THE ROBOTICS CLUB-SNIST

TEAM - 6

POST INDUCTION'23
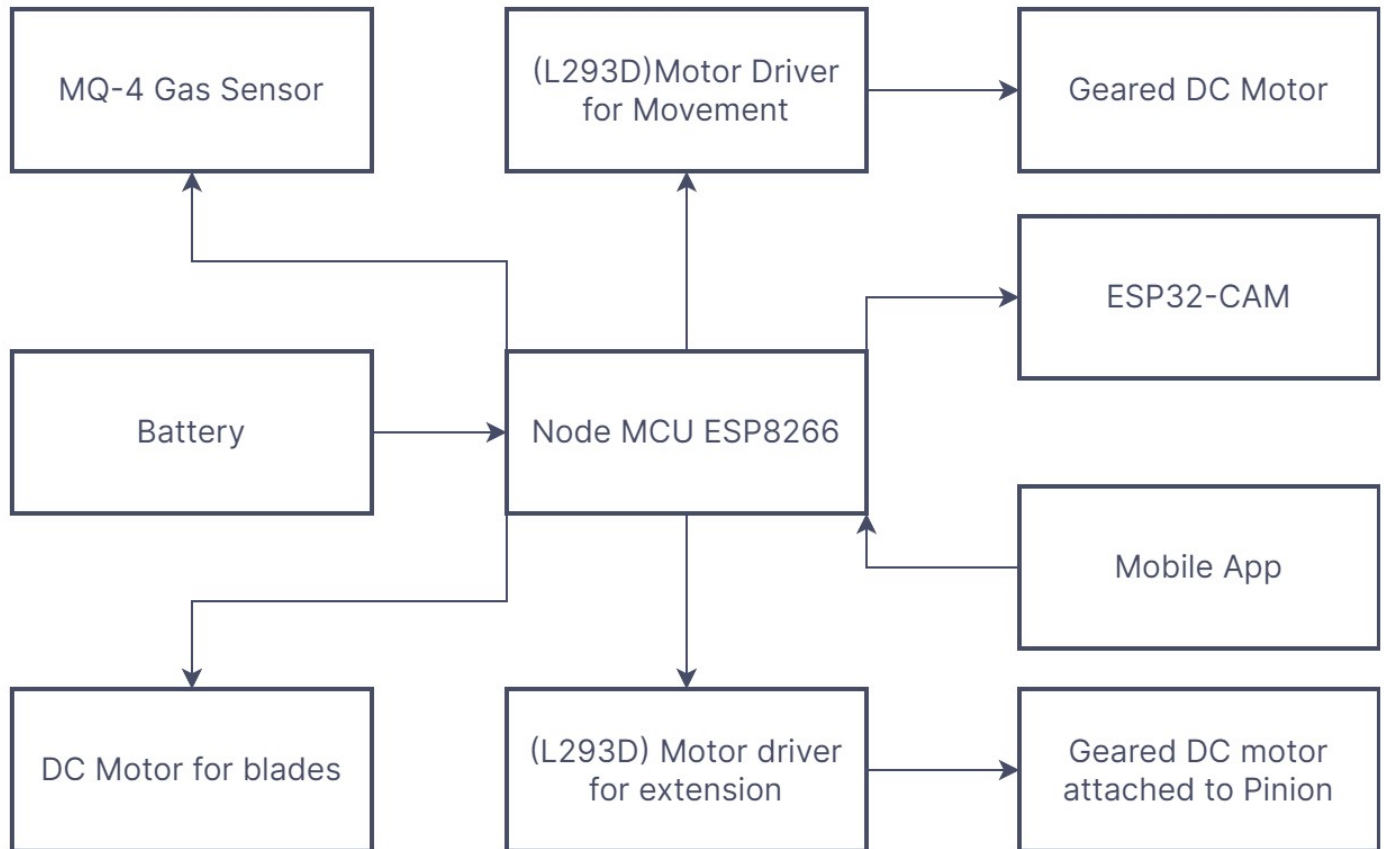
SEWAGE CLEANING BOT

ABSTRACT

PROBLEM STATMENT:

Cleaning sewage is a dangerous process that poses health risks. When human workers come into contact with sewage waste it can lead to damage to their physical health. Not only is this environment unsanitary. It also contains hazardous gases and materials that can be harmful for the human worker. Manual cleaning methods are often time consuming and not cost effective. In every city there is a network of sewage pipes that need cleaning and monitoring. However accomplishing this task can be quite challenging. Our project aims to simplify this process by introducing a bot. If the cleaning was done by a human the monitoring of the cleaning and giving direction would be a difficult task , To tackle this problem our bot is equipped with built in video streaming capabilities allowing real time monitoring of the cleaning procedure. This innovative solution eliminates the complexities associated with involvement. Ensures efficient and thorough sewage cleaning.

TEAM'S APPROACH TO SOLVE THE PROBLEM:

The robot utilizes the ESP32-CAM micro-controller.The micro-controller is compact and has an in-built camera so the system will be compact. For navigation within the challenging terrains of sewage systems, the robot is fitted with geared DC motors having a tank movement mechanism. To do the cleaning tasks, we implemented a high-torque motor combined with a rack and pinion system. Robot with the capability to extend an arm doesn't damage itself. It is equipped with cleaning tools to reach and clean areas effectively.One of the main features of our robot is its real-time video monitoring capability, facilitated through the ESP32-CAM's Wi-Fi function. This feature helps the operators can remotely view the cleaning process in real-time. Further enhancing the user experience and control, we integrated the robot with the A mobile application. This integration offers a seamless platform for both monitoring the video feed and remotely controlling the robot's movements and functions. The bot is also equipped with and MQ-4 sensor for detection of harmful gases.

BLOCK DIGRAM:

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┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐
│  MQ-4 Gas Sensor │      │ (L293D)Motor     │─────▶│  Geared DC Motor │
│                  │      │ Driver for       │      │                  │
│                  │      │ Movement         │      │                  │
└──────────────────┘      └──────────────────┘      └──────────────────┘
         ▲                         ▲
         │                         │                 ┌──────────────────┐
         │                         │                 │   ESP32-CAM      │
┌──────────────────┐      ┌──────────────────┐       │                  │
│     Battery      │─────▶│ Node MCU ESP8266 │──────▶└──────────────────┘
│                  │      │                  │
│                  │      │                  │       ┌──────────────────┐
└──────────────────┘      └──────────────────┘◀──────│   Mobile App     │
         │                         │                  │                  │
         ▼                         ▼                  └──────────────────┘
┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐
│ DC Motor for     │      │ (L293D) Motor    │─────▶│ Geared DC motor  │
│ blades           │      │ driver for       │      │ attached to Pinion│
│                  │      │ extension        │      │                  │
└──────────────────┘      └──────────────────┘      └──────────────────┘
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