ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

Smart Village: Solar Based Smart Agriculture with IOT Enabled for Climatic Change

Mr.K.Narsimhulu[1] P.Divya[2], M.Swetha[2], K.Prashanthi[2]
[1]Assistant Professor, Department of CSE,[2]Final year B.Tech. Students, Department of CSE,
Sreyas Institute of Engineering and Technology, Hyderabad, Telangana, India

ABSTRACT

Smart village is a intelligent system designed to help the farmer in agricultural development. In this process the device tells us about the water content in the soil whether it is dry or wet and it is notified to the farmer in a web application.By this the farmer can get a better yield and earn profits. Development of the country depends on the village development.In smart villages, access to sustainable energy services acts as a catalyst for development, enabling facility of internet connection for the new possibilities of increasing agricultural cultivation with proper information and guidance, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost farmer's income. The development of a country depends on the village's development. Most of the agriculture productivity suffer greatly with unforeseen change in climate. To ease for farmer understandings all the facts and information related to soil fertilization. In ancient Days Farmers used to figure the maturity of soil and predisposed reservations to develop which to kind of yield. Less concentration about the humidity, level of water and especially climate condition which terrible to a farmer increasingly The Internet of things (IOT) is remodeling the agri-business empowering the agriculturists through the extensive range of strategies, for example, accuracy as well as practical farming to deal with challenges in the field.
Keywords:IOT, WSN

1.Introduction

These IoT devices are operated either through solar panel or electric supply appropriately to balance the power requirement across the field. In smart villages, access to sustainable energy services acts as a catalyst for development, enabling facility of internet connection for the new possibilities of increasing agricultural cultivation with proper information and guidance,access to clean water, sanitation and nutrition, the growth of productive enterprises to boost farmer's income.The development of a country depends on the village's development. Most of the agriculture productivity suffer greatly with unforeseen change in climate.To ease for farmer understandings all the facts and information related to soil conditions.

It also provides large sample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods off arming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. Most of the papers signifies the use of wireless sensor network which collects the data from different types of sensors and then send it to main server using wireless protocol. The collected data provides the information about different environmental factors which in turns helps to monitor the system.

2.Problem definition

- In real time farmer should visit the field and check the soil moisture ,temperature,
    - humidity accordingly should on the motor for water.
- Accurate values cannot be known.
- Agricultural work is hard work. In the output we can find temperature , humidity , soil
- mositure
- If the temperature is less the motor is switched on
- If the soil moisture is less the motor is switched on
- If the humidity is less the motor is switched off.
- Demand of Labour for working in Agriculture increasing day by day.
- Labours are unaware about work; farmers also need labours to increase their production as both are dependent on each other hence, it is necessary to have a bridge between them.
- In the case of traditional irrigation system water saving is not considered. Since, the water is irrigated directly in the land, plants under go high stress from variation in soil
- moisture, therefore plant appearance is reduced. The absence of smart irrigation
- system result in improper water control system. The major reason for these limitations is the growth of population which is increasing at a faster rate.

At present there is emerging global water crisis where managing scarcity of water has become a serious job. This growth can be seen in countries which have shortage of water resources and are economically poor. So this is the serious problem in agriculture area. So we want to design an Smart Irrigation System which is based on Wireless sensor using arduino microcontroller that operate automatically by sensing the moisture content of the soil and turn ON/OFF the pump using relay without the intervention of farmer and hence save water.

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

2.1.Objective of Project

- Sensors are used to know the moist dryness and wetness of the soil.
- A wifi module helps in transfer of information to the farmer
- A web application is notified when soil is dry and water supply motor is switched on.
- A web application is notified when soil is wet and water supply motor is switched off.In the output we can find temperature , humidity , soil mositure
- If the temperature is less the motor is switched on
- If the soil moisture is less the motor is switched on
- If the humidity is less the motor is switched off.

3.Literature Survey

It reviewed the variations of WSNs (Wireless sensor network) and their potential for the advancement of various agricultural application improvements. It features the main agricultural and cultivating applications, and examines the appropriateness of WSNs towards improved performance and profitability. It groups the system architecture, node architecture, and communication technology norms utilized in agricultural applications. **Cosmin (2014) :** This investigation demonstrates that there is an unquestionable growing tendency in the adoption of artificial intelligence in agriculture. Computerized expert systems cover a broad area of farming but their number and complexity vary considerably from country to country. Underdevelopment of the IT infrastructure in many countries is the firstobstruction in using them, only around 30% of the world population currently having access to these new technologies.

3.1.Existing System

- In real time farmer should visit the field and check the soil moisture ,temperature, humidity accordingly should on the motor for water.
- One farmer may not be able to look after the entire farming area needs labour for the various purposes.

4. Proposed System

- Sensors are used to know the moist dryness and wetness of the soil.
- A wifi module helps in transfer of information to the farmer

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

- Through web application farmer get notified about the status of motor whether it is switched on or off
- In the output we can find temperature , humidity , soil mositure
- If the temperature is less the water supply motor is switched on
- If the soil moisture is less the water supply motor is switched on
- If the humidity is less the motor is switched off

4.Architecture

Charging circuit is used to charge the battery which is rechargeable.This can be charged in 2 ways they are through the solar panel and through the main supply(electricity).We have arduino as a micro controller which can record the temperature , humidity , soil moisture . Whenever the soil is wet the relay breaks down as the water is good conductor of electricity. IOT wifi is used to transfer the information without the human interaction.IOT application shows wheather the water supply motor is off or on and also temperature , humidity , soil moisture in the soil.Finally the values are stored on to the server from the micro controller.

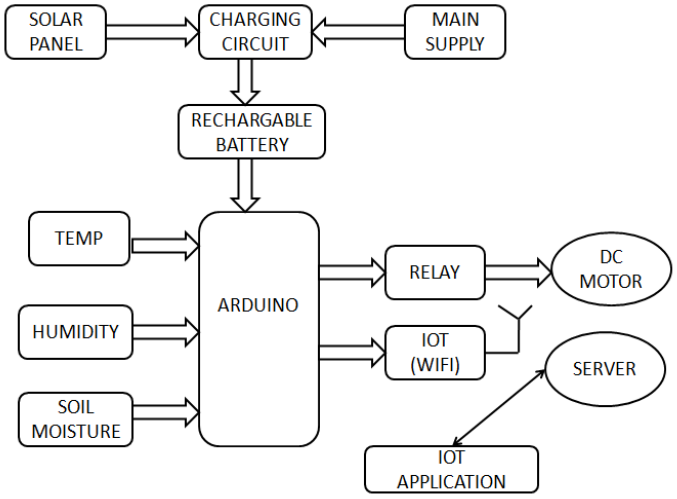

Fig 1:Architecture

5.Implementation& Results

5.1.Technologies Used Embedded Systems

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

Embedded systems are designed to do some specific task, rather than be a general-purpose computer for multiple tasks. Some also have real time performance constraints that must be met, for reason such as safety and usability; others may have low or no performance requirements, allowing the system hardware to be simplified to reduce costs. Wireless communication has become an important feature for commercial products and a popular research topic within the last ten years. There are now more mobile phone subscriptions than wired-line subscriptions. Lately, one area of commercial interest has been low-cost, low-power, and short-distance wireless communication used for \personal wireless networks." Technology advancements are providing smaller and more cost effective devices for integrating computational processing, wireless communication, and a host of other functionalities. These embedded communications devices will be integrated into applications ranging from homeland security to industry automation and monitoring. They will also enable custom tailored engineering solutions, creating a revolutionary way of disseminating and processing information. With new technologies and devices come new business activities, and the need for employees in these technological areas. Engineers who have knowledge of embedded systems and wireless communications will be in high demand. Unfortunately, there are few adorable environments available for development and classroom use, so students often do not learn about these technologies during hands-on lab exercises. The communication mediums were twisted pair, optical fiber, infrared, and generally wireless radio.

5.2.Solar Panel

- A solar cell (also called photovoltaic cell) is a solid state device that converts the energy of sunlight directly into electricity by the photovoltaic effect.
- Assemblies of cells are used to make solar modules, also known as solar panels.
- The energy generated from these solar modules, referred to as solar power, is an example of solar energy.

5.2.1.Advantages:

- They have no moving parts and hence require little maintenance and work quitesatisfactorily without any focusing device.

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

- It does not cause any environmental pollution like the fossil fuels and nuclear power.
- Solar cells last a longer time and have low running costs Low power consumption.
- Conservation of energy.
- Utilization of free available source of energy from sun
- Storage of energy into rechargeable battery.
- Stored energy is used for grass cutter.
- Motor automation.
- High efficiency can be achieved with relay switch.
- By using this project we can save more power. That is we can reduce the wastage of power.
- Here no need of man. The circuit itself checks the presence of vehicle and also checks weather it is day or night time. Once we switch on the circuit it automatically performs all this actions without manual operation.
- At night time also whenever vehicle comes at that time only light brightness increases after few seconds it will come to normal position that is decreases light brightness.
- It is the most advantage of this project. For these all reasons in future this project may be used in all streets to save power.

Fig 2: Solar Panel

6.Output screens

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

Fig 3:status report

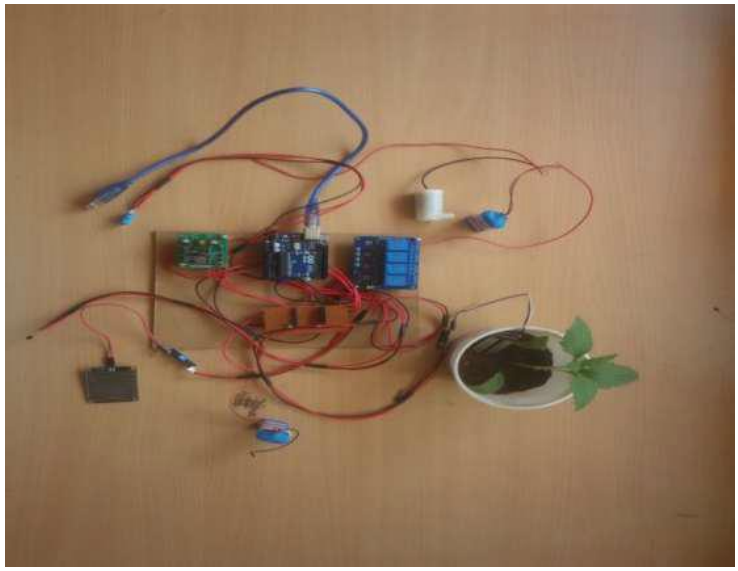

Fig 4:solar based smart agriculture with IOT

6.1.Design of Test cases

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

No. of Test Cases	Objective
1	Checking if all the libraries are working properly or not
2	Checking all the libraries are running according to the requirement.
3	Checking if the moisture value is being detected analog or digital
4	To check the value of temperature is accurate

Table1:Test case#1

Module name: user

S. No	Test Case	Input	Expected Output	Actual Output	Pass/Fail
1.	View status	Request for status	Status will be displayed	Status will be displayed	Pass

Table2:Test case#2

Module name: Microcontroller

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

S. No	Test Case	Input	Expected Output	Actual Output	Pass/Fail
1.	Read teampurature sensor	Retrieve remaining balance	Values must be retrieved successfully	Values retrieved successfully	Pass
2	Read humidity sensor	Retrieve remaining balance	Values must be retrieved successfully	Values retrieved successfully	pass
3	Read soilmoisture sensor	Retrieve remaining balance	Values must be retrieved successfully	Values retrieved successfully	pass
4	Motor on/ off	Push the motor on/off button	Motor on/off successfully	Motor on/off successfully	pass

Table3:Test case#3

Module name: IOT

S. No	Test Case	Input	Expected Output	Actual Output	Pass/Fail
1.	Retrieve data	values	Message must be send successfully	Sent successfully	Pass
2.	Store in server	Values	Must be successfully sent	Sent success	Pass

Table4:Test case#4

7.Conclusion

Irrigation can be defined as artificial implementation of water in agriculture and is regarded a very significant constituent of agrarian activity. Irrigation comes in many forms. Old technologies are rapidly being replaced by more efficient means of transporting water and applying it to the soil. Moreover, there are many different types of irrigation systems, depending on how water is distributed throughout the field like surface irrigation, sprinkler irrigation, drip irrigation and sub-irrigation.A network of small devices which collect and process real time information from the fields in which they are deployed. The use of this technique makes the

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

irrigation system independent of human intervention in terms of precise quantification, location and time of irrigation, and thus the establishment of an automatic irrigation system, which is known as the smart irrigation system for this reason.

8.REFERENCES

1. Tamoghna Ojhaa, Sudip Misra, Narendra Singh Raghuwanshi Wireless sensornet works for agriculture: The state-of-the-art in practice and future challenges, Computers and Electronics in Agriculture 118 66– 84,ELSEVIER,2015
2. IbrahimMat,MohamedRawideanMohdKassim,AhmadNizarHarun,IsmailMatYusoffIoTi n Precision Agriculture Applications Using Wireless Moisture Sensor Network, MIMOS, Ministry of Science, Technology and Innovation, KualaLumpur, MALAYSIA (2016) IEEE Conference on Open Systems(ICOS), October 10-12, 2016, Langkawi,Malaysia).
3. Ojas Savale,Anup Managave,Deepika Ambekar, Sushmita Sathe Internet of Things in Precision Agriculture using Wireless Sensor Networks., Internet of Things in Precision Agriculture using Wireless Sensor Networks
4. Ahmad Nizar Harun,Mohamed Rawidean Mohd Kassim,IbrahimMat,SitiSarah Ramli Precision Irrigation using Wireless Sensor Network, MIMOS (2015 International Conference on Smart Sensors and Application(ICSSA))
5. Nikesh Gondchawar1, Prof.Dr. R. S. Kawitkar, IoT based Smart Agriculture, International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 6, June2016(IJARCCE)
6. Prathibha S R, AnupamaHongal, Jyothi M P, Iot Based Monitoring System In Smart Agriculture,2017 International Conference on Recent Advances in Electronics and Communication Technology
7. Mohanraj I, Kirthika Ashokumar, Naren J, Field Monitoring and Automation using IOT in Agriculture Domain,6th International Conference On Advances In Computing Communications,ICACC2016,6-8 September 2016, Cochin, India
8. V.Ramachandran,R.Ramalakshmi,and Seshadhri Srinivasan, An Automated Irrigation System for Smart Agriculture Using the Internet of Things,2018 15th InternationalConference on Control, Automation, Roboticsand Vision (ICARCV) Singapore, November 18-21,2018

ISSN: 2278-4632
Vol-10 Issue-5 No. 6 May 2020

9. Managing Asian Cities: Sustainable and inclusive urban solutions, Asian Development Bank Report, Asian Development Bank, 2008, Publication Stock No. 050608, ISBN 978971-561-698-0, 2008.
10. Viswanadham N., Vedula Sowmya,.Design of Smart Villages ,INDIA Moving up the Service Chain, 2010.
11. TERI Draft Rajasthan State Action Plan on Climate Change New Delhi: The Energy andResources Institute, 2010.

