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Intelligent Mobile Robot

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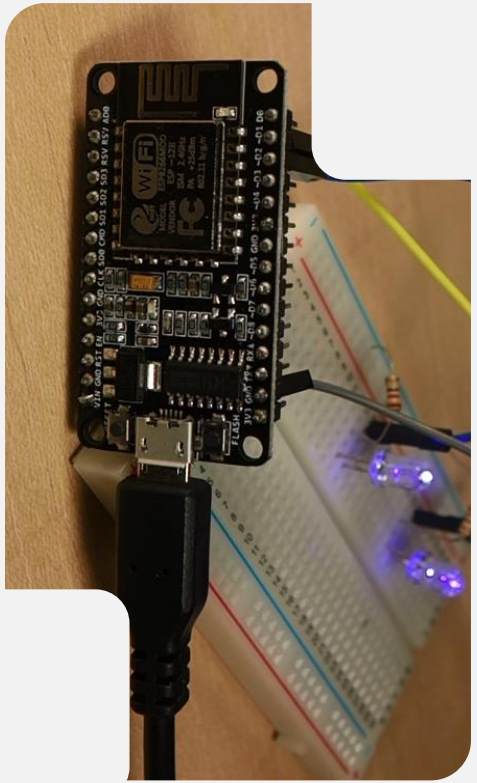
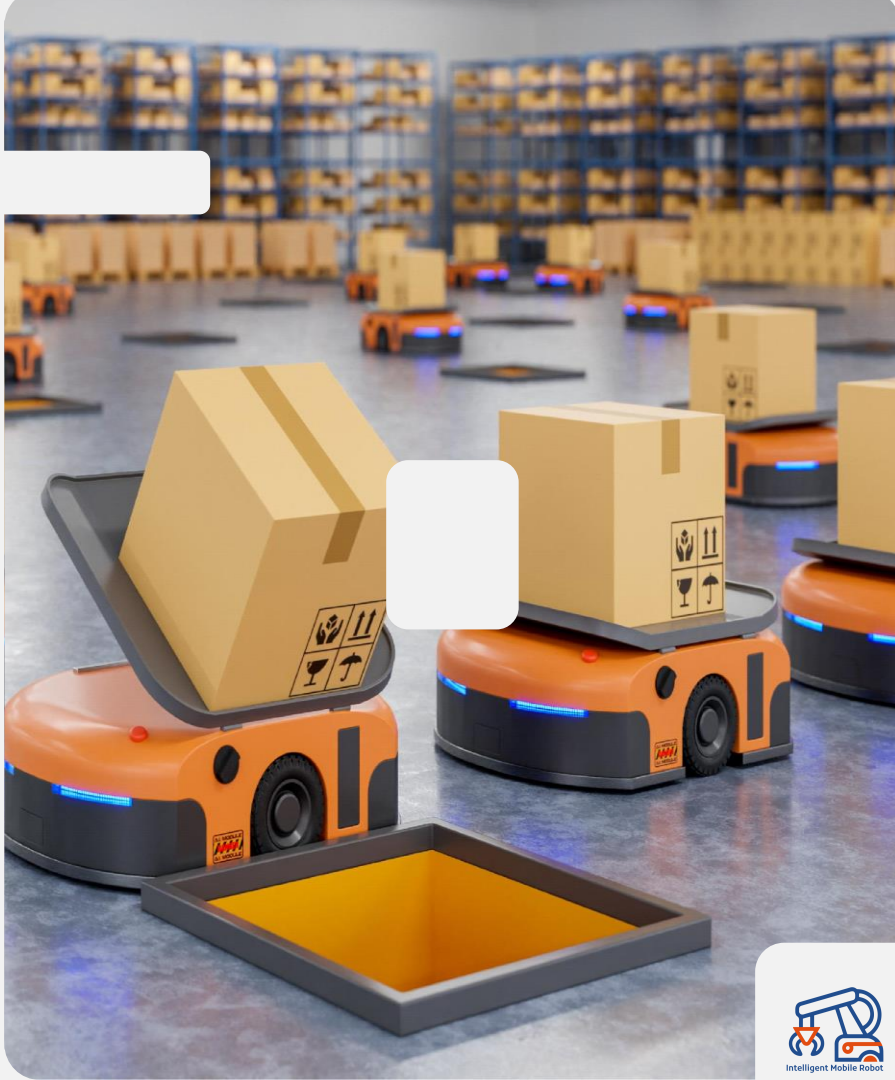
Table of contents

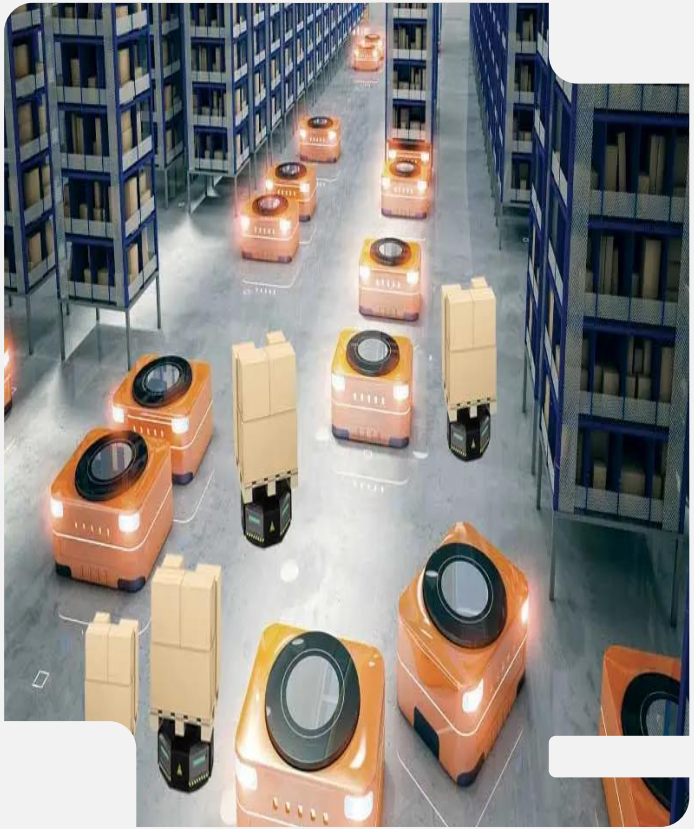


01

Introduction

Intro about mobile robot field





Introduction

In the current era, technology tends to develop in all fields and always seeks human comfort and helps workers to perform their difficult tasks. Therefore, we designed “An Intelligent Mobile Robot (IMR)" that will carry heavy loads in companies and factories and put them in the appropriate places for them (or on the appropriate shelf for them) through techniques of Artificial intelligence.

Intelligent Mobile Robot

AGVs Vs AMRs

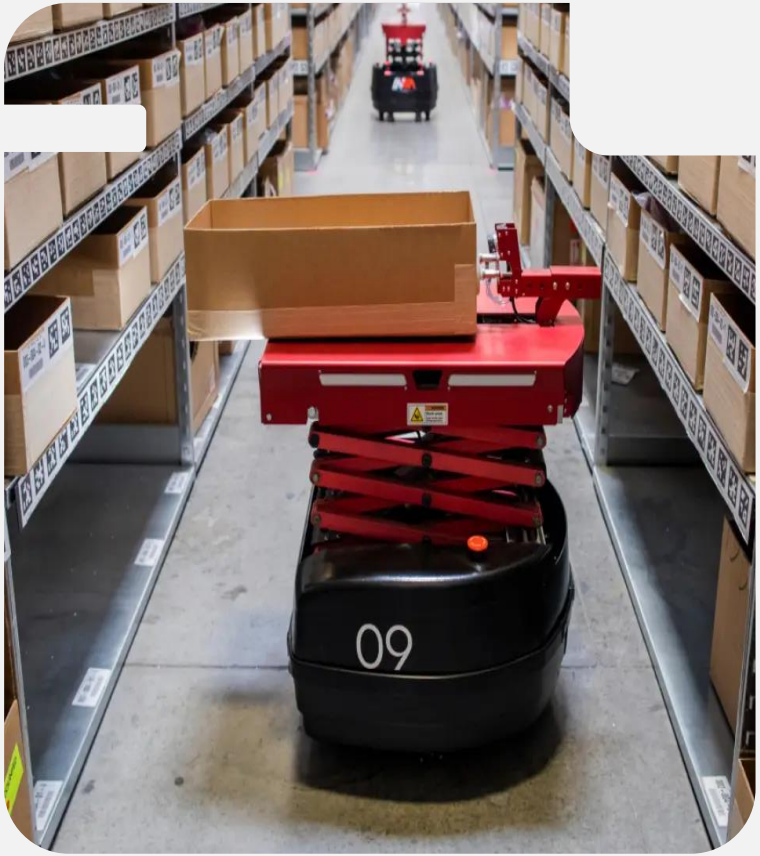
Automated Guided Vehicles (AGVs) are electric vehicles that move objects around an area. They move on fixed paths or routes, requiring infrastructure, and rely on pre-programmed software for instructions, as they depend on certain paths.
AGVs are a form of automation, but they are not intelligent machines.

On the contrary autonomous mobile robots(AMRs) use perception and navigation algorithms to navigate paths inside facilities and move objects from one place to the next, as they are not limited to a specific route.
AMR can navigate without external guidance. In other words, the AMR can navigate freely and decision-making. An autonomous mobile robot is not simply a programmed machine. The AMR is one that, in addition to the initial programming, has a certain Ai algorithm that gives it the degree of independence to make decisions in the middle of the work environment, without the need for human intervention.

Intelligent Mobile Robot

AVGs Vs AMRs

Intelligent Mobile Robot



02

Literature Review

Project’s literature review and related work

What are Intelligent Mobile Robots?

Intelligent mobile robots are autonomous robots that are capable of navigating and performing tasks in dynamic environments. They are equipped with sensors, processors, and actuators that enable them to interact with their environment and make decisions based on the data they receive. Intelligent mobile robots have been used in a variety of applications such as industrial automation, search and rescue operations, military operations, and medical care.

Types of Intelligent Mobile Robots

Flying Robots

Flying robots use wings or rotors to fly through the air and can be used for surveillance or search-and-rescue operations

Wheeled Robots

Wheeled Robots Are typically used for navigation in indoor environments where obstacles are present. They use a combination of sensors to detect obstacles and plan paths around them.

Legged Robots

Legged Robots Are designed for outdoor navigation where terrain is uneven or unpredictable. They use legs to move over obstacles or climb stairs.

03

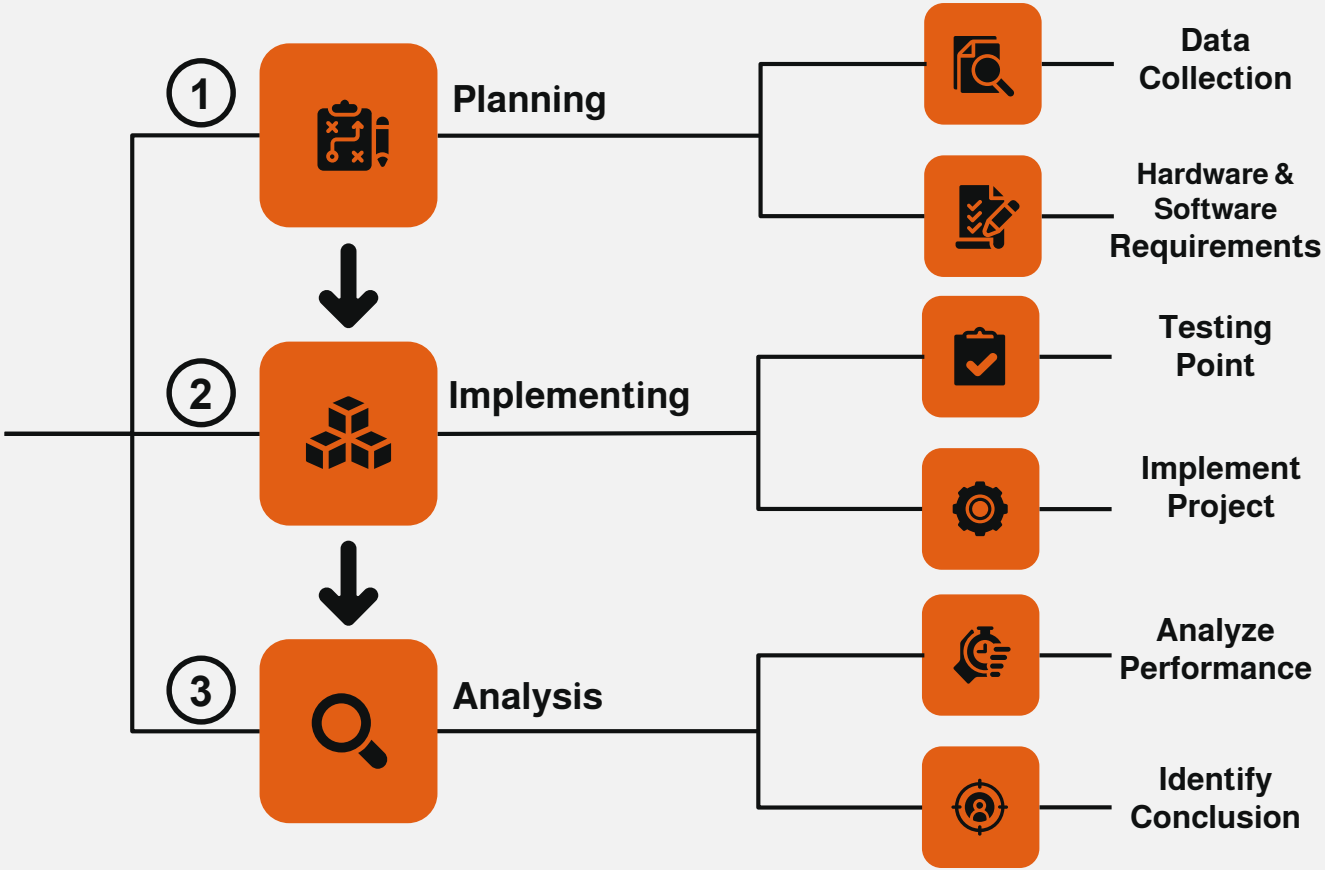
Methodology

Phases of developing our project

System Development Life Cycle

Our Steps

Our Methodology



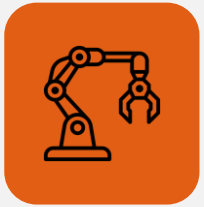
Hardware & Software Requirements

Hardware

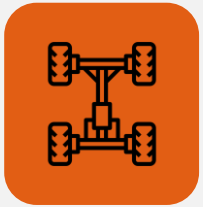
Servo Motors

DC Motors

ESP 32



Robotic Arm



Chassis & Wheels

Software

Esp Code

Application Code

Structure Side

Structure Team:

Started to design the IMR on 3Dmax.

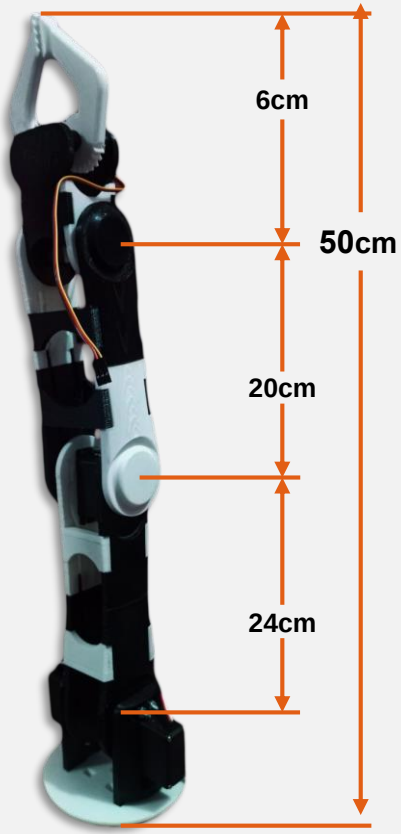
The design is composed of two parts:

- The chassis is made of wood.
- The arm we printed it using a 3D printer.

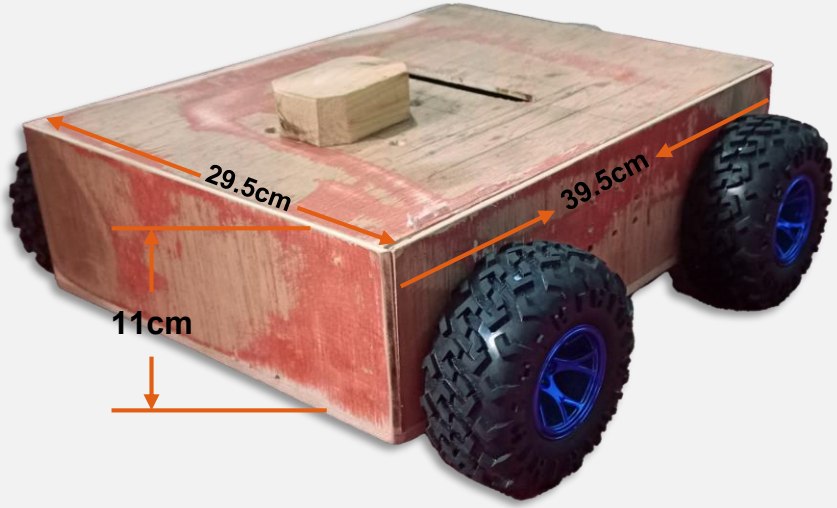
Intelligent Mobile Robot

Structure Parameter

Robotic Arm



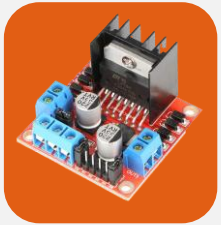
Robot Chassis



Hardware Side

Servo sg90

Servo S3003



H-Bridge

Esp 32

Li-Batteries

Wires & Resistors

DC Motors

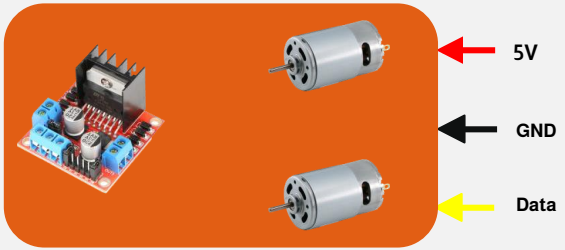
Hardware Team:

Started to buy the needed components
And started to wire them up
The components are:

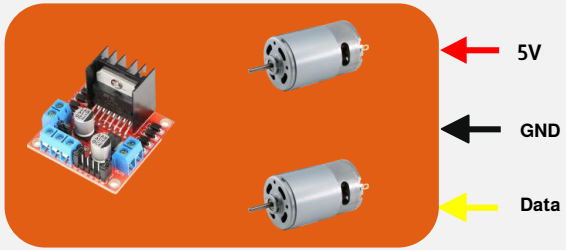
- 4 DC Motors
- 6 Servo Motors
- Esp 32
- lithium batteries
- 2 H-bridge
- Wires and Resistors

Intelligent Mobile Robot

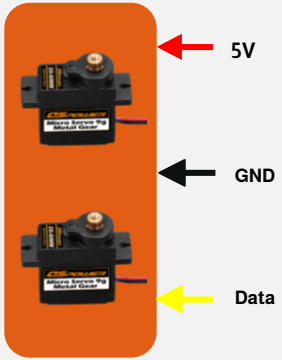
Circuit Diagram



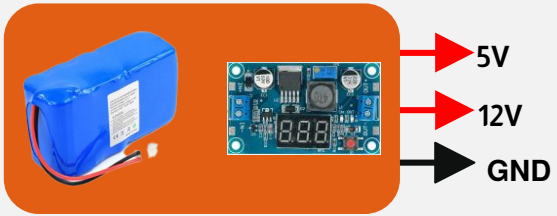
2 Motors with its Driver

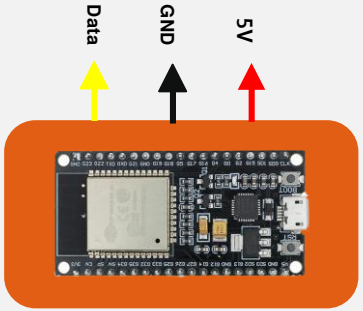


2 Motors with its Driver

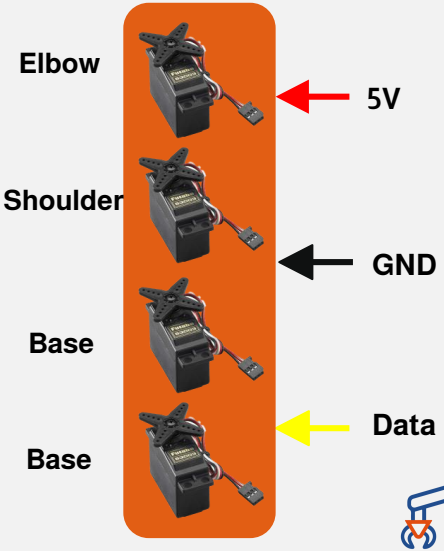


Power Supply





Esp 32



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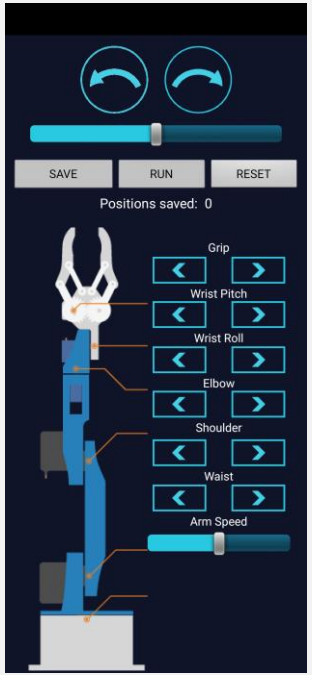
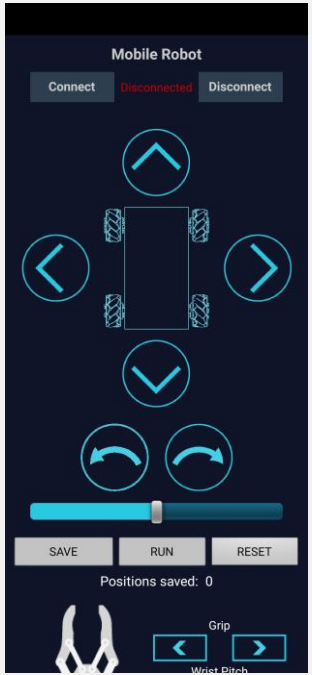
Software Side





Our App

Software Team:

Started to code the following:

- The Esp32 Code that controls all motors.
- The application used to control the robot with Esp32 code.

Intelligent Mobile Robot

Intelligent Mobile Robot

04

What to expect in the end?

The final anticipated outcome of this project

Futuristic Features

Kinect v2

Kinect v2 is a 3D sensor produced by Microsoft, it is composed by a RGB camera, an infrared camera, and infrared emitter. Based on the Time of Flight technology (ToF)

ROS

ROS is s a set of software libraries and tools that help you build robot applications. ROS is not an operating system (OS) but a set of software frameworks for robot software development

AI

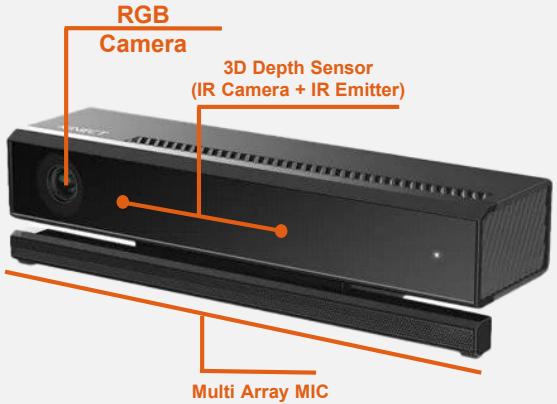
Our project may include in the future deep learning algorithms, neural networks, and also fuzzy logic. All of that is for path tracking, and object detection implementation on our robot.

Intelligent Mobile Robot

Futuristic Features

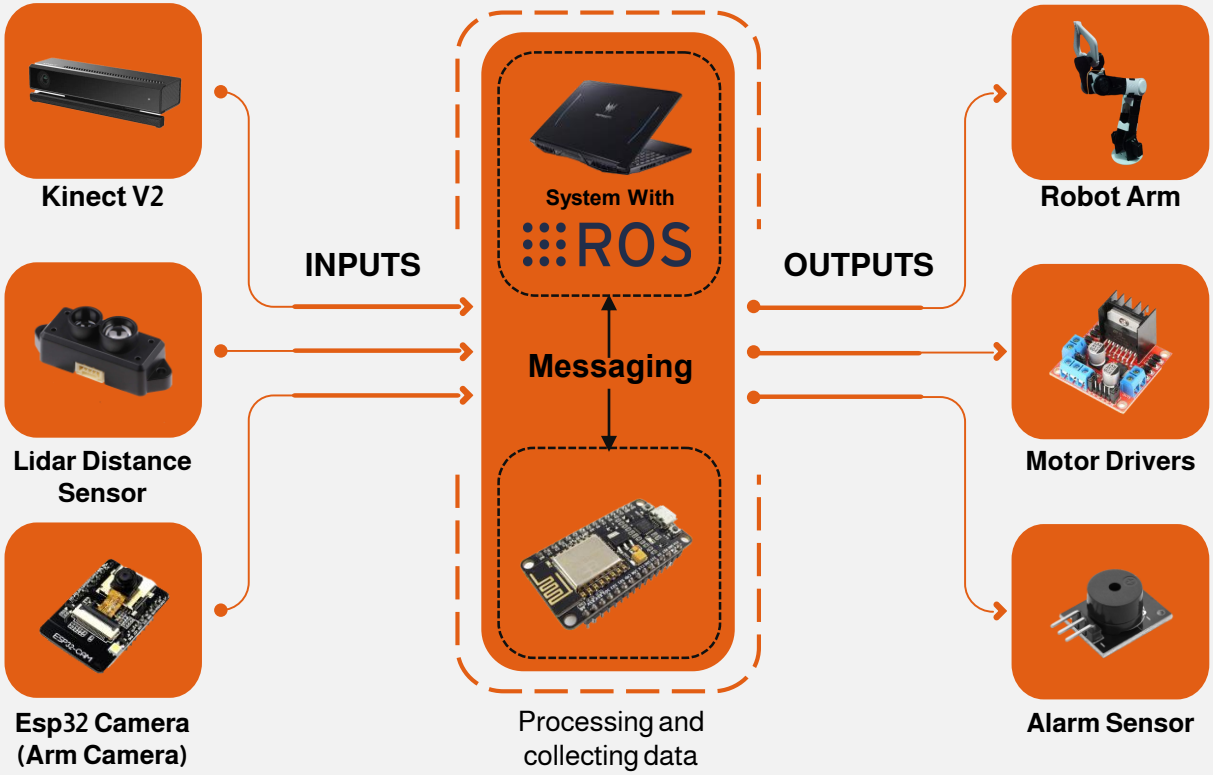
The Primary features that we need to Implement to achieve an intelligent robot:

- Our end goal is to make the IMR use the Kinect in tracking the path and detecting different objects with the assistance of deep learning algorithms and models.
- Implement the ROS environment to control and send data to the different outputs like motor drivers and arm drivers.



ROS

Block Diagram



Thanks!

We hope that you enjoyed our project

Intelligent Mobile Robot

KFS-H.I.E.T