THIRD EYE (Color Marker Based)

(A Project for Skill Development of Students)

The Problem

To navigate a robot from one location to another using a single sensor input, a small controller and low computational cost.

In general, such robots need multiple sensors like Lidar, IMU, large-size controllers and high computational costs. At this point in time, an indigenous robot that can be controlled using a single sensor and a small controller with a low computational cost is required.

The Solution

Third Eye is an innovative vision-based robotic localization and control system developed for AGVs. It utilizes color-based markers for localization, with green markers indicating the robot's direction and red markers showing its position. Using a single camera (logitech 270) for sensor input and a Node MCU-based low-cost controller, the system guides the robot from its starting point to the destination.

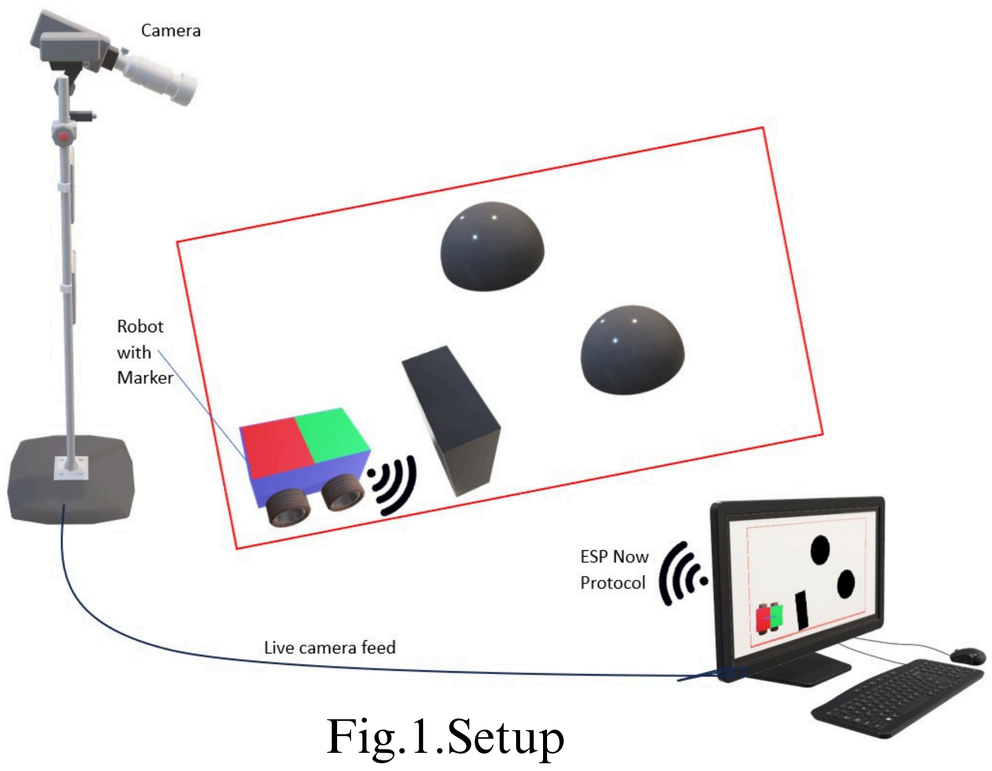

Fig.1.Setup

Fig.2.The Robot

Working Procedure

- **Localization:** A localization process uses marker identification to locate the robot, employing color masking techniques (red and green) to retrieve its coordinates in the surrounding environment.
- **Movement:** The robot will use angle-based wheel movement to move from its initial position to the target position. The angle between the robot's orientation and the destination's orientation is calculated using Pythagoras' theorem.

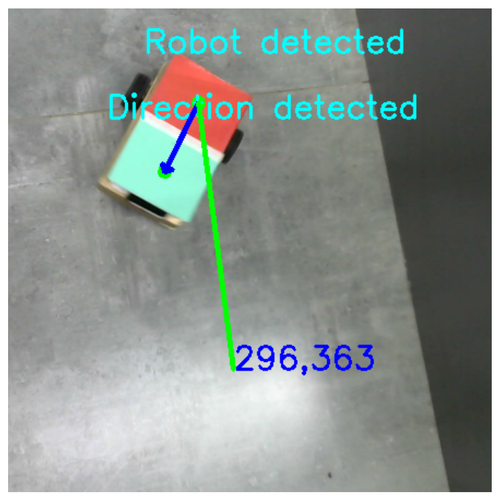

Fig.3.Third Eye Camera View

Applications

- **Smart Home Robotics:** The proposed robots are designed for smart home applications, where they can help with household chores, move around rooms, and interact with objects while avoiding obstacles to ensure safety.
- **Indoor Navigation:** The invention's marker-based localization and obstacle avoidance capabilities make it well-suited for indoor navigation tasks, including guiding visitors in museums, assisting shoppers in retail stores, and navigating office buildings.
- **Healthcare Assistance:** Robots equipped with the invention can support healthcare professionals in hospitals or care facilities by transporting medical supplies, guiding patients, or handling routine tasks while safely navigating healthcare environments.