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Intelligence Robot Agriculture Monitoring and Controlling Using IOT

K Renuka[1], M Siva[2], M Ashok Raju[3], S Ganeshgowd[4]

Department of Electrical and Electronics Engineering, Kuppam Engineering College, Kuppam, AP, India

ABSTRACT: This article Shows the India's economy is based on agriculture, with farmers being the main food producers. Traditionally, agricultural practices relied on manual labour with the help of primitive machinery such as bullock carts, tractors and tillers. However, in modern times, agriculture faces major challenges such as labour shortage, lack of understanding of soil analysis, high labour costs, and poor seed and water management. These robots are important in automating agricultural production, reducing human labour burden. Our designed system incorporates a robotic platform designed to facilitate agricultural activities, especially focused on tillage and seeding. This platform harnesses the power of microcontrollers, DC motors, DC pumps and a range of sensors to optimize agricultural operations. In addition, our solutions include ultrasonic sensors to detect animals near the farm and their movements, with SMS and audio alerts to quickly notify farmers By integrating state-of-the-art technology our farm robot seeks to adapt agricultural practices, have increased efficiency, productivity and sustainable development of agricultural land.

KEYWORDS: IOT, Soil, Wi-Fi module ESP8266, Ultrasonic and IR sensors, Relay.

I. INTRODUCTION

Agriculture remains the bedrock of rural India, sustaining livelihoods and fueling economic growth. But the project deals with multifaceted challenges, chief among which is the timely availability of skilled labour, exacerbated by rural migration to cities This demographic shift has left many farmers facing a daunting challenge: how to maintain productivity and profitability in the face of declining front manpower. Traditional reliance on manual labour, once the cornerstone of agricultural practices, is no longer tenable in today's context of rapid urbanization and changing demographics

Recognizing the importance of innovation in this critical area, our work seeks to address these concerns through automated agricultural systems. Our system proceeds from the twin objectives of simplifying agricultural work, saving valuable time and energy spent on routine tasks, and increasing crop productivity by adopting precise agricultural principles on the atom.

The essence of our approach is to use the modern era to enhance and in some cases replace traditional agriculture. By harnessing the power of automation, we strive to transform agriculture from a painstakingly long-distance endeavor into a green, productive, sustainable industry. Central to this shift is the concept of precision farming, where each crop is managed as a separate product and products are obtained exactly measured according to the precise preferences of the customer.

At the core of our work is a combination of advanced sensing technologies and strategic systems. Specifically, our challenge consists of infrared (IR) sensors to detect moving animals in farmlands. After surveying, ultrasonic sensors are used to check for the presence of animals in a predetermined area near the field boundary.

In response to such attacks, our system implements a multi-layered blocking task. A rapid audible buzzer is emitted to push back the attacking animals at the same time it alerts the farmer via the GSM module, ensuring swift and prompt intervention. Through this revolutionary integration of technology and agriculture, our project aims to empower farmers with tools to reduce risk, protect their crops and implement sustainable and efficient agricultural practices a new era has come. By embracing the concept of automation and precision agriculture, we create a destiny where Indian agriculture will succeed in the challenges of the present generation, ensuring food security, economic prosperity and environmental stewardship for generations a we imagine what will happen.

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II. BLOCK DIAGRAM

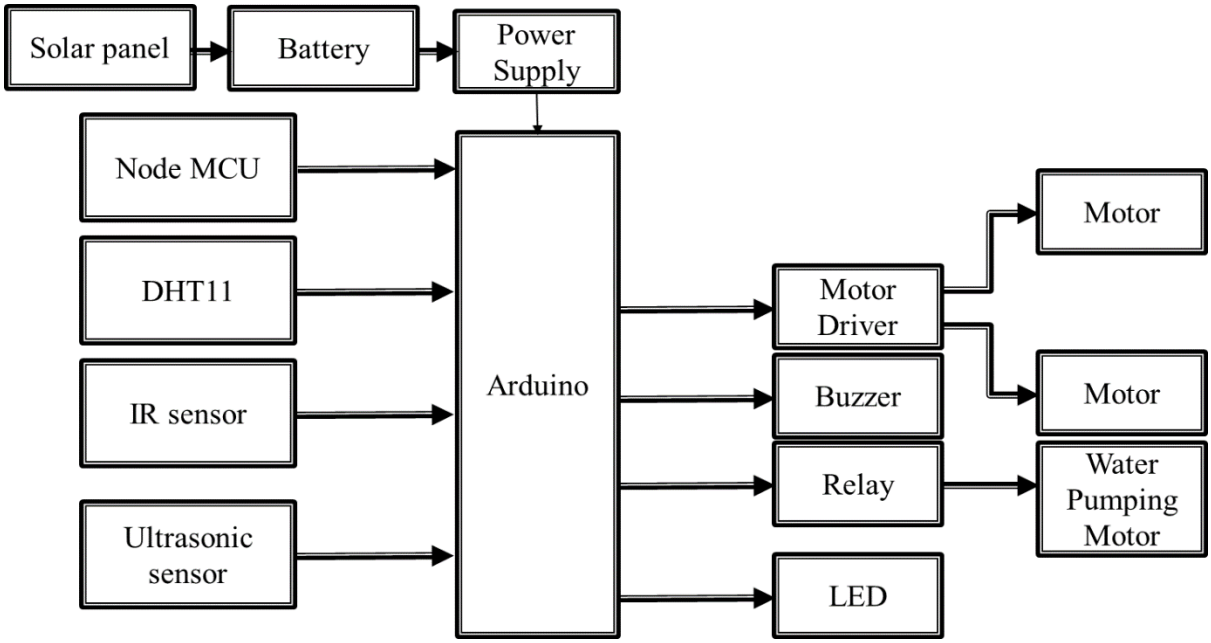

Fig 1.Block Diagram

The Above Fig 1 Shows the Block diagram and which gives information of the required modules
Like Hardware Requirements and Software tools . The Hardware Requirements are the Soil moisture sensor, Temperature sensor (DHT-11),Relay, Pump, IoT (WI-FI module ESP8266), 12 V Battery, PIR Sensor, Ultrasonic Sensor , Motor Driver, Buzzer . and the Software Tools are Adafruit website, Arduino IDE

III. REQUIRED MODULES

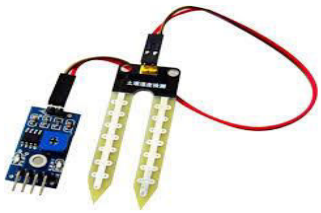

Fig 2. Soil moisture sensor

Soil moisture sensor moisture sensor to sense the moisture level in the sand is shown in Figure 2 .The sensor reminds the user to the water plants and also monitors the moisture content of soil.

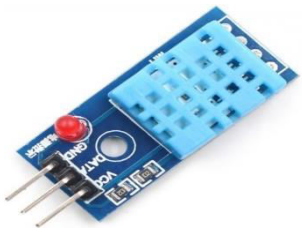

Fig 3. Temperature sensor

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The temperature sensor is used to capture the surrounding temperature and to measure the ambient air.

Fig 4. Relay

The relay is the one way module shows in figure 4 .and is the used to control high voltage and control loads.

Fig .5 Water Pump

A waterpump shows in figure 5 is used to pump the water in its small size submersible pump motor operation .works in 2v to 6v.

Fig 6.Node MCU

The Node MCU is an iot device which is used to iot devices .Now a days an d theNODE MCU use in mini projects.CU works wifi only and it is very flexible .

Fig 7. 12V Battery

A Figure 7 Shows 12v rechargeable battery it can be charged again after being discharged and while charging vapplying DC to it terminaks and it will charge again.

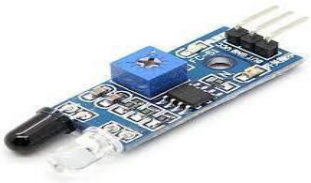

Fig 8. IR Sensor

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The Figure 8 Shows IR sensor body temperature it detects objects body temorature and transmit heat through their bodies to produce infared radiation.

Fig 9. Ultrasonic Sensor

A sensor transmits ultrasonic waves into the air and detects the distance and automatically detects reflecting waves.

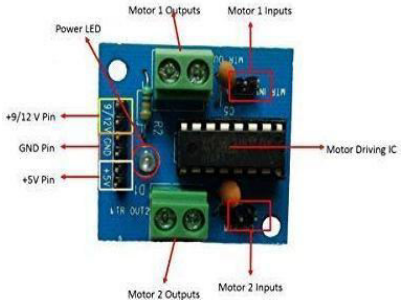

Fig 10. Motor Driver

The MOTOR DRIVER that can be drive a dc motor and also controls by the dual H-bridge integrated motor driver.

Fig 11.Buzzer

A buzzer is audio signalling device in this project when ever the sensors detects the object then the buzzer well active and the buzzer will worknin dc.

TABEL OF REQUIRED HARDWARE AND SOFTWARE TOOLS

Hardware requirements	Software tools required
Soil moisture sensor	Adafruit website
Temperature sensor (DHT-11)	Arduino IDE
Relay	-
Pump	-
IoT (WI-FI module ESP8266)	-
12 V Battery	-
PIR SENSOR	-
UITRASONIC SENSOR	-
MOTOR DRIVER	-
BUZZER	-

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IV. DESCRIPTION OF CIRCUIT DIAGRAM

The Fig.12 Shows the Working of Intelligence Robot Agriculture Monitoring and Controlling Using IOT and we can see the Circuit With Naked Connection and it have Soil moisture sensor, Temperature sensor, Relay, Pump, IoT (WI-FI module ESP8266), 12 V Battery, PIR Sensor, Ultrasonic Sensor , Motor Driver and Buzzer and the Software tools are Used in is Adafruit website , Arduino IDE.

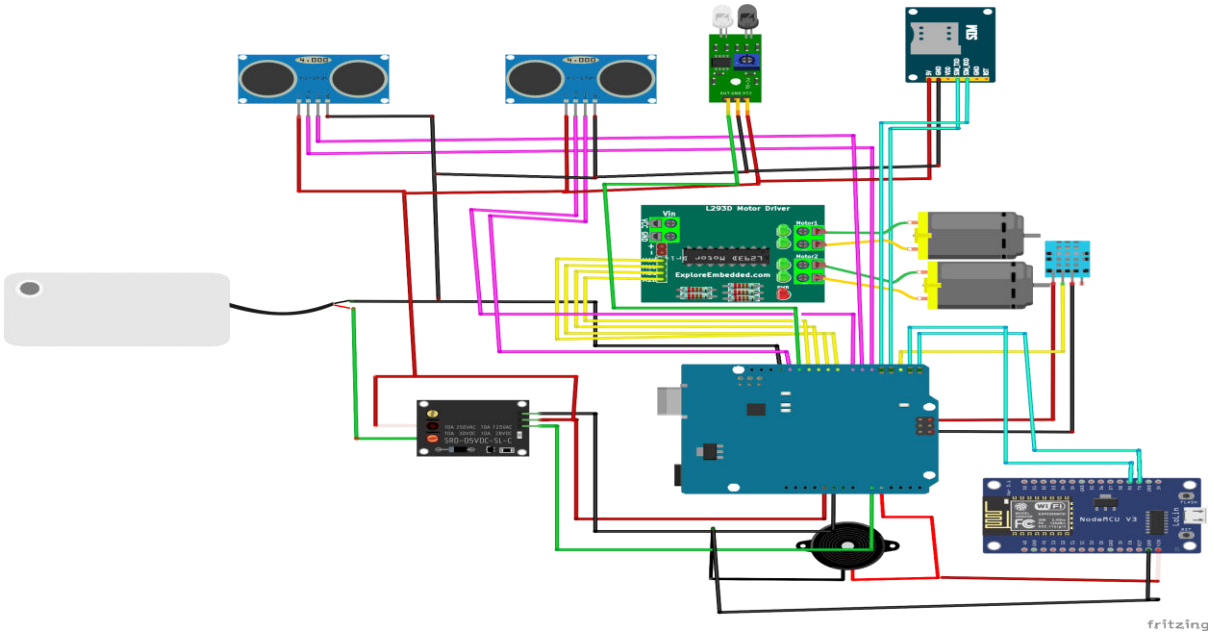

Fig 12.Circuit Diagram

Working To address the limitations of current agricultural systems, we are introducing a project called Agri-Bot, which leverages sensors and robotics technology for enhanced farm management. The inclusion of a soil moisture sensor enables real-time detection of soil conditions, allowing the system to automatically activate the pump based on moisture levels. Additionally, temperature sensors provide valuable environmental data crucial for crop health. All collected data is uploaded to the cloud, facilitating remote monitoring and analysis. With the integration of a DC motor, Agri-Bot enables efficient seeding operations, streamlining planting processes. The system's IOT (Adafruit) allows for convenient remote control, empowering farmers to manage tasks from a distance. This innovative approach not only automates essential farming activities but also increases efficiency and productivity. Agri-Bot represents a significant advancement in precision agriculture, offering potential solutions to optimize crop yields and mitigate resource wastage. Through the synergy of sensors and robotics, it paves the way for sustainable and technologically-driven farming practices.When Animal detection of IR sensor and Temperature monitoring of DHT11 ,Monitoring values will happens threshold message sent to user.

- **Advantages**
  - Increase the Productivity Rate.
  - Reduce Harmful Emission.
  - User Friendly.
  - Using Renewable Energy.
- **Applications**
  - In Farming
  - In Nurseries

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PROJECT KIT

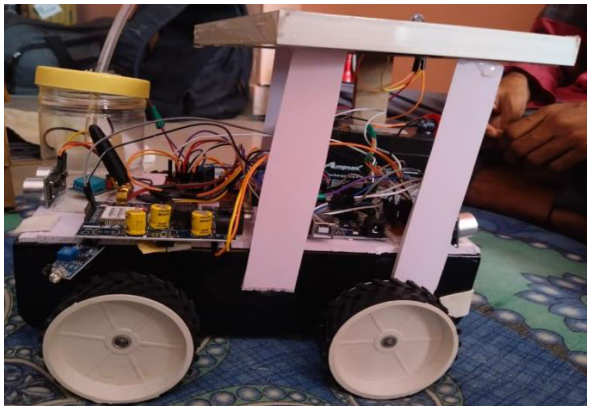

Fig 13.Side View

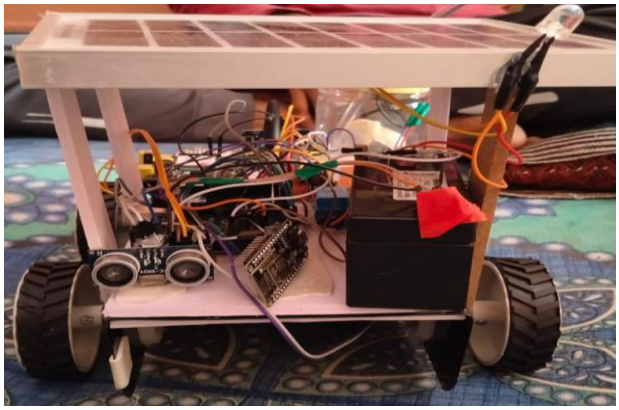

Fig 14.Back View

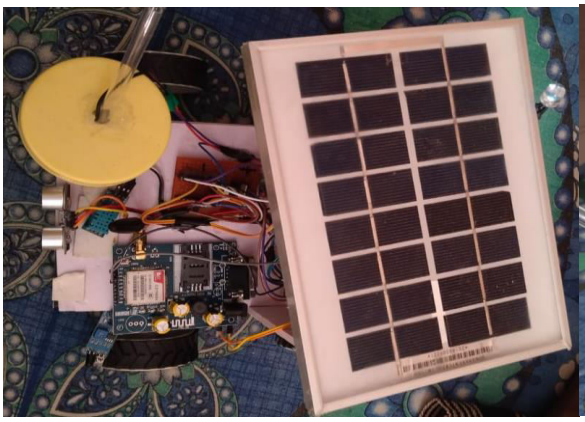

Fig 15.Top View

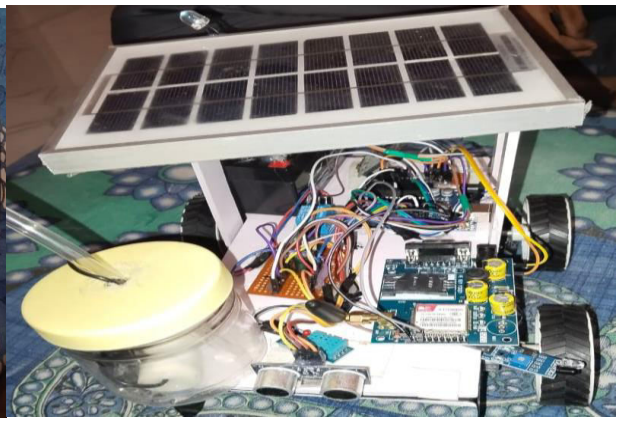

Fig 16.Front View

The Above Figure Show's 13,14,15,16 Show's the All Angle of Views and it's the Total Completed Project Kit.

V. IOT OUTPUT MODULING

The Figure 17 Shows the IOT Based Output of the Ultra Sonic Sensor Which Detect's the Distance and Animal in the Agriculture Field without Physical Contact . and we are Observing By Using IOT the Output Shows in fig 17.
The Distance 1 is the Front Side and the Distance 2 is the Back Side of the Project Kit Which Used to Detect the Distance and Animal's in the Agriculture Field.

Fig 17. IOT Based Ouput of Distance 1 and Distance 2 (Ultra Sonic Sensor)

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The Figure 18 Shows the Output of the Humidity and Temperature in Real Time By Using IOT and Humidity, also known as hygrometers, measure the amount of moisture in the air, which is essential to maintain an attractive, comfortable and energy-efficient environmentHygrometers, also known as hygrometers, measure the amount of moisture in the air, which is essential to maintain an attractive, comfortable and energy-efficient environment.

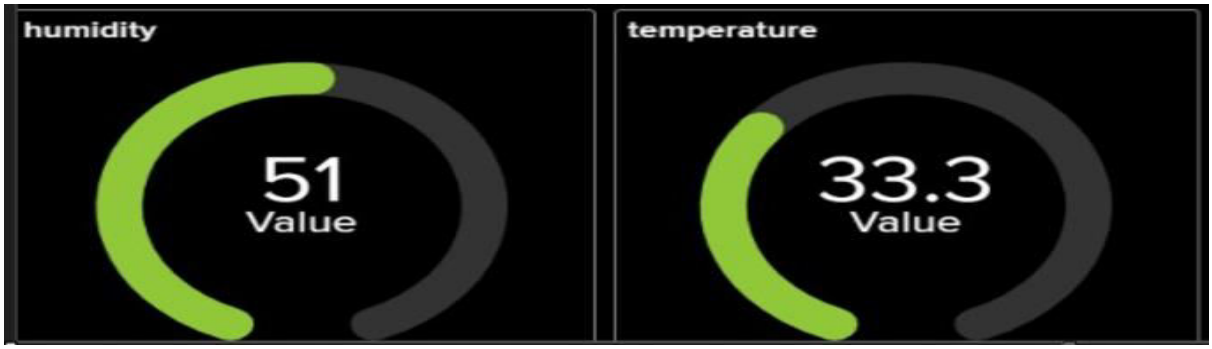

Fig 18. IOT Based Ouput of Humidity and Temperature

The Figure 19 Shows the Overall Whole Graph of the Distance 1 and Distance 2 , Humidity , Temperature with RealTime IOT Based.

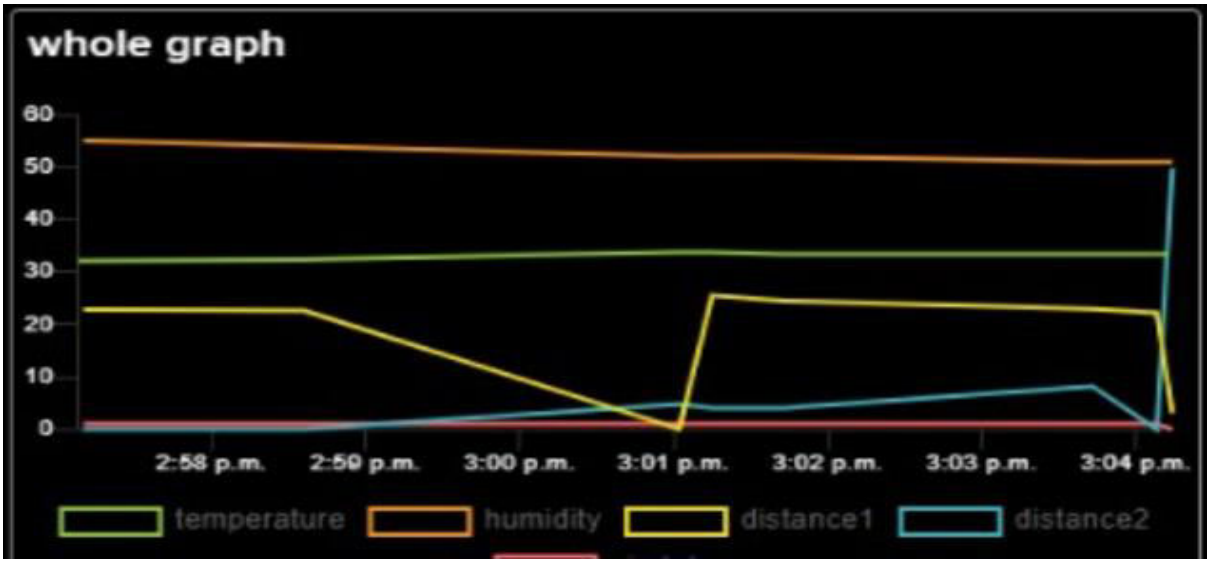

Fig 19. Output Graph

VI. CONCLUSION

This project introduces wireless technology in the field of agriculture. To assits Farmers Significantly. Provides a flexible user interface to farmer to govern system effectively. It reduces hard work requirement which is a been to the farmers as finding people is a hard work today. The Agrirobot can work in any climatic condition in addition it can work nonstop unlike humans. The time required to carry out the five functionalities reduces considerably in comparison with carrying out the same activities manually. It is a onetime investment which reduces the overall farming cost considerably. This Agrirobot acts as a gateway to automated smart farming, finally we are detecting the animals while entering in to the field by a buzzer sound and to send an SMS to a mobile.

VII. FUTURE SCOPE

An Agri-robot to carry out rural in operation in the figure .from the study ,it is clear that there is great potential to improvement self monitoring system rural cages ,where a satisfactory safety management system can be considered at

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reasonable cost .to improve the delivery of this work in the future we need to include AI for this we can use a night vision camea for eveningsurvilleance. We need to add ML equipment to rofile line and self traicing for plant.

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BIOGRAPHY

Ms.K.RENUKA., M.Tech.,, Working as Assistant Professor in Department of EEE from Kuppam Engineering College Chittoor Andhra Pradesh, India

M.SIVA B.Tech (Electrical and Electronics Engineering), in Kuppam EngineeringCollege Chittoor Andhra Pradesh, India

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S GANESH GOWD B.Tech (Electrical and Electronics Engineering) , in Kuppam EngineeringCollege Chittoor Andhra Pradesh, India

M ASHOK RAJU B.Tech (Electrical and Electronics Engineering), in Kuppam EngineeringCollege Chittoor Andhra Pradesh, India

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