

Robot mind

The Raspberry Pi 4 Model B serves as the Main Processing Unit (MPU), acting as the robot's central brain. It executes the complex Python code and coordinates all real-time sensory data and actuator commands.

We selected the Raspberry Pi 4 for its high-performance quad-core Cortex-A72 processor (1.8GHz) and 64-bit architecture. This computational power is non-negotiable, as it provides the necessary capacity to simultaneously manage:

- Computer Vision (CV): Processing real-time video frames from the USB Camera using the OpenCV library to detect and track colored obstacles.
- Sensor Fusion: Rapidly integrating data from the IMU (Gyroscope) and the four Ultrasonic Sensors for path correction and obstacle avoidance.
- In compliance with competition rules, the code is loaded onto the Raspberry Pi prior to the start. The entire autonomous routine is initiated by a physical push button connected to a GPIO pin, which activates the main Python script.

