

Homee: Smart Home Assistant Robot with ROS

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Introduction

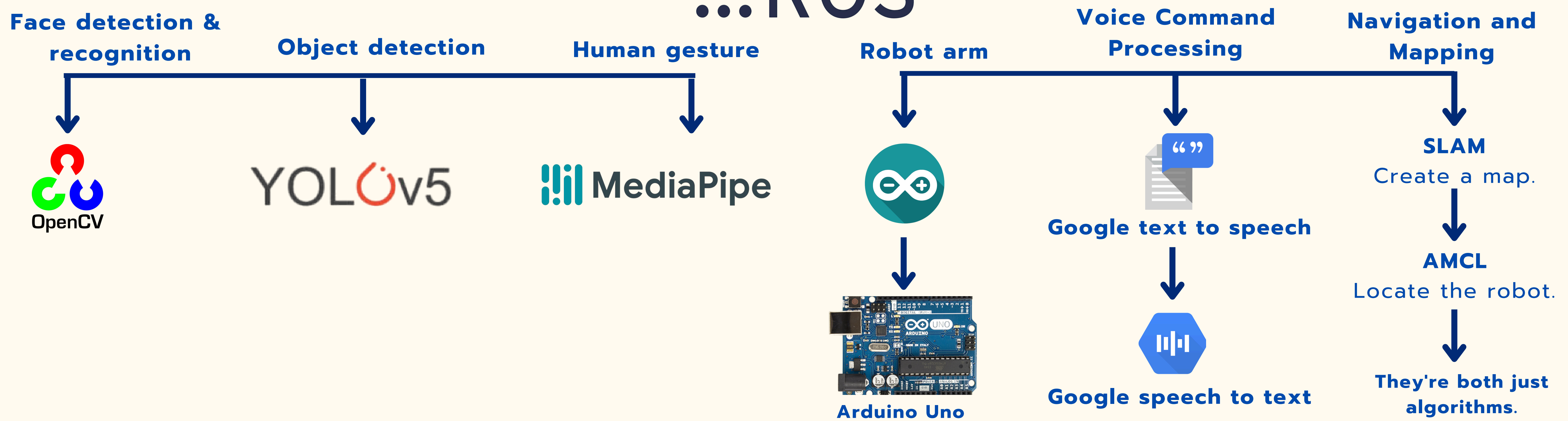
The goal of this project is to develop a smart home assistant robot named "Homee" using the Robot Operating System (ROS) as the foundation for controlling and processing data from various sensors. Its purpose is to make daily activities at home more efficient, such as carrying items and guiding guests. This project originated from our participation in the Thailand Open ROS and Smart Robot competition under the @Home Education Challenge, where the team realized the potential of robots and AI in creating innovations that truly benefit people.

Objectives

- Develop and explore the Robot Operating System (ROS) and Artificial Intelligence (AI) using technologies like face detection, face recognition, and object detection.
- Design the robot structure and robotic arms to suit home service tasks, such as carrying items and navigation.
- Improve the Homee robot for real-life use in homes by refining its system and evaluating test results to make it better at handling different situations effectively.

Project Design

ROS



Findings

- The robot can use SLAM and AMCL technologies to create maps and accurately determine its position.
- Face detection in different lighting conditions shows limitations in extremely bright or dim environments.
- Using the YOLOv5 model for object detection allows the robot to quickly identify objects, but there are limitations when objects are small.
- Google Speech-to-Text and Google Text-to-Speech help the robot understand and respond to commands well, but there are limitations if the user is too far from the robot and the microphone can't pick up the sound.
- The robot can use the robotic arm to help carry objects, but it can't handle objects that are too heavy or large.
- HOMEe is just a prototype, so the size of the robot or some functions may not be suitable for all environments.

Conclusion and Discussion

"Homee" was developed to showcase how combining ROS and AI can improve home services. It can assist with tasks like carrying items, greeting, and guiding guests. While there are still some limitations in certain situations, it remains a prototype that can be developed further for effective use in real homes.

Reference

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