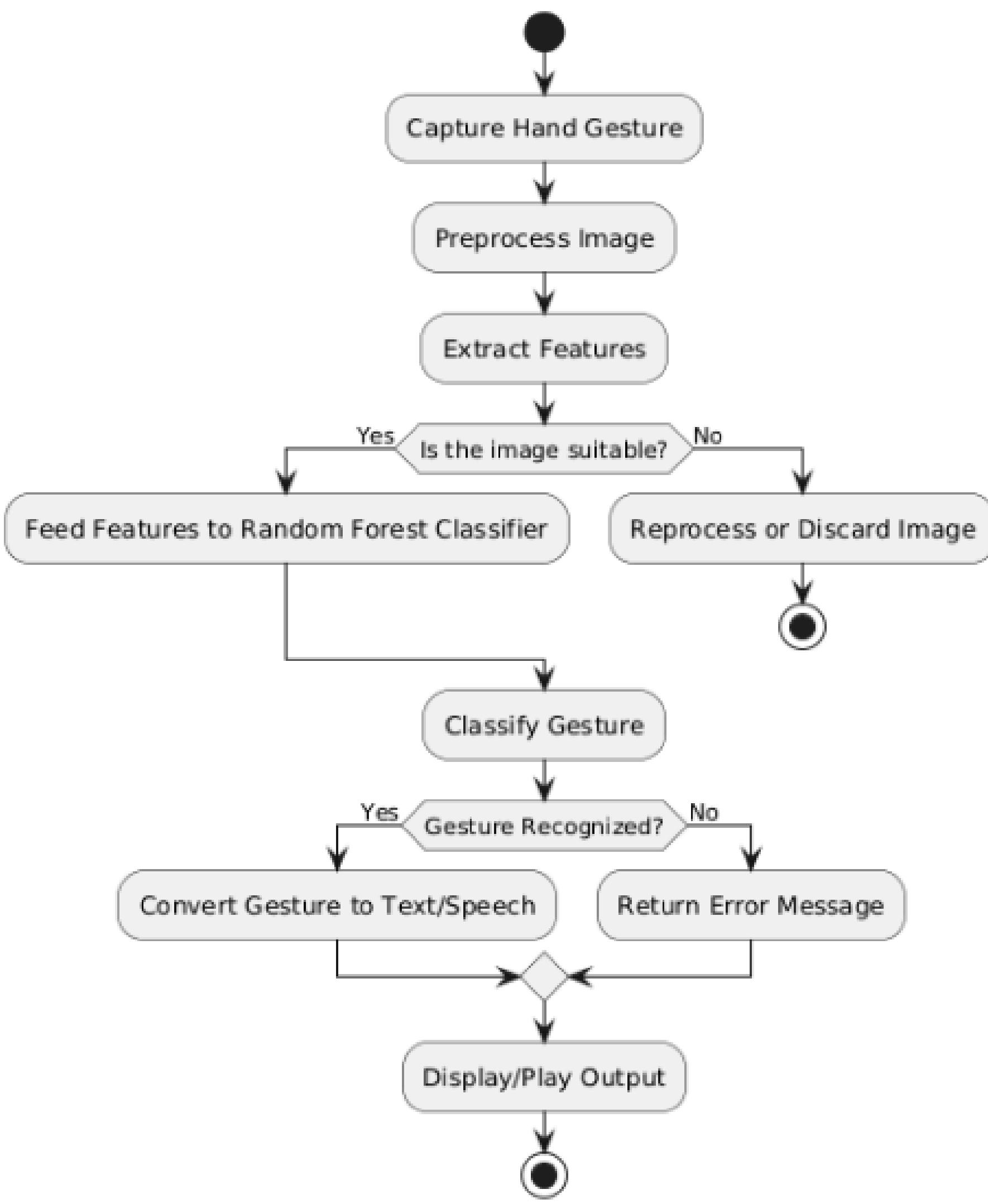
The system architecture will be designed to accommodate additional gestures and languages, allowing for future expansion.





# TECHNICAL ARCHITECTURE

- Capture Hand Gesture
  - Preprocess Image
  - Extract Features
  - Image Suitability Check
    - If YES, the features are fed into RFC.
    - If NO, the image is either reprocessed or discarded
  - Classify Gesture
  - Gesture Recognition Check
  - Display Output
- 



# RESULTS AND ACHIEVEMENTS

01

- **High Accuracy:** The system demonstrated a high accuracy rate in recognizing predefined sign language gestures, thanks to the effectiveness of the Random Forest Classifier. The system successfully processed and interpreted gestures in real-time, with minimal latency.

02

- **User Satisfaction:** Initial user testing indicated a high level of satisfaction with the system's performance and ease of use. The system's architecture allows for the addition of new gestures and languages, making it a scalable solution for various sign language dialects.

THANK YOU!



# RESOURCE PAGE



