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Gas Sensing Robotic Device using Wi-Fi

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ABSTRACT: Mobile robot applications are required in various hazardous fields to reduce human casualties. One of the most demanding applications is gas sensing mobile robot. Since the hazardous chemical compound is undetectable by humans, autonomous mobile gas sensors are needed. Over the past few decades, various attempts to incorporate gas sensor on mobile robots are reported. Gas source localization and gas distribution mapping are the two mainly focused scope of research. This paper presents the earliest works and recent development in gas sensing mobile robots.

I. INTRODUCTION

Robotic evolution minimizes the human efforts and it can be deployed in a lot of fields like military, surveillance application, Industrial Pick and Place Robots latest Humanoid robots are developed in the modern world. Now a day's robotic Devices are developed by using Wireless technology. Wireless technology in Robotics starts with Bluetooth, WI-FI, and Zigbee Communication. Based on the Requirement and Application they deployed the communication in Projects. Blynk is a Popular App used in this Project it has a lot of Features like buttons, gauges, Sliders and Plotting Features also. By using Wi-Fi technology we can reach out to places where human intervention is not possible and range covered is also more than Bluetooth technology. The robot Device is operating with Nodemcu esp32 controller and the command is given by the Blynk android application in a mobile phone using the wi-fi network. The Nodemcu esp32 as inbuilt wi-fi module and the devices connected with robot Device. Both wi-fi is connected with an authentication token. The guage in blynk measures the gas in atmosphere using MQ-07 sensor and gives an alert message is there is a gas leakage.

II. LITERATURE SURVEY

1.   **Gas Sensing Mobile Robot: A Review: by R.Visvanathan, K.Kamarudin, S.M.Mamduh, A.S.A.Yeon, A.Zakaria, L.M.Kamarudin, S.A.A.Shukor and A.Y.M.Shakaff :** Here they focused on Mobile robot applications that are required in various hazardous fields to reduce human casualties. One of the most demanding applications used is gas sensing mobile robot. Since the hazardous chemical compound is undetectable by humans, autonomous mobile gas sensors are needed. They have explained the different types of gas sensors that can beused.

2.   Bringing Mobile Robot Olfaction to the next dimension — UAV-based remote sensing of gas clouds and source localization by Patrick P. Neumann, Harald Kohlhoff, DinoHullmann,Dino
Hüllmann,Achim J. Lilienthal, Martin Kluge : here This paper introduces a novel robotic platform for aerial remote gas sensing. Spectroscopic measurement methods for remote sensing of selected gases lend themselves for use on mini-copters, which offer a number of advantages for inspection and surveillance. No direct contact with the target gas is needed and thus the influence of the aerial platform on the measured gas plume can be kept to a minimum. This allows to overcome one of the major issues with gas-sensitive mini-copters.

III. METHODOLOGY

EXISTING SYSTEM

Now a days the advancement in technology various new designed smart makes use of Wi-Fi robot for various applications. Mostly wi-fi network was using home security purpose. The various applications are done by robot Device like doing different works when the robot is given the command by the Wi-Fi enabled device. A toxic gas detecting/monitoring system in a chemical plant is not movable, a gas sensing robotic Device can be implemented. This invention is an active multi-functional wireless Device that can substitute for humans that inspect a plant's security controlled by smartphone

PROPOSED METHODOLOGY

The Device is controlled by the wi-fi network in Blynk application. The wi-fi robot Device can be easily moved from one place to another place by using the command in Blynk application. We can make the Device do the various task using wi-fi network technologies. Wi-fi network technology is used to run the Device and also to detect gas leakage. A gas sensor is used for this purpose. A gas sensor is a type of instrument which is used to identify the presence of various types of gases available in the sensing range of a gas sensor. This sensor detects the presence of gas and performs the action programmed for it. A gas sensor can notify the user when the leak is occurring, giving them the opportunity to leave

Requirements for the proposed system:
Here requirements are of the types those are hardware, software and blynk libraries for Arduino IDE
Hardware Requirements These are the requirements that are used to make gas sensing Robotic Device
1. Node MCU
2. L298N MotorController
3. MQ-07 Gas Sensors
4. Two Wheel Chassis
5. DC Motor
6. 9V Battery
7. Jumper Wires
8. Breadboard
 Software requirements
These are the requirements used to control the robotic Device. \
1. Arduino IDE
2. Blynk
Blynk libraries for Arduino IDE
we use the two libraries
   1. ESP8266WiFi.h
   2. 2. BlynkSimpleEsp8266.h

IV. IMPLEMENTATION

We implement to complete our project by sequence of steps as follows
Step1: Here to implement we use both hardware and software requirements

Step2: First the above mentioned hardware requirements are put together in a systematic way to make a gas sensing robotic Device

Step3: After aggregation we got gas sensing robotic Device. Now we have to compile the code .After successful compilation the code which is shown below is ready to upload. We upload the code written in arduino IDE software to NodeMCU.

Step 4: now the hardware part is ready. This has to be controlled by smartphone usind wifi where wifi module is already inbuilt in NodeMCU. In smartphone we install the app called Blynk

Step5: After installing we have to configure the app by Start by signing up with Blynk. Then tap on New Project, name our project, and select the device as "nodeMCU" and select "Wi-Fi". Tap on "Create".

Step6: After tapping Create, Blynk will send us an email with our project authentication token code to use. This has to be written in our code. After creating our project, we can add a couple of buttons by Tapping on "+".

Step7: Here we are adding the Joystick where we select the virtual pin as V1 in its setting .Then we add gauge button to configure CO which shows the ppm of CO in the air where we select analog pin ADC0. if the ppm reaches the maximum level it sends the alert message.

Step8: Experiment and Result
now we have to connect to same wifi name and password in mobile which we have entered in code already.it shows that device has been connected

Now from here we can control the gas sensing robotic Device using smartphone.and when CO concentration increases in surrounding of robotic Device it senses through sensors and give us alert notification

ADVANTAGES

- It is wireless control as it uses wifi
- Use of Wi-Fi technology can reach out to places where human intervention is not possible
- Range covered is more than Bluetooth technology.
- It can be used in various industries for checking the gas leakage
- Takes in use of mobile technology which is almost available everywhere
- Cost effective

V. CONCLUSION

- A robot used in replacing human for handling various tasks in a hazardous and dangerous workplace where human life may be at risk.
- A mobile gas sensing robot Device constructed to sense the leakage of gas through pipelines move on a track which is situated along the length of pipeline.
- The technique increases the overall efficiency of the system and makes the system a perfect gas leak detector providing overall safety of the residents.
- In addition to gas leakage detection, the weight measurement system can also be incorporated, thus giving the user intimation about the refill time of cylinder.
- Tripper circuit can be used which will trip off the main supply once the gas leak is detected.
- Along with the tripping off of the main supply it is very much necessary to turn off the gas regulator so that no further leakage of the gas occurs

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