International Journal of Progressive Research in Science and Engineering
Volume-1, Issue-4, July-2020
www.ijprse.com

IoT Based Automated Irrigation System Using Solar Power

Shaikh Zameer S. Shabbir[1], Vaishali J. Kothale[2], Dnyaneshwar S. Wayal [3], Apeksha S. Sarkate[4], Sagar R. Dukare[5], Mangesh J. Nemade[6]

[1,2,3,4,5]*UG Student, Dept. of Electrical Engineering, Pankaj Laddhad Institute of Technology and Management Studies, Buldana, India*

[6]*Assistant Professor, Dept. of Electrical Engineering, Pankaj Laddhad Institute of Technology and Management Studies, Buldana, India*

Corresponding Author:shaikhzameer944@gmail.com

Abstract: - Agriculture is that the supply of living of majority Indian and it's conjointly includes a incalculable influence on economy of the country. solar energy has emerged as viable supply of renewable energy over the past few decades and is currently used for varied applications like emergency lighting, water heaters, and industrial application. it's low cost supply of energy. solar energy is employed as solely the supply of power to regulate the system. the main objective of our project is to reduced manual involvement by the farmer by exploitation an automatic irrigation system that purpose is to reinforce water for agriculture crops. With embedded technology and internet of Things, during this work we've designed IoT based automated irrigation system for the Indian situation. Our system is ready to deliver optimum water to the plants supported moistures, humidity and temperature levels which are obtained through sensors. The farmer is able to monitor the parameters through the mobile app that is integrated with cloud storage. By analyzing and scrutiny previous year's information and our current information we have a tendency to square measure able to with efficiency notice some way to avoid wasting water.

Keyword- ***IOT, Moisture sensor, DHT11 sensor.***

I. INTRODUCTION

Irrigation is making use of water to the land artificially. Water is one of the precious useful resource and important factor for farming. general troubles in farming is underneath watering or over watering the problems are nice explained with the aid of answering the easy query that when the water cycle began and the way long watered.? Under watering is starting the water cycle too late and running it for no longer enough periods due to this the crop may be damaged and it impacts the manufacturing. overwatering is beginning the water cycle too early and going for walks it for longer length than what it is essential by using doing this exercise the crop can be broken and manufacturing reduces. if human intervention is greater than this under and over watering takes vicinity due to small human errors. the primary object of this paper is to reduce human intervention and growth the irrigation performance by automating the irrigation system the use of sensors (moisture and DHT11) and tracking via thingspeak net web page.

India owns agrarian economy with 70% of population depending upon agriculture immediately or in at once. in this sort of developing usa wherein digitization is given high precedence, technology is showing its optimization in diverse fields while it nonetheless calls for footprints into irrigation so present day smart move inside the discipline is significantly advocated. the trouble with modern-day irrigation system are shortage in water and energy definitely required for plant boom traditional methods of farming are accompanied requiring-a great deal man-electricity non remunerative for the farmer as the price of manufacturing is improved. so there is a need to make a few changes in modern-day device.

In one of the systems, an electromagnetic sensor was used to measure soil moisture. Water saving of about 53% were achieved as compared with the ones using sprinklers. Reducing water use have been achieved, using sensor based scheduling of irrigation. A soil sensor and an evapori meter were incorporated in this system.

The use of automated irrigation system to reduce water consumption was done in a system that composed of a distributed network of soil moisture and temperature sensors placed near roots of plants. In this paper, the design and development of a smart irrigation system using sensors and microcontrollers is presented. The aim of the implementation was to optimize water consumption by crops in an agricultural field and also reduce the manual involvement and improve.

II. MOTIVATION AND AREA OF UTILITY

A. *Motivation*

For continuously increasing demand in supply of food is necessities, it's important to rapid improvement in production of food technology. Farming is only the source to provide this. This is the important for human societies to growing and dynamic demand in food production. Farming plays the important role in the economy like India. Due to a lack of water and scarcity of land water result the decrease volume of water on the earth, the farmer use irrigation. Irrigation may be

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defined as the artificial application of water to the land or soil means depending on the soil type plant are to be provided with water.

B. *Area of utility*

- The primary focus of this project is to help the farmer and reduce their work.
- This module can be implemented in perennial plat irrigation land and gardening land A fingerprint recognition system can be used for both verification and identification.

III. WHAT IS IOT?

A. *Definition*

The internet of things (IoT) is that the interconnections of unambiguously classifiable embedded computing devices at intervals the prevailing internet The "Internet of Things" connects devices and vehicle exploitation electronic sensors and also the net.

B. *Introduction*

The 'Thing' in IoT may be any device with any quite inbuilt sensors with the flexibility to gather and transfer knowledge over a network while not manual intervention. The embedded technology within the object helps them to act with internal states and also the external surroundings, that successively helps in choices creating method. In a shell, IoT may be a conception that connects all the devices to the web and allow them to communicate with one another over the web. IoT may be a big network of connected devices all of that gather and share knowledge concerning however they're used and also the environments.

IV. BLOCK DIAGRAM AND WORKING

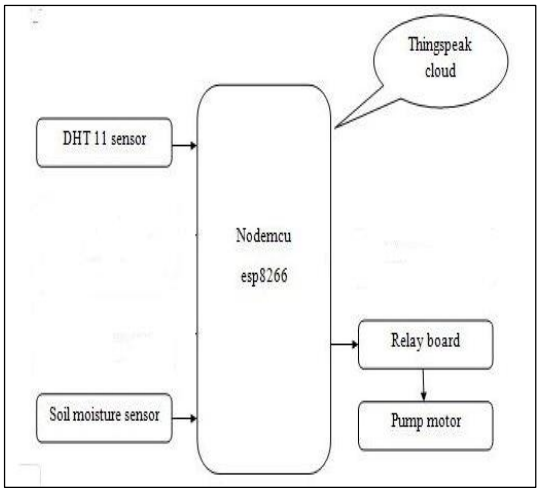

Fig 1. Block Diagram

A. *Component used*

- NODEMCU
- MOISTURE SENSOR
- DHT11 SENSOR
- RELAY
- WATER PUMP
- SOLAR PANEL
- BATTERY

1) *NodeMcu:*

Espressif Systems' good property Platform (ESCP) could be a set of high performance, high integration wireless SOCs, designed for house and power unnatural mobile platform designers. It provides unexcelled ability to engraft wireless local area network capabilities at intervals alternative systems, or to operate as a standalone application, with rock bottom price, and borderline house demand. an entire and self-contained wireless local area network networking solution; it is accustomed host the appliance or to dump wireless local area network networking functions from another application processor.

ESP8266EX hosts the appliance it boots up directly from external flash. In has integrated cache to boost the performance of the system in such applications.

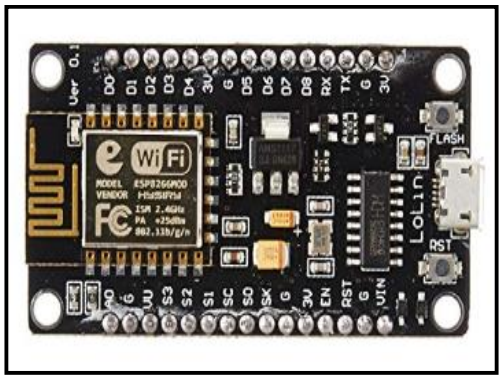

Fig.2. NodeMcu

2) *Moisture sensor:*

Soil moisture sensor measure the water content found in soil. Measuring soil moisture is most essential in agriculture to help farmers manage their irrigation systems more efficiently and also save manpower. Not only are farmers able to typically use less water to grow a crop at paddy field, but they're also in a position to increase yields and the fine of the crop by higher management of soil moisture during plant increase stages.

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Besides agriculture, there are numerous different disciplines the usage of soil moisture sensors. Golf publications are now the usage of sensors to boom the efficiencies of their irrigation systems to save you over watering and leaching of fertilizers and different chemical substances offsite. The module makes use of LM393 comparator to compare the soil moisture level with the preset threshold value. When the soil moisture deficit module outputs a excessive level, and vice versa.

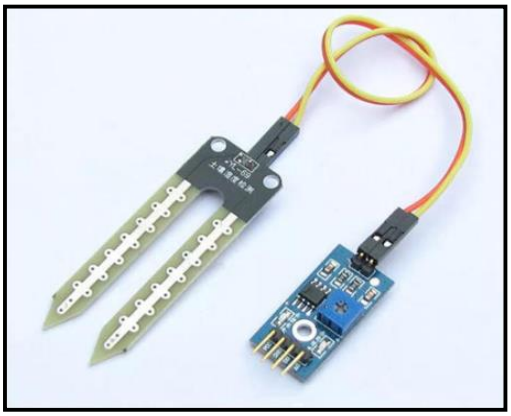

Fig.3. Moisture sensor

3) DHT11 sensor:

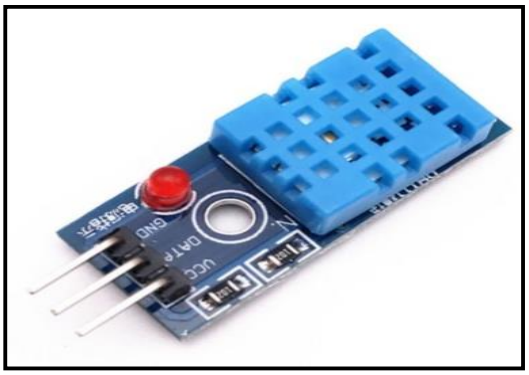

Fig.4. DHT11 sensor

The DHT11 sensor use to measure a Temperature and humidity. The sensor comes with a dedicated NTC to measure temperature and an 8-bit micro controller to output the value of temperature and humidity as serial data. The sensor is likewise manufacturing facility calibrated and hence easy to interface with other micro controllers. This sensor can measure temperature from 0°C to 50°C and also humidity from 20% to 90% with an accuracy of ±1°C and ±1%.

4) Relay:

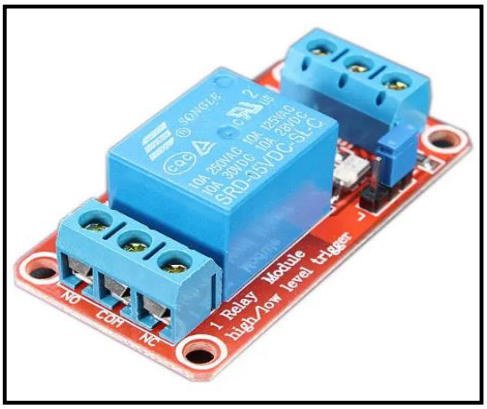

Fig.5. Relay

A relay is an electrically operated device. It has a control system and (also called input circuit or input contactor) and controlled system (also called output circuit or output cont actor). It is frequently used in automatic control circuit. To put it simply, it is an automatic switch to controlling a high-current circuit with a low-current signal. The advantages of a relay lie in its lower inertia of the moving, stability, long-term reliability and small volume. It is widely adopted in devices of power protection, automation technology, sport, remote control, reconnaissance and communication, as well as in devices of electro mechanics and power electronics.

B. Working

IoT based automated irrigation system which is capable of automating the irrigation process by analyzing the moisture of soil and the surrounding condition. Also the data of sensors will be displayed in graphical form on Thing speak web page.

When the power supply is on the microcontroller checks the soil moisture content present in soil. If the moisture content is not up to the threshold value, then it makes the motor to get on automatically and turns off automatically if reaches the threshold value level. When the weather condition is such that it is raining then the microcontroller put off the motor till then raining. After the raining it checks for threshold value and makes the necessary action. If the power supply is off suddenly then after the power is on microcontroller turns on automatically there is no need of manually turn on and off the motor. All the data from the sensors and water is graphically shown in the thing speak IoT cloud web page which is used for monitoring Advantages of these method is that it is a cost effective irrigation and also save the wastage of water, increase efficiency and easy to monitor, reduces manpower and cost, reduced runoff water and nutrients.

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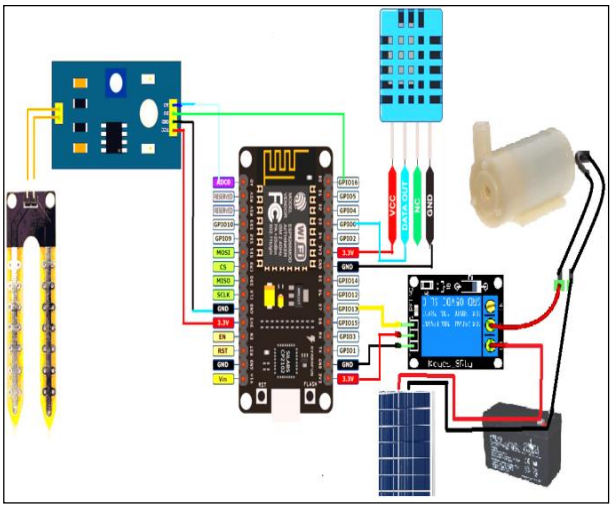

Fig.6. Circuit Diagram

V. FUTURE WORK

It can be decorate by developing this gadget for huge acres of land. Also the machine can be integrated to check the nice of the soil and the increase of crop in each soil. Designing a user friendly application that is without problems understandable for the farmers.

VI. RESULT

The benefits as mentioned like water-saving and laborsaving are required the maximum in current agricultural state of affairs. Consequently, its miles proved using the sensor networks again making clever irrigation. The information from IoT is dispatched to the client using cloud. Consequently, any versions inside the crop may be identified effortlessly and early analysis is achieved as such. The facts are in graphical shape so we will easily screen.

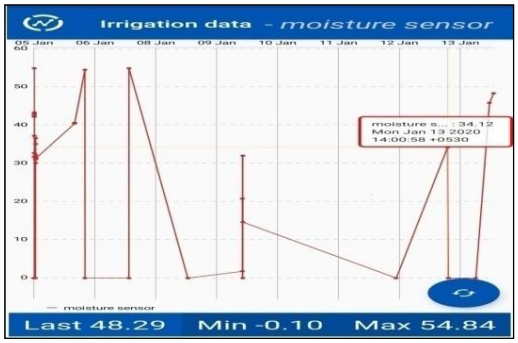

Fig.7. Moisture sensor data

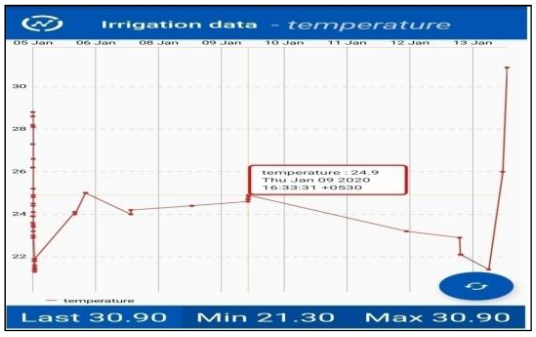

Fig.8. Temperature data

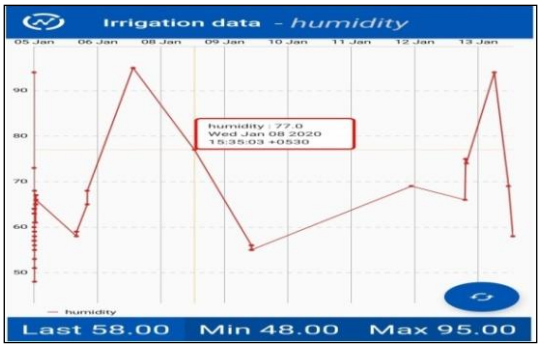

Fig.8. Humidity data

REFERENCES

[1]. IJACT: International Journal of Advancements in Computing Technology, 2.Vol. 4, No. 5, pp. 83-90, 2012.

[2]. Xun-yi Ren, Lin-juan Chen, Hai-shan Wan, "Homomorphic Encryption and Its Security Application", JDCTA: International Journal of Digital Content Technology and its Applications, Vol. 6, No. 7, pp. 305-311, 2012.

[3]. Ken Cai." Internet of Things Technology Applied in Field Information Monitoring", Advances in information Sciences and Service Sciences AISS, Vol.4, No.12, pp.405-414, 2012.

[4]. Zhao Xing, Liao Guiping, Shi Xiaohui, ChenCheng and Li Wen. "Construction of agricultural service mode in IOT and cloud computing environment" [J]. Journal of Agricultural Mechanization Research, Vol.4 pp.142-147, 2012.

[5]. Liu Hai, He Chaobo, Tang Yong, Huang ShiPing." Research and Application of Service-Oriented Scholar Cloud Platform", Journal of Convergence Information Technology JCIT, Vol.7, No.5, pp.333-339, 2012.

[6]. Harjit Singh Lamba, Gurdev Singh, "Cloud Computing-future Framework for e management of NGO's",

International Journal of Advancements in Technology, Vol.2, No. 3, pp.400-407,2011.

[7]. N. K. Walia, P. Kalra and D. Mehrotra, "An IOT by information retrieval approach: Smart lights controlled using WiFi," 2016 6th International Conference - Cloud System and Big Data Engineering (Confluence), Noida, 2016, pp. 708-712.

[8]. R. Shete and S. Agrawal, "IoT based urban climate monitoring using Raspberry Pi," 2016 International Conference on Communication and Signal Processing (ICCSP), Melmaruvathur, 2016, pp. 2008-2012.