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IOT Based Automated Green House Monitoring and Control System.

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Abstract - *This project describes an IOT based wireless sensor network for monitoring green house effect, global warming ,industrial pollution within an green house environment. The wireless sensor networks automatically monitors the environmental parameters inside a green house and initiates the control measures to be taken. The robot checks the environmental conditions and if the value exceeds threshold level a message will be sent. The image processing techniques used detects and eradicates the pests. With the help of gear motors the robot can move around the green house on wheels.*

Key Words: Global warmig, green house effect, image processing, wireless sensor networks,

1.INTRODUCTION *(Size 11 , cambria font)*

The demand for increased crop production and quality affected the high quality green house. This paper describes a wireless sensor network for monitoring the green house gases and environment. This sensor senses the vital parameters in the environment and the values are displayed using an android application. The sensor is connected to a microcontroller which automatically turns on the motor when the soil moisture content is low. This method is focussed on saving water, reducing environmental impacts on plant production and increasing efficiency. The user can monitor the green house gases from far way places and can control them..

1.1 Existing System

The existing system has mainly three steps: i) Manual set-up: manual irrigation of plants, visual inspection of plant growth, manual application of pesticides and fertilizers. ii) Partially automated set-up: combination of manual supervision and partial automation. Reduces labor involved in terms of irrigation set – up. iii) Fully automated: used feedback system which reacts to climatic changes occurring in green house. It overcomes the problems caused due to manual errors.

1.2 Problem Definition and Motivation

The plant growth is affected by the complexities involved in humidity, soil moisture, soil pH, temperature etc. The existing systems monitor and control only one parameter rather than many parameters simultaneously. The proposed systems with mobile acquisition technology monitor and control multiple parameters at a time. It improves efficiency, reliability and skilled labour.

2. PROPOSED SYSTEM

He proposed system can be divided into two parts: vehicle part and controlling part.

1.1 Vehicle Part

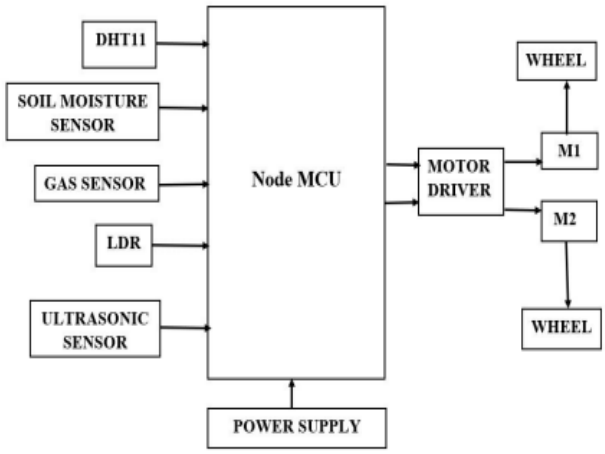

Fig -1: Block diagram of vehicle part

The main part of vehicle part is Node MCU. The sensing part senses and measures natural parameters such as soil moisture, temperature, humidity, presence of toxic gases and carbon-di oxide within the green house. The vehicle moves in and around the green house and any unnecessary variations can be controlled by the controlling part. The Node MCU controls the motor driver and robotic wheels. The front wheels are controlled by motor and back wheels are made free. The vehicle utilizes flood fill wall following algorithm for its movement in and around the green house.

1.2 Vehicle Part

The application controlled robotic vehicle moves around the green house under the control and monitoring of controlling part. This part monitors and controls the environmental parameters like soil moisture, humidity, soil pH, temperature etc.

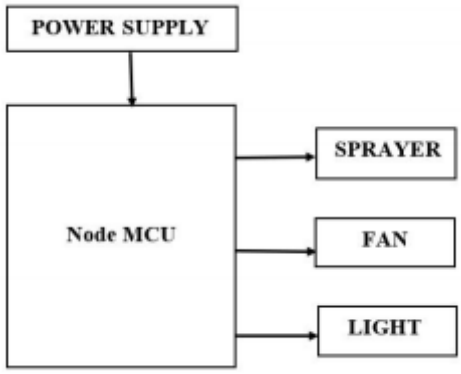

Fig -2: Block diagram of control part

3. CIRCUIT DIAGRAM

The circuit diagram of the proposed system has three parts: sensor part, microcontroller part and relay part.

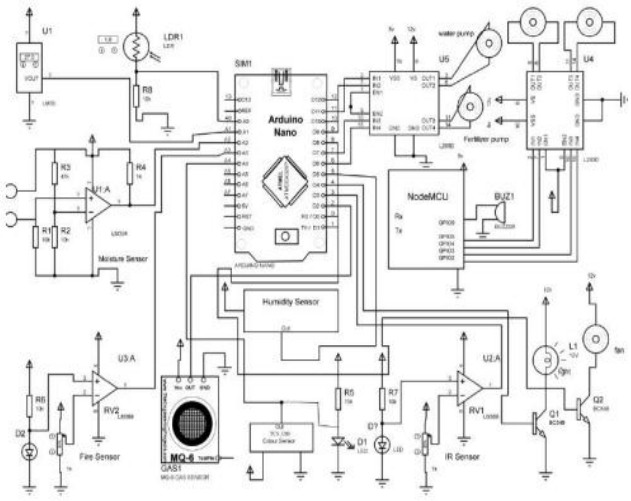

Fig -3: Circuit diagram

The sensors included are temperature sensor, humidity sensor, soil moisture sensor, fire sensor and gas sensor. These sensors sense various environmental parameters and the values are sent to the user mobile by uploading it through cloud based IOT technique. The sensors are connected to the microcontroller which is the controlling part of the system. The microcontroller is connected to water pump, sprayer, cooling fan, buzzer, artificial light and relays. The water pump is automatically turned ON by the microcontroller when the soil moisture is less. If the presence of toxic gases is sensed by the gas sensor, then the information is passed to microcontroller which displays the message Toxic Gases Found on the user mobile. Then the buzzer is turned ON. The sprayer is automatically turned ON by the microcontroller when the humidity is less. When the temperature inside the green house is high then the cooling fan is turned don by the microcontroller.

3.1 Working

The power supply for the working of green robot is provided by 9v, 12v batteries. The output of each analog sensor is connected to the microcontroller. When any of the parameters sensed by the sensors crosses the threshold value, then the microcontroller performs the necessary actions required for the protection of crops. This done by the help of relays until the conditions is brought back to normal conditions or optimum level. The sensors are connected on arduino nano boards. The sensors sense and measure the parameters inside the green house and necessary control measures will be taken by the microcontroller. The measured values are made available to the user through Wi-Fi module based on IOT technology. The user can see the present and past values of the environmental parameters. The date and time of the occurrence of the particular event can also be obtained for the user. The movement of the robot can be controlled by the user through his phone.

3.2 Advantages, Disadvantages and Application

This system automatically controls the green house parameters there by enabling sufficient plant growth. The risk of green house not maintained in an optimum level due to human errors is eliminated. The labour cost is eliminated by this method. This compact system provides more user friendly interface. The sensors are highly sensitive, easy to handle and do not disturb any of the green house parameters. If any one of the sensors is not working, the entire system is not affected. There is no self test mechanism involved in this system to detect the malfunctioning of sensors. Requires uninterrupted power supply and facility to remotely monitor the green house. This system can be used in mechanical companies to monitor the temperature and light. Temperature monitoring and control can be used in houses and offices.

4. RESULTS

Green house monitoring system measures various parameters inside the green house using sensors and IOT. Various values are obtained and analyzed using sensors. The values measured by the sensors are used to activate the microcontroller by which necessary and sufficient actions are taken to maintain the green house in an optimum and efficient level. The movement of green robot around the green house on the wheels can be controlled by user through his mobile. The valueds measured by the sensor is displayed on the user's mobile and the microcontroller can be activated to take necessary actions from any part of the world by the user through his mobile.

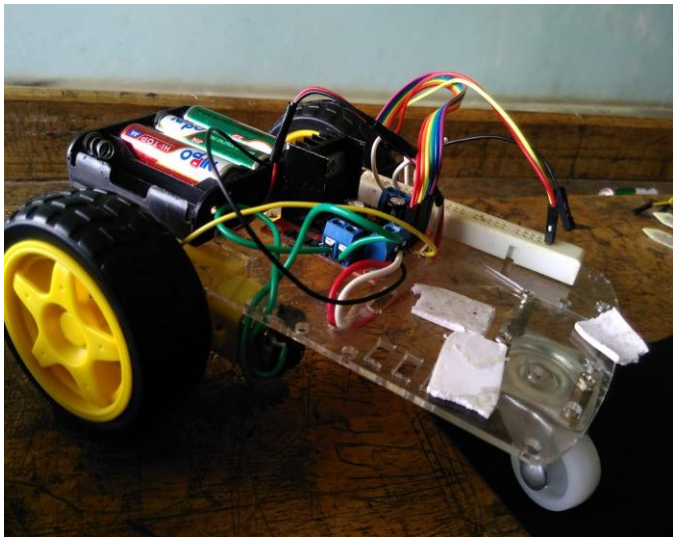

Fig -4: Green Robot

5. CONCLUSIONS and FUTURE SCOPE

This paper describes an IOT based green house monitoring system. The system is profitable as it optimizes the green house parameters. The complete system is low cost and is of low power operation. This technique can be extended with flood fill wall following algorithm so that it can be made applicable to house hold and official premises.

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