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IOT Based Agro-Helper

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***Abstract*—Work on, "IOT BASED AGRO-HELPER", repre- sents a significant step forward in modern farming. We are using clean, renewable energy from battery to keep the model running, reducing our reliance on traditional power sources and minimizing harm to the environment. To make the model move precisely and efficiently, we are using high performance DC motors. These motors allow it to navigate different types of terrain smoothly. For planting seeds accurately, we have incor- porated servo motors. We are also using a dedicated DC motor pump for precise pesticide application to protect crops. And for cutting grass effectively, we rely on a high-torque GC motor, making the robot versa tile in various agricultural tasks. All of these components are controlled by an Arduino microcontroller, which acts as the model's central brain. It manages interactions between the different parts,ensuring that tasks are carried out in real-time. To make the model user-friendly.IOT BASED AGRO- HELPER" is set to improve farming efficiency while minimizing harm to the environment. This abstract provides a glimpse of the critical components and functions we will delveop into in the following sections of our project report.**

***Index Terms*—Node MCU, Motor Driver L293D, Servo Motor, Adapter, Battery, DC Gear Motor**

I. INTRODUCTION

In the world, the primary occupation 42% of total population is Agriculture. It plays a significant role in the life of the people. For the betterment of the life and growth of world economy, mechanization of agriculture process especially agricultural autonomous vehicle is important in order to improve the overall productivity. In recent years,the development of autonomous vehicles in agriculture has experienced increased interest. This development has led many researchers to start developing more rational and adaptable vehicles. In the field of agricultural autonomous vehicles, a concept is being developed to investigate if multiple small autonomous machines would be more efficient than traditional large tractors and human force. These vehicles should be capable of working throughout out the day and year round, in most all weather conditions and have the intelligence embedded within them to behave sensibly in a semi-natural structured or unstructured environment over long periods of time. Applying robotics in plant production requires the integration of robot capabilities, plant culture and the work environment. Commercial plant production requires certain cultural practices to be performed on the plants under certain environmental conditions. Agriculture's history dates back thousands of years and its development was driven and defined by very different climates, cultures and technologies. So the agriculture system should be advanced to reduce the efforts of the farmers. The model developed automatically sows the seeds, spray the pesticides and also cut the grass. The prototype represents the advanced system for improving the agricultural processes such as seed sowing, grass cutting and pesticide spraying based on as a assistance.

This research was conducted at MVPS's KBT College of Engineering, Nashik.

II. LITERATURE SURVEY

IoT based smart multipurpose agricultural robot [1], This paper is about to design the robotic system is named as agri-cultural robot, nothing but the machine which assembles with electronic equipment or components and performs specific operation as directed by in structure. This technology provides optimum and efficient solution for wide range of production in agriculture field. The robot is capable of performing operation like automatic ploughing, seed sowing and chemical spraying. IoT based mechanized robot [2], The research paper about integrated process involving full time multipurpose control, automation and surveillance system of the internet of things (IoT) is the next generation of wireless technology that au-tomates routine tasks and reduces labor. Software, sensors, and actuators are combined into a network of linked devices in the internet of things. The gadgets may exchange data and communicate over a network. The IOT innovation can provide fantastic content for modern automation. This study proposes an internet-based smart laboratory and laboratory machine automation, cloud storage data gathering, and monitoring system to efficiently operate types of machinery, online live data streaming, and monitor mechanical work devices. The IoT Microcontroller devices are connected to the robot to gather different sensors data, control and monitor the types of machinery and lab appliances in a smart lab environment. Any android phone, laptop, or computer may operate the robot wireless. All sensors data and parameters can be collected from google's cloud storage platform blynk and used to operate all appliances and devices.

A multipurpose agricultural robot [3], The research paper about automatic ploughing, seeding and plant health monitor- ing is on the designing of agricultural robot for various tasks. Certainly robots are playing an important role in the field of agriculture for farming process autonomously. In agriculture, the opportunity for robot is enhancing the productivity and

the robots are appearing in the field in large number. The proposed system focuses on implementing all the farming process especially in the field of ploughing and seeding by using Microcontroller, HC-05 and HC-06 Bluetooth models, various sensors etc. The robot detects the planning area by using sensors and seeds need to be planted in the corresponding field using gripper arrangement of the robot.

An IoT based multifunction agribot [4] agriculture is the science and art of cultivating plants and livestock. More than 40 percent of the population in the world choose agriculture as the primary occupation. In recent years, increased interest has grown for development of the autonomous vehicles like robots in agriculture. The proposed system aims at designing multipurpose autonomous agriculture robotic vehicle which performs the tasks such as ploughing, seed sowing, watering the crops. This robotic vehicle is an agricultural machine of a considerable power and great soil clearing capacity. This multipurpose system gives an advance method to sow, plow, water the crops with minimum man power and labor making it an efficient vehicle. The machine will cultivate the farm by considering particular rows and specific column at fixed distance depending on crop. Moreover, the paper aims at making use of evolving technology i.e. IOT and Bluetooth which results in smart agriculture. The whole process calculation, processing, monitoring is designed with motors sensor interfaced with Microcontroller.

IoT and solar energy based multipurpose agricultural robot [5], for smart farming in India, nearly 70% such as seed sowing, grass cutting, pesticide spraying, ploughing are carried out. Automation of agricultural operations is a current demand to increase productivity through the use of tools and technology. At the moment seed sowing, pesticide spraying, and grass cutting are all difficult tasks. The equipment needed for the aforementioned actions is both expensive and inconvenient to use. As a result, India's agricultural system should be advanced through the development of a system that reduces reliance on human labor and time. The proposed agricultural robot is a user-friendly, internet of things (IoT)-based system that can be used in any type of soil. Users can use a web page to monitor the crop's condition as well as perform some specific operations. The objective of this project is to design, develop, and build a robot that can sow seeds, cut grass, spray pesticides, pluck fruit, and detect soil nutrition levels and irrigation. Solar energy is used to power the entire system.

IoT based multipurpose surveillance robot [6], the main goal of IoT based multipurpose surveillance robot is to design and develop a surveillance robot that is capable of being used for rescue and spying in military operations. It is known that humans cannot venture into hazardous/disaster-affected places as it can be life threatening and hence robots are required where human intervention is nearly impossible. Wireless surveillance robots can help to prevent the endangerment of humans or animals. The robot acts as a surveillance device to capture the intruder's surrounding information before the intruder attacks the soldiers. The issues related to short-range communication to control the movement of the robot are overcome by using IoT technology and therefore real-time video can be transmitted to the intended recipient. An android phone can control the robot's movement from a distance. This project comprises the following phases: controlling the robot in manual mode using IoT technology via android application, phone acting as a camera for live video streaming, IR, gas and metal detection sensors, and rechargeable batteries. The work aims to reduce loss of lives during military operations, ensure safety on the war field and help provide footage of disaster struck regions.

III. METHODOLOGY

The IOT-Based Agro Helper model operates seamlessly through the integration and collaboration of its key components. The system begins with the solar panel, positioned at the core, which captures sunlight and converts it into electrical energy. The energy harvested is then directed to the battery, which serves as the model's energy reservoir during periods of sunlight. The rechargeable and long-life battery ensures sustained operation of the model even in the absence of direct sunlight. The heart of the model's intelligence is the Node MCU, which functions as its central brain. The Microcontroller receives user commands through the Android app, establishing a communication link through the WiFi module. These commands are translated into precise actions that manage the timing, logic, and sequencing of the model tasks. The motor driver, a critical component, governs the DC motors responsible for the movement of the model and the operation of various agricultural implements. It regulates motor speed, direction, and safeguards against potential damage, providing the necessary precision for tasks like seeding and grass cutting. The choice of high-torque DC motors ensures the model can efficiently handle the physical demands of diverse agricultural operations. The adaptability and versatility of the model are realized through agricultural implements, which act as attachments or tools for specific tasks. These implements, such as seeders and grass cutters, enable the model to address a wide range of agricultural needs. The ability to switch seamlessly between these implements enhances the model's functionality and utility in different farming scenarios. The WiFi module serves as a vital communication gateway, connecting the model with the user through the Android app. This allows users to remotely control the model, directing its movement, switching between implements, and monitoring its status. Real-time information, including battery levels is accessible through the user-friendly app interface. In operation, the solar panel continuously captures sunlight, replenishing the battery's energy reserves. The Node MCU Microcontroller orchestrates the entire process, ensuring efficient use of energy and precise execution of tasks. The motor driver regulates the DC motors, propelling the model and activating agricultural implements as needed. The WiFi module maintains a seamless link with the Android app, enabling real-time control and monitoring. These solar-powered agricultural model offer

substantial benefits to modern farming practices. Their reduced reliance on fossil fuels makes them environmentally friendly, while their capacity to operate for extended periods without human intervention enhances efficiency and reduces labor costs. The model adaptability to various tasks positions them as invaluable tools, representing a harmonious fusion of technology and agriculture for a more sustainable and efficient future in farming.

IV. BLOCK DIAGRAM

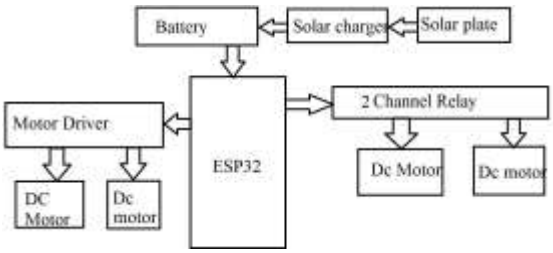

Fig. 1. Block Diagram

V. RESULT

Fig. 2. Result

Fig. 3. Result

VI. CONCLUSION

The ”IOT BASED AGRO-HELPER” project introduces a sustainable, efficient, and accessible solution for modern farming. By harnessing solar energy and employing advanced robotics, it addresses labor shortages, enhances productivity, and reduces environmental impact. The integration of mobile control via an Android app makes farming operations more convenient and technology- driven. This project exemplifies the potential of innovation in agriculture, promising a brighter, more efficient future for farming.

REFERENCES

[1] Dr. S. B. Dhoble, mrunmayee gahukar, ankita rahate roshani borkar, dipali bansod ,“Iot based smart multipurpose agriculturalrobot”, https://scienceresearchjournals.org/IRJNST/2020/volume-2%20issue-1/ irjnst-v2i1p102.pdf.

[2] abdullah all mamun anik, istiak habib , shuvodip ad- hikary, dr. Abdul gafur , “IOT based mechanized robot”, https://www.researchgate.net/publication/357815953 IoT Based Mechanized Robot An Integrated Process Involving Fulltime Multipurpose Control Automation and Surveillance System Best Paper Award IEEE-SOLI2021 Singapore.

[3] Chandana R, Nisha M, Pavithra B, Sumana Suresh, Nagashree R N, “A multipurpose agricultural robot”, *https://www.ijert.org/a-multipurpose-agricultural-robot-for-automatic-ploughing-seeding-and-plant-health-monitoring.*

[4] A. R. Uday1 , D. Nisarga2 , Syeda Arshiya3 , A. Deepak4 , J. Sudha5, “An IoT based multifunction agribot”, https://www.ijresm.com/Vol.3 2020/Vol3 Iss2 February20/IJRESM V3 I2 72.pdf.

[5] Ashok g meti, kirangouda s biradar, manoj g, Pramod N Rayangoudra, Vishal Kumar, B T Venkatesh Murthy, “Iot andsolar energy based multipurpose agricultural robot”, https://www.researchgate.net/publication/368455156 IoT and Solar Energy Based Multipurpose Agricultural Robot for Smart Farming.

[6] Divakar U1, Ningaraju A.M2, Sudarshana Chakravarthy3, Suraj Sharma S4, Harish S.V5, Pawan Bharadwaj6,“Iot based multipurpose surveil-lance robot”, https://www.irjet.net/archives/V9/i7/IRJET-V9I7417.pdf.