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SMART IRRIGATION SYSTEM USING IOT

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***Abstract*—** Lawns make up the largest irrigated crop by surface area in North America, and carry with it a demand for over 9 billion gallons of freshwater each day. Despite recent developments in irrigation control and sprinkler technology, state-of-the-art irrigation systems do nothing to compensate for areas of turf with heterogeneous water needs. In this work, we overcome the physical limitations of the traditional irrigation system with the development of a sprinkler node that can sense the local soil moisture, communicate wirelessly, and actuate its own sprinkler based on a centrally-computed schedule. A model is then developed to compute moisture movement from runoff, absorption, and diffusion. Integrated with an optimization framework, optimal valve scheduling can be found for each node in the space. In a turf area covering over 10,000ft2, two separate deployments spanning a total of 7 weeks show that MAGIC can reduce water consumption by 23.4% over traditional campus scheduling, and by 12.3% over state-of-the art evapotranspiration systems, while substantially improving conditions for plant health. In addition to environmental, social, and health benefits, MAGIC is shown to return its investment in16-18 months based on water consumption alone.

***Keywords*—** IOT, Wastage maintenance, Garden automation and Street light etc

I. INTRODUCTION

Improving farm productivity requires crop performance to be understood and forecasted under a wide variety of environmental, soil, fertilization, and irrigation conditions. Productivity of a farm can be enhanced by determining which crop variety has produced the greatest yield under similar soil, climate, fertilization, and irrigation conditions. The same data-driven approach to crop selection can also address climate change, resource constraints (water, labour, and energy shortages), and societal concerns around issues such as animal welfare, fertilizers, and environment that often impact agricultural production. According to the United Nations' Food and Agriculture Organization, food production must increase by 60% by 2050 to be able to feed the growing population, expected to reach 9 billion. Increased crop productivity is urgently needed, and it is the cornerstone of any solution for meeting food shortage and farm profitability problems. Smart farming involves the use of Information Communication Technologies (ICT)

In particular, the Internet of Things (IOT) and related big data analytics to address these challenges via the electronic monitoring of crops, as well as related environmental, soil, fertilization, and irrigation conditions.

Such monitoring data can be then be analyzed to identify which crops and specific crop varieties can best meet the productivity targets of any particular farm around the world. Crop variety identification involves the use of plant phonemics (an area of biology concerned with the measurement of phonemics the physical and biochemical traits of organisms as they change in response to genetic mutation and environmental influences).

Crop performance, environmental, soil, irrigation, and fertilization data) and related data analysis results with specific crop varieties (i.e., plant genes and phenotypes). The association of information will revolutionize the way food is produced globally. To observe the growth of the crop under varying real world conditions (e.g., soil quality, environmental conditions, etc.), typical crop studies involve phenol typing to understand the key factors (e.g., the pH levels of soil, the rate of Nitrogen depletion) affecting growth. Such studies are conducted in natural outdoor environmental conditions and locations where plants are growing, by varying irrigation and the application of fertilizers/additives. Internet of Things (IOT) technologies can lower the cost and increase the scale of such studies via the collection of related time series data from sensor networks, spatial data from imaging sensors, and human observations recorded via mobile smart phone applications. For example, IOT devices can help to capture the pH levels of soils and the rate of Nitrogen depletion as time-series data, and share it among interested researchers and growers for further analysis. Point solutions for smart farming currently exist, but they can only utilize a small number of specific IOT devices (e.g., a specific model of soil humidity sensor), and provide no support for data analysis or sharing. Using such existing solutions also requires a significant effort in order to integrate and correlate the data obtained from different IOTdevices , e.g., data from a fertilizer sprayer on a tractor (made by one manufacturer) with the data obtained from soil moisture sensors (made by a different manufacturer).

Existing solutions are not designed around a bring-your-own IOT sensor principle that will allow the use of new IOT devices without modification, and permit such solutions to keep up with the rapid development of cheaper and better IOT sensors. Furthermore, none of the existing solutions are designed for comprehensive and scalable analysis, recommendation/visualization, or sharing of crop performance data among farmers, growers, biologists, government, and commercial organizations that support farming operations and produce relevant products.

II. OBJECTIVE

To attain our proposed system need to use Arduino UNO, controller to monitor the field. In this temperature sensor, Humidity sensor, water level sensor is used to monitor the field environment and flooding of the fields. The whole process is controlled by microcontroller. If the sensed value goes beyond the threshold values set in the program, the pump will be automatically switched ON/OFF by the relay circuit and it is connected to the driver circuit which helps to switch the voltage. The farmer will be intimated about the current field condition through IOT.

III. EXISTING SYSTEM

In the existing system robot can be operated only in the manual mode. So it is difficult to perform in automatic operations where it doesn't require humans.

Drawbacks of existing system:

It cannot be operated automatically
Less operations can be performed using robot
It's not user friendly

IV. PROPOSED SYSTEM

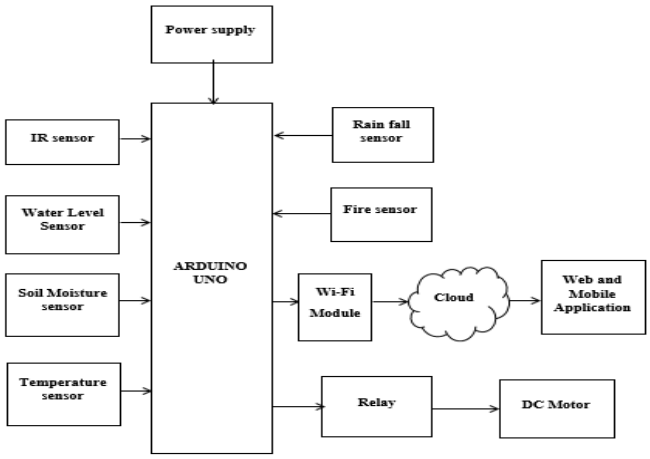
In the proposed system robot can be operated in both automatic and the manual mode. So that by using this mode, vast operations can be performed. It can be operated automatically. More operations can be performed using Automation. Has intelligence to avoid flooding of field. By using IOT we can monitor.

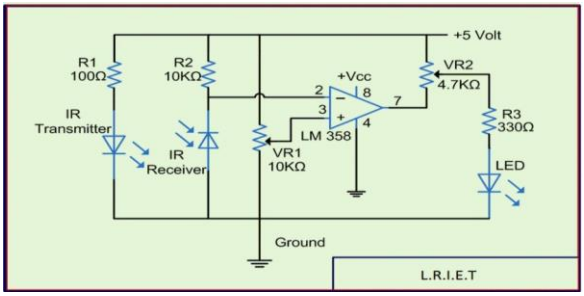
To attain our proposed system need to use Arduino UNO, controller to monitor the field. In this temperature sensor, humidity sensor, water level sensor is used to monitor the field environment and flooding of the fields.

The IR sensor is used to identify the animals enter into the field. Soil Moisture sensor used to identify soil Controller status and everything is displayed In IOT. The whole process is controlled by microcontroller.

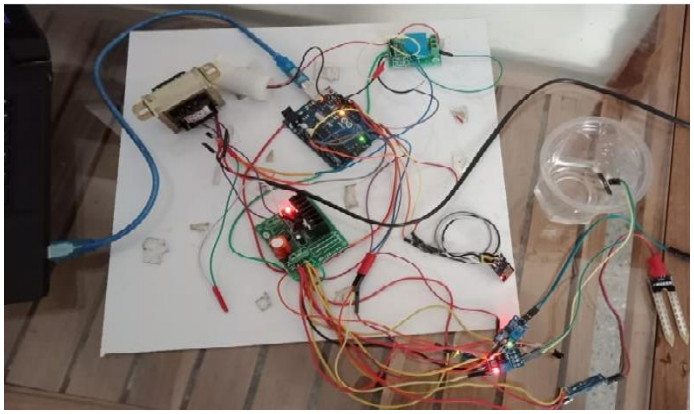
If the sensed value goes beyond the threshold values set in the program, the pump will be automatically switched ON/OFF by the relay circuit and it is connected to the driver circuit which helps to switch the voltage.

LOCK DIAGRAM





V. OUTPUT



VI. CONCLUSION

The application of agriculture networking technology is need of the modern agricultural development, but also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features, functionality and the corresponding software architecture of precision agriculture water irrigation systems, actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production.

With more advancement in the field of IOT expected in the coming years, these systems can be more efficient, much faster and less costly. In the Future, this system can be made as an intelligent system, where in the system predicts user actions, rainfall pattern, time to harvest, animal intruder in the field and communicating the information through advanced technology like IOT can be implemented so that agricultural system can be made independent of human operation and in turn quality and huge quantity yield can be obtained.

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