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SOLAR DRIVEN AGRIBOT FOR FARM IRRIGATION

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***ABSTRACT*- Agriculture accounts for a significant portion of India's GDP. Water shortages and high labour costs are two big challenges in modern agriculture. These problems can be solved by agriculture task automation, which promotes precision farming. In light of India's abundant sunlight, this paper discusses the design and creation of a solar-powered IoT-based Agribot that automates irrigation tasks and allows for remote farm monitoring. An Arduino microcontroller is used to create the Agribot. When it's not irrigating, it collects solar energy. It travels along a pre-determined path of a farm when performing irrigation, sensing soil moisture content and temperature at regular intervals. Data from multiple sensors is processed locally at each sensing point to determine the need for irrigation, and the farm is watered accordingly. Agribot also functions as an IoT system, transmitting data from multiple sensors to a remote server through a Wi-Fi connection. Raw data is processed at the remote server using signal processing operations like filtering, compression, and prediction. As a result, according to the user's request, the analysed data statistics are presented using an interactive interface.**

***Keywords*—Internet of Things, Agribot, Farm Monitiring,Data Analysis.**

I. INTRODUCTION

Agriculture is the most diverse business field and plays a critical role in a country's overall economic growth. Agriculture's technological advances would almost certainly improve the competence of such farming practises. By using wireless communication technology to connect a smart sensing system and a smart irrigator system, the smart irrigation system has proposed a novel methodology for smart farming. The measurement of physical parameters such as soil moisture content, nutrient content, and pH of the soil, which play an important role in farming activities, is the subject of smart irrigation systems. The necessary amount of green manure, compost, and water is splashed on the crops using a smart irrigator installed on a movable overhead crane system, based on the critical physical and chemical parameters of the soil measured. In the smart irrigation system, the comprehensive modelling and control strategies of a smart irrigator and smart farming system are illustrated. In the last decade, there has been a lot of concern about fresh water shortages around the world. In the agricultural sector, efficient water resource management is critical. Unfortunately, due to adherence to traditional values, this is not given top priority in third-world countries. Smart irrigation system with low-cost sensors demonstrates a smart irrigation system that controls water supply in water-scarce areas using a bespoke, low-cost soil moisture sensor. The sensor is made with low-cost materials and methods and operates on the concept of moisture-dependent resistance shift between two points in the soil. Moisture data from a sensor node is sent to a centralised server that controls water supply through XBEE wireless communication modules. The regular moisture data is visualised using a user-friendly gui. Since the sensing hardware is low-cost and wireless, it can be used to monitor the moisture

levels of vast agricultural fields. Furthermore, the proposed moisture sensing approach can be integrated into an automated drip-irrigation system and used to conduct automated, precision agriculture with decentralised water control.

II. LITERATURE SURVEY

[1] AUTHORS: Zhang, C. and Kovacs, J.M [7]

There are far too many advances in precision agriculture for rising crop production in today's world. Over 70% of rural people in developing countries such as India depend on agriculture fields. Diseases are wreaking havoc on the agricultural fields. These diseases were spread by pests and insects, lowering crop productivity. In order to improve crop quality, pesticides and fertilizers are used to kill insects and pests. When spraying pesticides in the crop filed manually, the WHO (World Health Organization) estimated one million cases of illness. Unmanned aerial vehicle (UAV) – aircrafts are used to spray pesticides in order to prevent the health risks associated with manual spraying. Where equipment and labor are difficult to run, UAVs can be used easily. The use of unmanned aerial vehicles (UAVs) for crop monitoring and pesticide spraying is briefly discussed.

[2]. AUTHORS: Hussain, M., Gawate, S.P., Prasad, P.S. and Kamble, P.A [5]

The aim of the three level access machine is to create a wireless three level regulated smart irrigation system that will provide automatic irrigation for plants while saving water and money. The main goal is to use the device to boost the soil's and thus the plant's health by using multiple sensors. In recent years, remotely controlled embedded irrigation systems have become a new necessity for farmers looking to save electricity, time, and money. Centered on Wireless Sensor Networks and GPRS technology, three level access machine proposes a full agricultural solution for the farmer. Microcontroller, temperature and humidity sensors, soil impurity sensors, load sensors, sprinklers, and a wireless sensor network are among the components (WSN)

III. PROBLEM FORMULATION

Smart Agribot's goal is to help farmers boost and stabilise their crop yields by implementing sustainable irrigation systems, promoting water management practises that maximise the amount and timing of water delivery, and generating positive economic outcomes for farmers and their families.

IV. PROPOSED SYSTEM

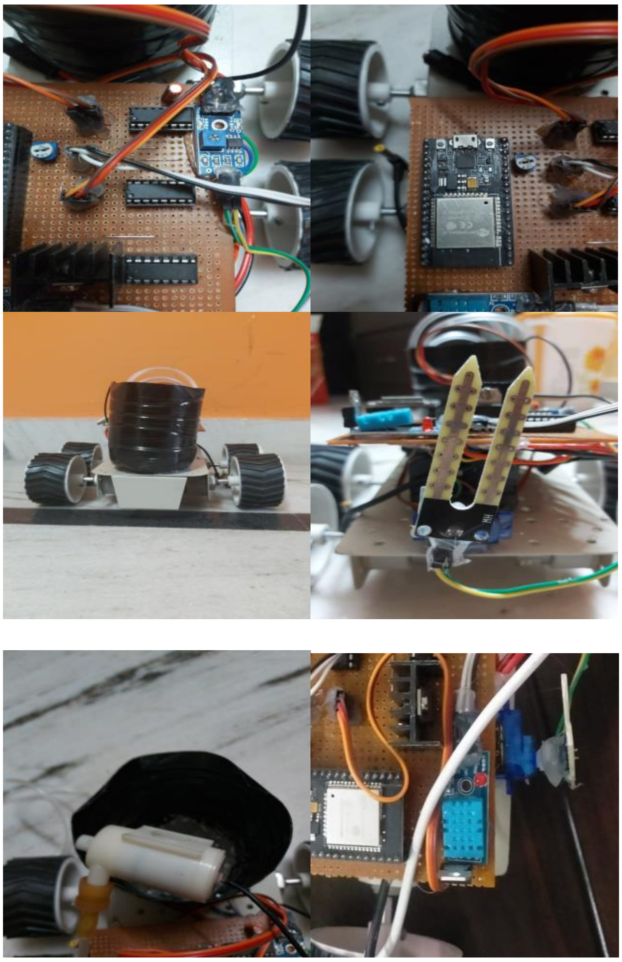
Smart Agribot's main goal is to use a PC based on IoT, GSM, and an automated water inlet setup to track the soil's moisture content during dry and wet conditions, measure the corresponding relative humidity, and irrigate it based on its existence using a moisture sensor circuit. which can also monitor and record temperature, humidity, and sunlight, and which is continuously changing and can be monitored in the future to optimise these resources for maximum plant growth and yield.

V. METHODOLOGY

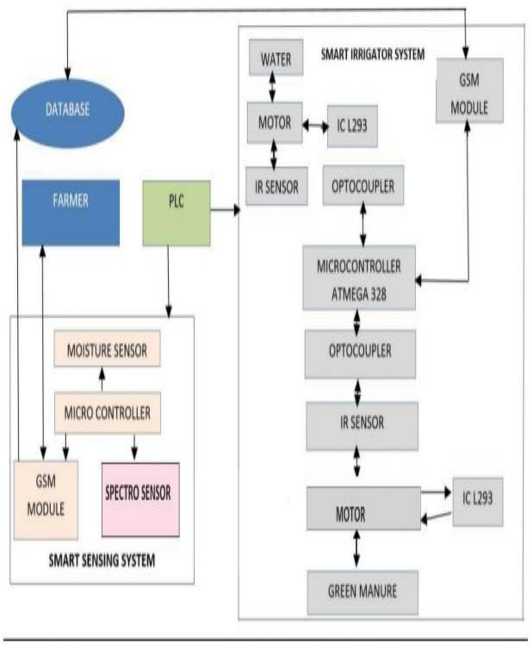
Smart Agribot stresses the fact that the methodology used to track the moisture content of the soil here allows agriculturalists to use humidity calculation and traditional automatic irrigation with the potential to eliminate unnecessary irrigation cycles and save a large amount of water. Aside from the standard modes of measurement and analysis, the blynk app is used to monitor the irrigation course. The most important requirement in most semi-arid cultivating estates is effective crop treatment and water management. Monitoring the condition of the soil, estimating its moisture content, and monitoring it as required proposes a possible solution to support landsite irrigation management and, as a result, to handle desiccated fields and provide significant yield to producers. The most critical aspect of agriculture is obtaining knowledge about the moisture content and temperature of the soil.

Smart Agribot is being developed to create an automated irrigation device that senses the moisture content of the soil and turns the pump motor ON/OFF. In the field of agriculture, it is important to use the correct irrigation system. The soil is dug using a screw rod mechanism. The benefit of this approach is that it requires less human interference while also ensuring adequate irrigation.

VI. COMPONENTS.



VI. FLOW CHART.



VII. APPLICATIONS

1. Smart Agribots use less water than manual irrigation and do this by taking direct soil moisture and humidity measurements at different locations in the field.
2. Due to the use of a screw rod technique and just a single collection of sensors, the prototype forms a low-cost device that can virtually sense and relay data from various locations around a farm.
3. Since the Smart Agribot can travel around the field, there is no need to mount multiple sensors at different geographical locations.
4. The Arduino Mega AT2560 processor is used in the development of Smart Agribot. With the aid of two solar panels, the battery can be recharged using renewable solar energy. As a result, it is capable of harvesting solar power while not irrigating the farmland.

VIII. RESULT

Smart Agribot, an IoT unit, was created for remote farm monitoring as well as irrigating farmland. The established Agribot is solar powered, so when it is not irrigating, it harvests solar energy. Agribot is a better option for farm monitoring and irrigation than fixed automation systems because it needs less hardware than a fixed system. The details and predictions are derived from the data, which is processed and analysed. The future scope of this project is to develop prediction-driven irrigation activities for the Agribot

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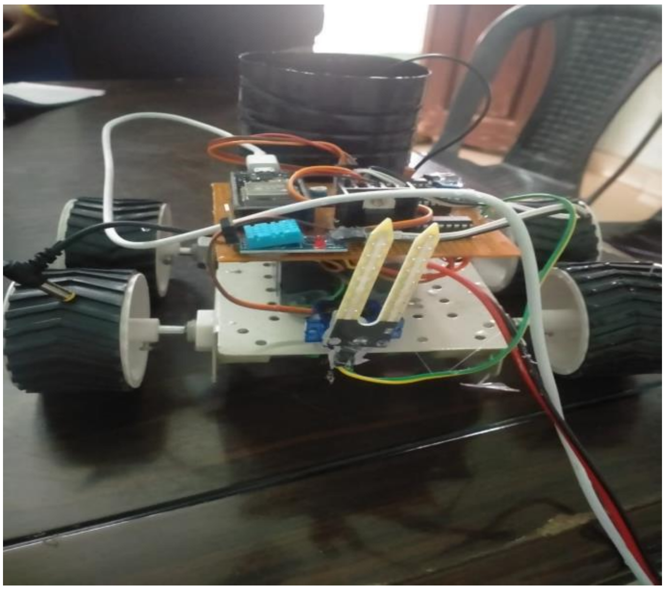
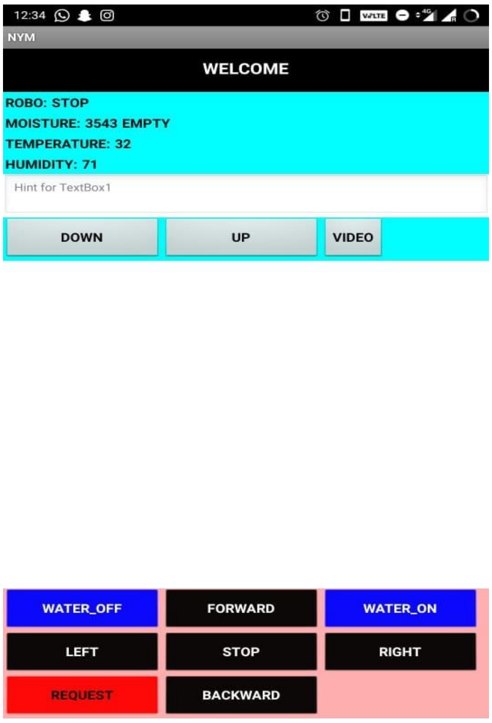


Prototype



Application.

IX. ACKNOWLEDGMENT

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X. REFERENCES

[1] Bandara, A.G.N., Balasooriya, B.M.A.N., Bandara, H.G.I.W., Buddhasiri, K.S., Muthugala, M.A.V.J., Jayasekara, A.G.B.P. and Chandima, D.P., December. Smart irrigation controlling system for green roofs based on predicted evapotranspiration. In Electrical Engineering Conference (EECon) (pp. 31-36). IEEE. 2016.

[2] Gollakota, A. and Srinivas, M.B. Agribot a multipurpose agricultural robot. In India Conference (INDICON), 2011 Annual IEEE (pp. 1-4). IEEE. 2011.

[3] Gupta, N. Decline of Cultivators and Growth of Agricultural Labourers in India from the International Journal of Rural Management, 12(2), pp.179-198. 2016.

[4] Hussain, M., Gawate, S.P., Prasad, P.S. and Kamble, P.A. Smart irrigation system with three level access mechanisms. In Computation of Power, Energy Information and Commuincation (ICCPEIC), 2015 International Conference on (pp. 0269-0275). IEEE. 2015.

[5] Ashwinkumar.U.M and Dr. Anandakumar K.R, "Predicting Early Detection of cardiac and Diabetes symptoms using Data mining techniques", International conference on computer Design and Engineering, vol.49, 2012.

[6] Jagannathan, S. and Priyatharshini, R. Smart farming system using sensors for agricultural task automation. In Technological Innovation in ICT for Agriculture and Rural Development (TIAR), 2015 IEEE (pp. 49-53). IEEE. 2015.

