Development of a Gesture Recognition Library for Enhanced Human-Robot Interaction using the Pepper Humanoid Robot



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Aims

- Develop a general Gesture Recognition Library.
- Improve Human Robot Interaction.
- Learn new gestures in real-time.
- Develop middleware for Pepper.
- Generate contextual natural language responses based on gestures detected.

Objectives

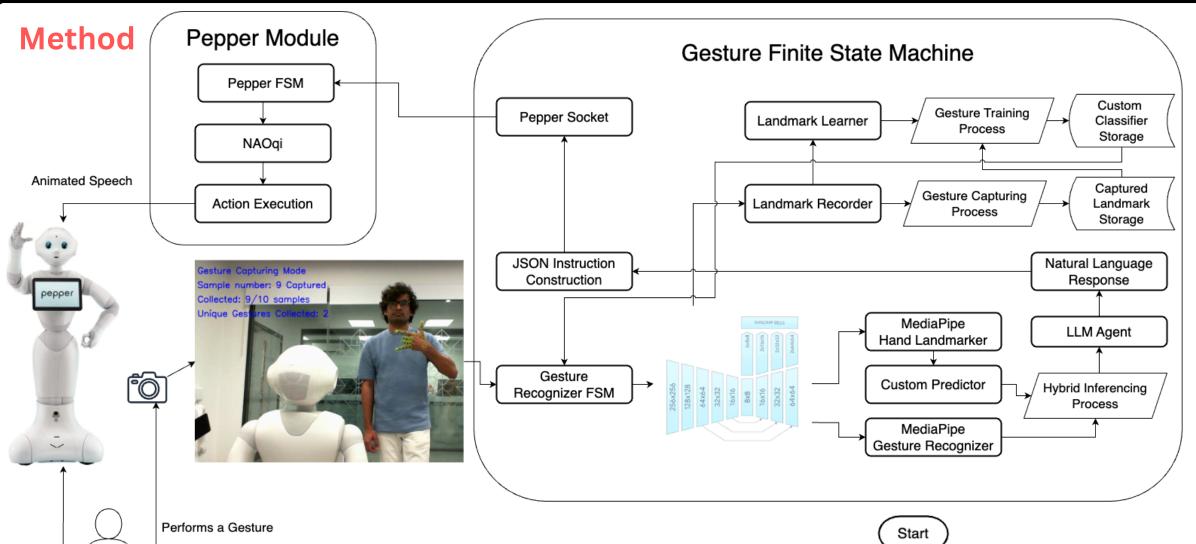
- Recognise common gestures: Thumbs Up, Thumbs
 Down, Open Palm, Closed Fist, Victory, Pointing
 Up, I Love You (Sign Language).
- Develop rich interactions with Pepper.
- Generate a spatial visualisation of pre-trained and custom gestures, understanding clustering of landmarks.

Scan for Github Repository



Scan for Dissertation Report



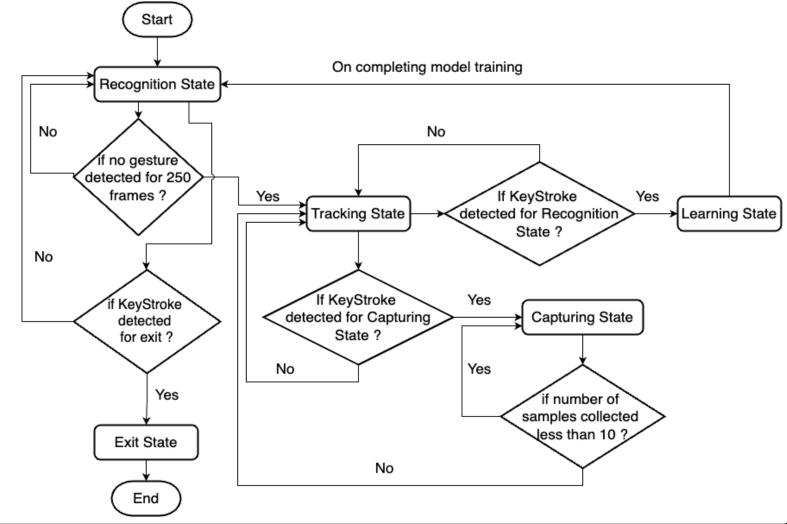


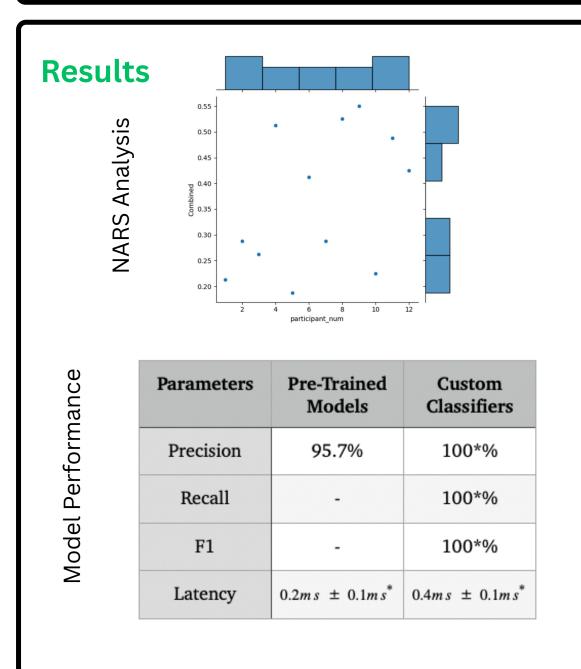
System Architecture

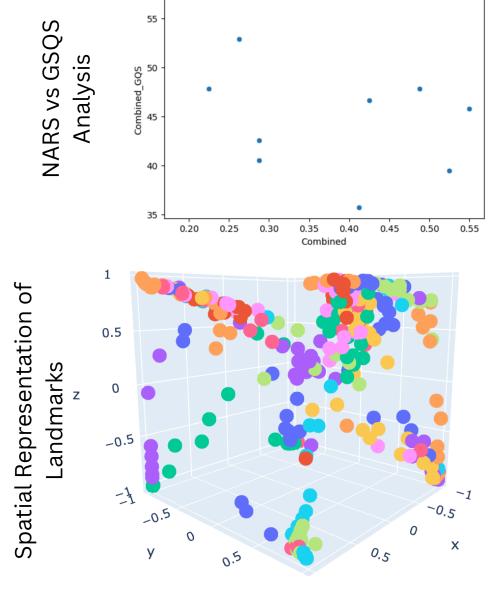
- Pepper Module: Executes NAOqi instructions on Pepper.
- Gesture Finite State
 Machine: Detecting
 gestures from the
 livestream and
 generating natural
 language responses.

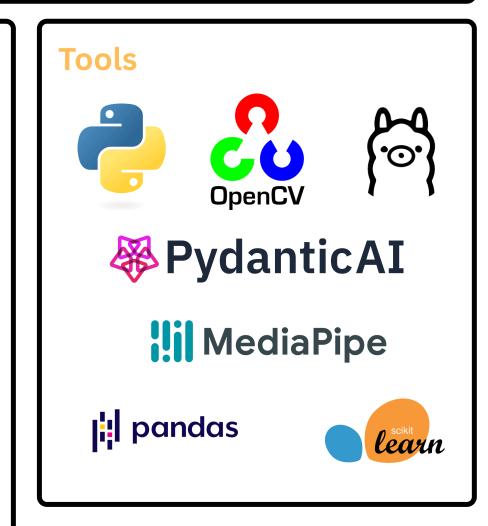
Finite State Machine

- **Recognition State:** Applies the Hybrid Recognition pipeline.
- **Tracking State:** Activates the Landmark Detection Model to retrieve Hand Landmarks in real-time.
- Capturing State: Auto captures Hand Landmarks for new gestures in real-time.
- Learning State: Off the shelf classifiers run a grid search to learn new gestures from collected samples.
- Exit State: The endpoint for the system.









Scan for Demonstration Video

