

Solar Powered Smart Irrigation Using Iot

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ABSTRACT

The farming is one of the fundamental assets for creation of food and assumes significant part in the economy of each country by adding to the GDP. Consequently, extension, of water system has been a vital methodology in the improvement of agribusiness. Today, land owners have a few issues in agribusiness because of absence of downpours and shortage of water. So, in this task, we will carry out computerized water system framework for land lords that will save time, cost and so on Manual inclusion is needed for the farmland strategies. By utilizing soil dampness sensor levels of soil dampness/mugginess can be checked. At whatever point there is an adjustment of stickiness/dampness in the dirt this sensor detects the change and sends signal to the microcontroller and relying upon this the water system framework works. Robotized water system framework utilizes valves to turn the water pump ON and OFF. Engines can be robotized effectively by utilizing regulators and no need of manual intervention to turn engine ON and OFF.

Keywords:*Internet of things, Node MCU, Relay, Automatic water valve(AV).*

1 INTRODUCTION

Agribusiness assumes significant part for the economy of a country and the majority of farmers and average citizens rely upon the counterfeit cycle of applying controlled measure of water to land to satisfy their water prerequisites known as water system. For profitability horticulture, it is basic info and essential in agrarian, social and monetary development of the country. The vast majority of the water system frameworks are worked physically. These old-fashioned methods are supplanted with semi-robotized and mechanized procedures. Trench water system, dribble water system, terraced water system and sprinkler framework are the accessible conventional procedures. In light of expanded interest for higher farming efficiency, lackluster showing and diminished accessibility of water for agribusiness the worldwide situation of water system is ordered.

The most bountiful wellspring of energy is the sun. Creating power from the sun based energy through photovoltaic cells is as a rule generally utilized these days. Empowering the utilization of this energy-effective framework in different areas makes a gradually declining cost to develop the sun powered innovation. This application can be utilized in water system framework since it is a way delivering clean energy for the climate. There are numerous uses of the sun powered age framework to consider like water system

framework, animals watering and homegrown uses and a sustainable wellspring of energy on the planet. Sun oriented force age through PV module saves energy as well as a climate cordial alternative, which in since a long time ago run is financially savvy choice.

Need of Automatic Irrigation

- Easy to execute and design.
- Every framework can be computerized with assistance of clocks, sensors or PCs or mechanical apparent uses.
- Avoiding water system at some unacceptable periods of day, decrease overflow from overwatering immersed soils which will improve crop execution.
- Automated water system framework utilizes valves to turn engine ON and OFF. Engines can be mechanized effectively by utilizing regulators and no need of work to turn engine ON and OFF.

2 SMART IRRIGATION SYSTEM

Henceforth moving Water system is the counterfeit method of watering crops in fields. In the current period, water shortage due to over misuse have come about the inclination of building up another innovation that could save water from being squandered and since, farming is the most water burning-through occupation, consequently making water system framework shrewd would be a more brilliant method of checking water misfortune. Shrewd water system framework is a viable and proficient method of watering fields. It screens climate, soil conditions, dissipation and plant water use and consequently changes watering plan.

Towards brilliant water system framework has become a superb worry to give farmers a shrewd device which would uphold them in yielding quality harvests Since India is an agro based country and around 61% of absolute land in India is dependable to take care of around 1.3 billion populaces. India involves second position in rice send out and as rice crop require gigantic measure of water for water system reason, thus brilliant water system has monstrous significance in India.

In keen water system project, we utilize a few kinds of sensor to make a farmer forward-thinking about the field. Sensors utilized are soil dampness sensor, ultra sonic sensor and temperature sensor which can ascertain the measure of water utilized in the field, a dirt dampness sensor which can compute the dampness profile of the field to keep crops from water logging issues and a temperature detecting sensor, so one can check the temperature of the harvests since crops are temperature touchy as well and in the event that the savvy framework mindful the farmer previously, rancher can utilize sprinklers to chill off temperature of the yields it would save both yield and rancher.

Our methodology is to make this framework open from even far distance with the goal that farmer has the data and controls the irrigation system.

A. INTERNET OF THINGS

With the methodology of IoT in the keen water system framework, it will be advanced for water assets and plant creation. Additionally, the client can distantly screen the framework without being actual present in that specific region. The center IoT presents an assortment and handling of information through the Internet and can rapidly give quick activity for arising issues and change in the conditions.

Shrewd Farming for IoT driven agrarian Green Revolution which draws upon the utilizations of information driven examination on dependent on advancements like exact and precise organization for sensors and different gadgets. The mix of IoT makes an asset effective methodology that conveys more beneficial and reasonable in general creation proficiency.

The Internet has consistently been a methods for correspondence between individuals, however with the mechanical turn of events and changing prerequisites and way of life, this organization has become an instrument of correspondence between things, everything being equal, and estimates, and is known as Internet of things (IoT) therefore.

Quite possibly the most encouraging uses of IoT innovation is the robotized water system frameworks. The point is to favor an approach of the execution of remote sensor as an Internet of things gadget to build up a savvy water system the board controlled by sun based energy



Figure 2.1: Internet of things.

The above figure 2.1 shows the diagram of internet of things

B. RELAY:

A transfer is an electromagnetic switch for example used to kill on and turn a circuit by a low force.

The primary activity of a hand-off comes in where just a low-power sign can be utilized to control a circuit. It is additionally utilized in where just one sign can be utilized to control numerous circuits



Figure 2.2:Relay

The above figure 2.2 shows the electromagnetic switch(Relay)

C. ATMEGA328

The ATmega328 is a microcontroller that is executed on the single chip and produced by the Atmel in the megaAVR gathering of microcontrollers. The processor center of this module is eight-bit RISC (decreased guidance set PC) which has Harvard engineering with some modification. This engages framework originator to upgrade the gadget for power utilization as opposed to preparing speed.



Figure 2.3:Atmega328MicroController

The above figure 2.3 shows the chip diagram of microcontroller

D. NODE MCU

The NodeMCU (Node MicroController Unit) is firmware and hardware based on based on esp8266 which is low cost enabled microchip with tcp/ip stack and microcontroller capabilities.

The ESP8266 NodeMCU has total 17 GPIO pins broken out to the pin headers on both sides of the development board. These pins can be assigned to all sorts of peripheral duties, including ADC channel.

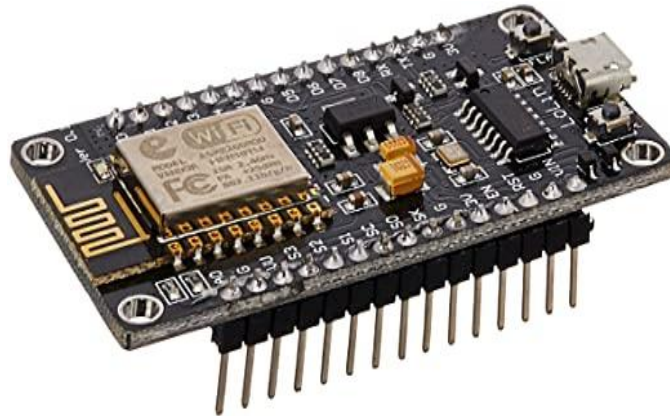


Figure 2.4: Node MCU

The above figure 2.4 shows the node MCU chip

3: LITERATURE SURVEY

In one of the existing works, The dirt dampness and mugginess sensors are set in the plant root zone. The microcontroller is utilized to control the inventory of water to the field dependent on the detected qualities. This framework doesn't inform the farmer about the field status.[1]

In another existing work, For getting high return from soil, soil boundaries like pH, dampness, dampness and temperature are estimated. This framework is completely mechanized which turns the engine siphon ON/OFF according to the degree of dampness in the dirt.[2]

The framework gets power from daylight however photograph voltaic cells .This framework doesn't rely upon power. The dirt dampness sensor has been utilized and PIC microcontroller is utilized to ON/OFF the engine siphon dependent on the detected qualities.[3]

The intricacies engaged with water system is handled with computerization framework utilizing microcontroller and GSM to make water system framework less complex. In light of the detected qualities from soil dampness, temperature and stickiness sensors, the GSM sends message to the rancher when these boundaries surpass the limit esteem set in the program. The supplement content in the dirt isn't controlled by this framework.[4]

An automated irrigation system where the humidity and temperature sensors are used to sense the soil conditions and based on that microcontroller will control the water flow. Farmer will be intimated through GSM. This system doesn't monitor the nutrient content in the soil.[5]

This project is designed to function as an automatic irrigation system which turns the pump ON/OFF depending upon the humidity content in the soil. The project uses ATMEGA328 microcontroller which is programmed to receive the input signal of varying moisture condition of the soil through the sensing arrangement. [7]

4: METHODOLOGY

In our proposed work, we have implemented the system in IOT. The IoT-based smart farming system uses real-time data to produce irrigation decisions. With the help of solar energy, a power supply is given to the Microcontroller. Sensors detect soil moisture, humidity and temperature and sends the data to microcontroller. If water is required to the field, the relay switch and water pump will ON and valve will open automatically and water is supplied to the field. Microcontroller data is stored in Things peak cloud with the help of WIFI module. Node MCU is a low cost open source IOT platform, it runs the wifi soc from Espressif systems. Using Blynk app ,the user can monitor and control the system.

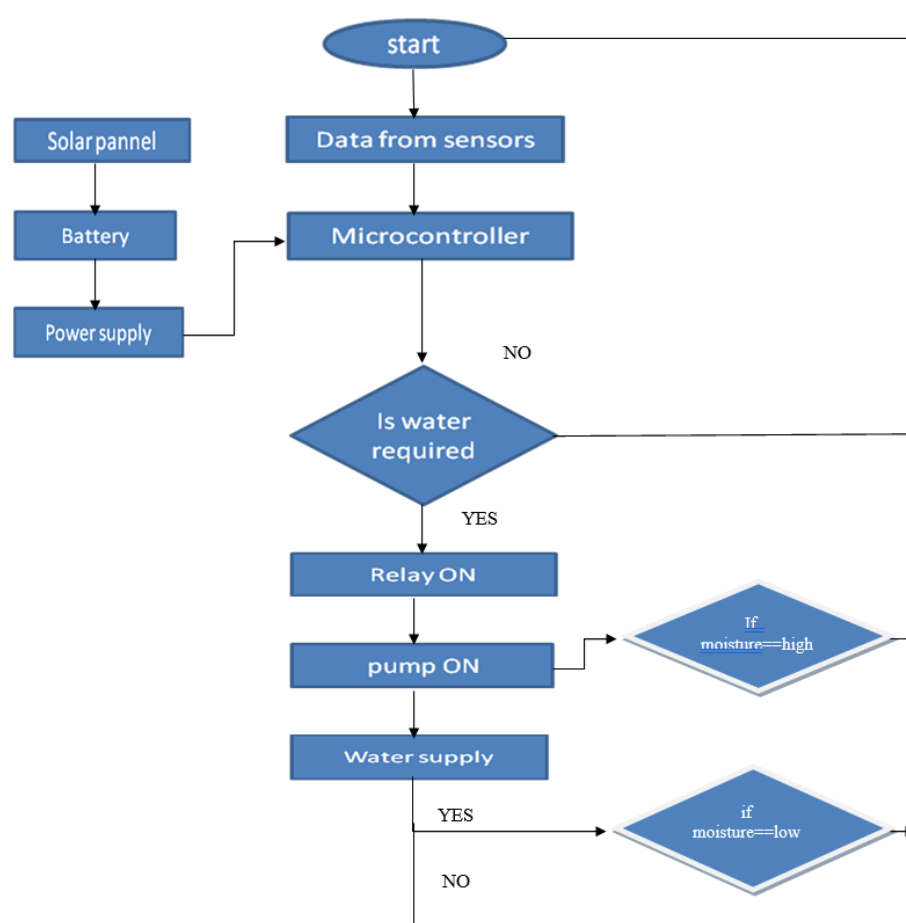


Figure 4.1: Flowchart of the smart irrigation system

The above figure 4.1 explains the flowchart of the proposed system

A. SOFTWARE USED

- Arduino IDE
- Embedded C

B. HARDWARE COMPONENTS

- Hard disk : 40 gb
- Ram : 2GB
- Processor: dual core/i3 4 core
- Atmega 328 microcontroller
- 16*2 LCD display
- Node MCU
- Temperature sensor
- Humidity sensor
- Soil moisture sensors
- Water level sensor
- 12V Adaptor
- Relays
- Water pump

5: BLOCK DIAGRAM

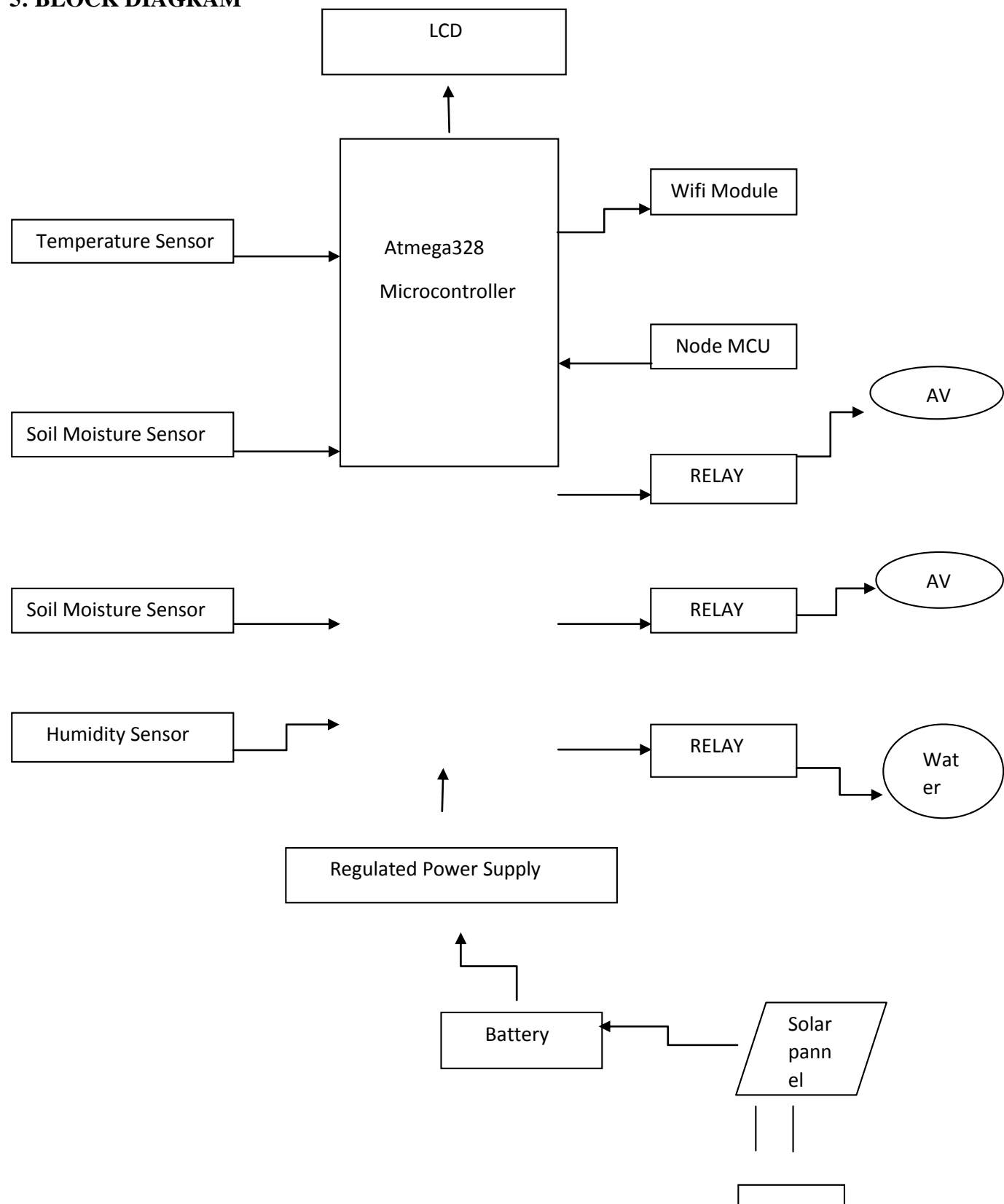


Figure 5.1 : Proposed system (Block diagram of solar powered smart irrigation system using IOT)

The above figure 5.1 shows the block diagram of the proposed system of solar powered smart irrigation using IOT

With the assistance of sunlight based energy. The power supply is given to the Microcontroller. The various sensors which we have utilized here are Temperature sensor, soil dampness sensors and moistness sensor. Each of the 3 sensors recognize the temperature, soil dampness and mugginess from the climate and sends the data to the microcontroller. All the qualities that are identified by the sensors are shown on the lcd display. Hand-off goes probably as an electromagnetic switch the initial two exchanges will help with sending water to the av1 and av2 zones with the help of semi solenoid valves and other hand-off helps with turning on the water siphon. Hub MCU runs an ESP8266 Wi-Fi SoC from Espress. Hub MCU has a specific Wi-Fi module. That proposes without an entirely striking stretch accomplice it to Wi-Fi with few lines of codes. All the information from microcontroller will be transport off thing talk cloud using Wi-Fi module. Utilizing blink application the customer can screen and control the structure.

6. RESULTS AND DISCUSSIONS

This framework gives a few advantages and can be worked with less labor. The critical strategies, for instance, lowered and over-water impacts the collect so proper proportion of water should be given. By examining the soil limits system water the property. Suddenness and temperature potential gains of an earth are appeared on a site page using cloud thoughts. These characteristics can moreover be seen to the customer through android application. With the help of robotization and web interface customer can without a very remarkable stretch screen the system and in view of this man incorporation is lessened. The used system refreshes the advancement of plants and besides save water.

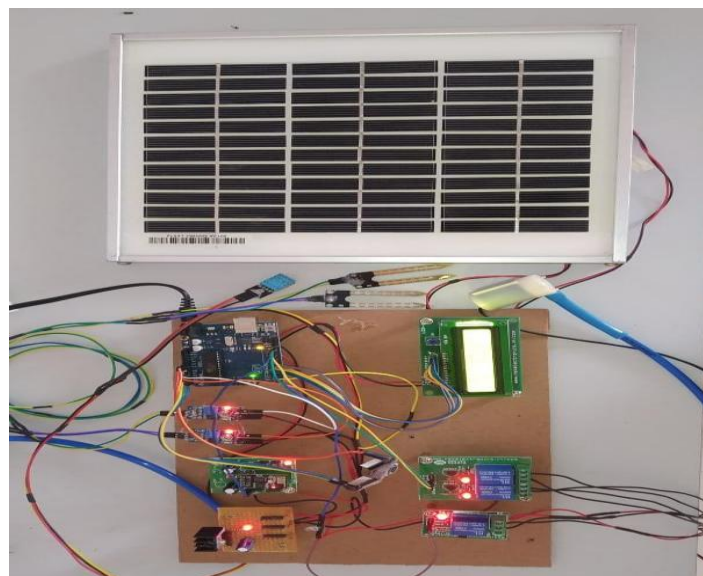


Figure 6.1 : Result of the proposed system

The above figure 6.1 represents the result of the proposed system

7. CONCLUSION

So this venture reasons that robotized water system framework will become solace and simple for the ranchers to work water system. The significant strategies, for example, under watering and over watering will influences the yield, so the legitimate measure of water ought to be provided. By investigating the dirt boundaries framework water the homestead. Soil dampness and temperature esteems are shown on a website page utilizing Thing talk cloud. These qualities can likewise be seen to the client through android application. With the assistance of mechanization and web interface client can without much of a stretch screen the framework and with the assistance of robotization and web interface client can undoubtedly screen the framework and because of this man association is decreased. The pre-owned framework redesigns the development of plants and furthermore save water.

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