



TECHNOLOGY

# AUTOMATED PET MONITOR

DECEMBER 2023

# A G E N D A

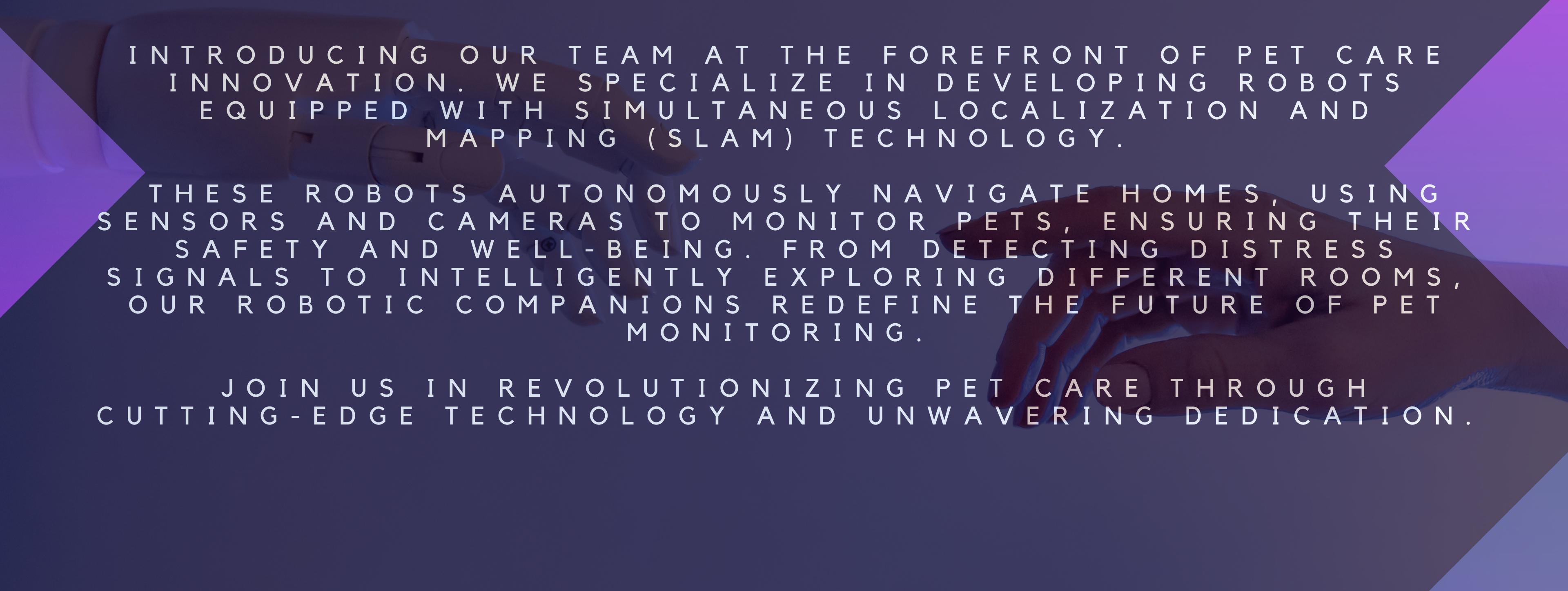
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# INTRODUCTION

MEET QUANTUM TEAM MEMBERS!

KHASANOV ABROR	ABDUVALI UGLI	1 2 2 0 4 5 4 2
BOBOKULOVA DIYORA	BAHODIR KIZI	1 2 2 1 4 7 3 1
KHUDOYBERDIEV MADAMINBEK	PULAT UGLI	1 2 2 2 5 2 4 6
ILHOMOV MANSUR	ILHOM UGLI	1 2 2 2 5 2 4 7
TSOGOO MUNKHZUL		1 2 2 2 5 2 4 9
MUHAMMEDOV MIRONSHOH	MIRKHON UGLI	1 2 2 2 5 2 5 2
ABDURASULOV MIRSAID ALIMARDONOVICH		1 2 2 2 5 2 5 3
SARVARBEK		1 2 1 9 4 8 6 1

## PRIMARY GOAL

A close-up photograph of a white robotic pet monitor. The device has a small circular camera at the top, followed by several light-colored sensors or vents. It appears to be a compact, cylindrical design. The background is dark and slightly blurred.

INTRODUCING OUR TEAM AT THE FOREFRONT OF PET CARE INNOVATION. WE SPECIALIZE IN DEVELOPING ROBOTS EQUIPPED WITH SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) TECHNOLOGY.

THESE ROBOTS AUTONOMOUSLY NAVIGATE HOMES, USING SENSORS AND CAMERAS TO MONITOR PETS, ENSURING THEIR SAFETY AND WELL-BEING. FROM DETECTING DISTRESS SIGNALS TO INTELLIGENTLY EXPLORING DIFFERENT ROOMS, OUR ROBOTIC COMPANIONS REDEFINE THE FUTURE OF PET MONITORING.

JOIN US IN REVOLUTIONIZING PET CARE THROUGH CUTTING-EDGE TECHNOLOGY AND UNWAVERING DEDICATION.

## WHAT IS SLAM?

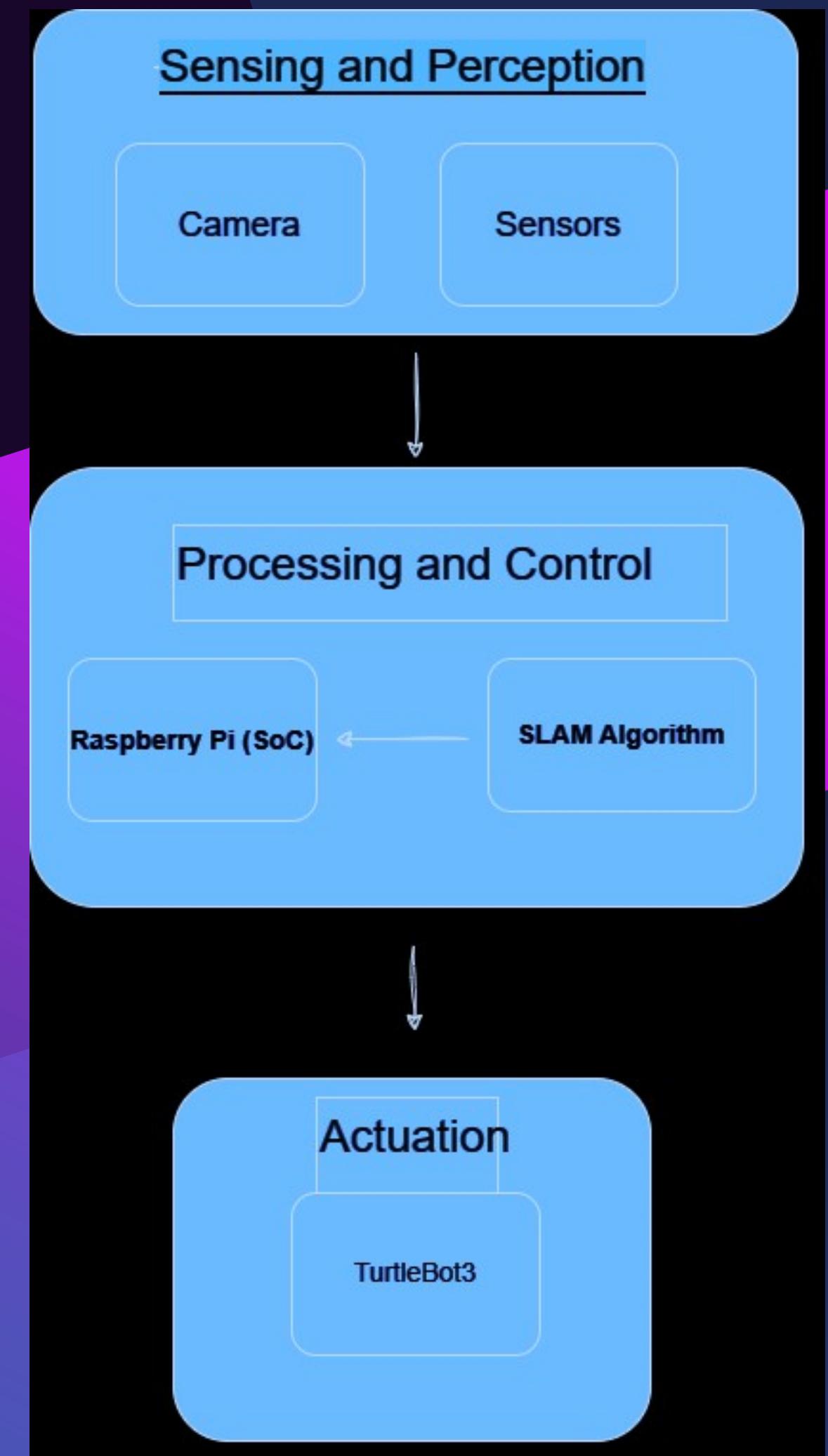


SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) IS A METHOD USED IN AUTONOMOUS VEHICLES TO MAP AND LOCATE THEMSELVES IN UNKNOWN ENVIRONMENTS. IT'S CRUCIAL FOR TASKS LIKE PATH PLANNING AND OBSTACLE AVOIDANCE.

SLAM HAS BECOME MORE PRACTICAL WITH IMPROVED PROCESSING SPEED AND AFFORDABLE SENSORS LIKE CAMERAS AND LIDAR. TWO MAIN SLAM TECHNOLOGIES ARE VISUAL SLAM (USING CAMERAS) AND LIDAR SLAM (USING LASER SENSORS).

DESPITE CHALLENGES LIKE LOCALIZATION ERRORS AND HIGH COMPUTATIONAL COSTS, MATLAB PROVIDES ROBUST SUPPORT, OFFERING SOLUTIONS FOR SENSOR PROCESSING, LOOP CLOSURE DETECTION, AND MAP GENERATION, MAKING SLAM IMPLEMENTATION MORE ACCESSIBLE.

# Block Diagram



# FlowChart

Start

Initiate System

Activate Cameras

Check for Pet Presence

If Pet Detected

Navigate to Pet's Location

Check Pet's Behavior

If Pet in Distress

Alert Owner

If Pet not detected

Continue Monitoring

Check for Pet Presence

If Pet Not Detected

Continue Monitoring

End

# Hardware & Software

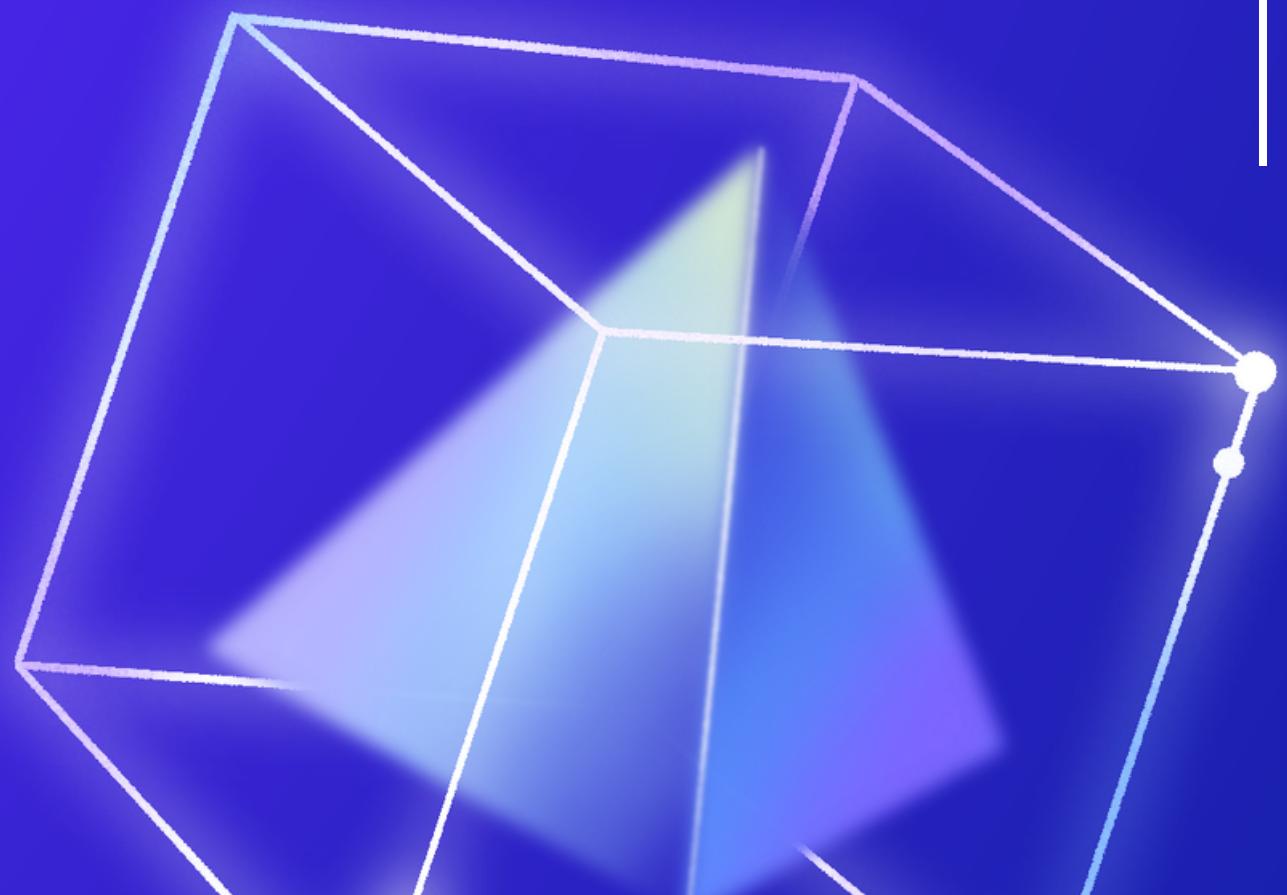
The TurtleBot typically consists of hardware and software components. The hardware includes a mobile base with wheels, sensors like a depth camera and laser scanner, and a computing device like a Raspberry Pi. The software stack often involves ROS (Robot Operating System) for communication and control, along with various packages for navigation, perception, and manipulation. Specific TurtleBot models may have variations in hardware specifications and software configurations.

shamsqamar kosimov



# HARDWARE

- TurtleBot Hardware components:
- Mobile base with wheels for movement.
- Sensors such as a depth camera for 3D vision and a laser scanner for environment mapping.
- Onboard computing device.



# SOFTWARE



## Components

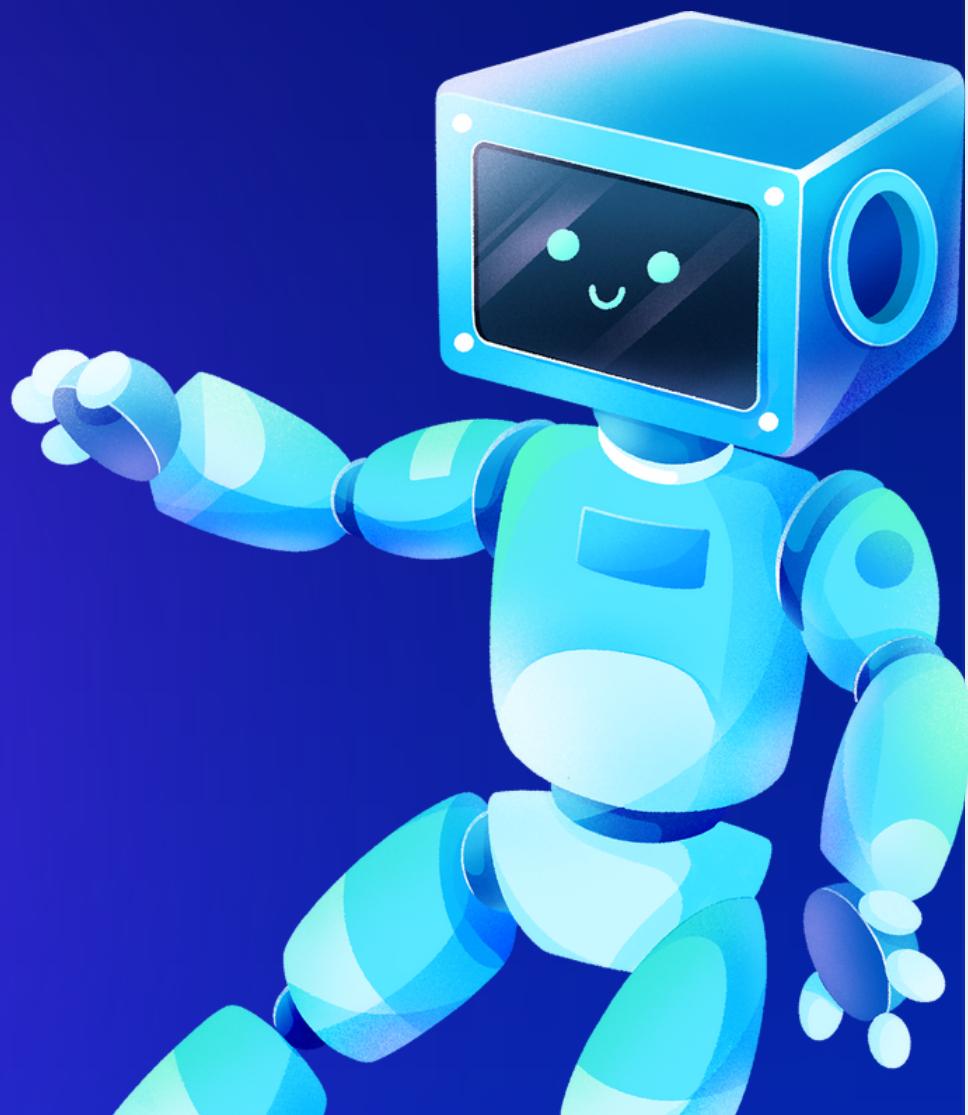
- Navigation: TurtleBot plans and executes movements through mapping and localization.
- Perception: Sensors are employed for environmental awareness.
- Manipulation: TurtleBot can interact with its surroundings through manipulation capabilities.

## Algorithm

Algorithms are step-by-step procedures or formulas for solving problems or accomplishing specific tasks. They play a fundamental role in computer science, mathematics, and various other fields

## INTEGRATION OF HARDWARE AND SOFTWARE

It's the integration of hardware and software that brings TurtleBot to life. Sensors collect data, ROS processes it, and the mobile base executes movements based on the input received. This seamless interaction is what enables TurtleBot to navigate and perceive its environment effectively.



# Future functions of Turtle bot

## Waiter Bot

It can deliver small items, like snacks or drinks, to people in different rooms. This can be particularly useful in social gatherings.

## Health Monitoring

Equip the bot with additional sensors in order to monitor environmental factors like air quality and temperature for both pet and human well-being.

## Home Security

Enhance the robot's capabilities to patrol the home for security purposes, providing live video feeds and alerts for unusual activities.

# Other functions:



## Educational Interactions:

Develop interactive features that can teach or quiz users on various topics, making the bot a learning companion.



## Personal Assistant:

Enable the bot to set reminders, answer basic queries, and provide updates on the weather or news.



## Remote Communication:

Integrate a communication system to allow users to remotely interact with people in other parts of the house using the bot's camera and microphone.

# THANK YOU