Solar Based Smart Irrigation System Using Internet of Things (IoT)

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Abstract- ***In smart irrigation, 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. Therefore, farmers need to get appropriate information's if any sudden climatic disruption occur, it should notify on time to avoid any major damage in agricultural field. As part of the smart irrigation concept, an intelligent system is designed that may help a farmer to get basic facilities/infrastructure by agricultural development. Here an intelligent system is proposed on the fact of farmers getting all relevant details about the improvement in fertilization of soil and agriculture by delivering climate change information's through an IOT (Internet of Things) devices. These information's could be handled through website and mobile phones. To ease for farmer understandings all the facts and information related to soil fertilization and climatic alerts are delivered as per their native language / language of their interest. This system may help its members to collaborate and take it to another level of requirement in improving their production capacity. These IOT devices are operated either through solar panel or electric supply appropriately to balance the power requirement across the field.***

Indexed Terms- ***Internet of Things, Data Collection, Database, Monitoring Platform, Solar System***

I. INTRODUCTION

Village equipped with all the modern technology without destroying the nature can be defined as smart village. The system consists of centralized microprocessor interfaced with many sensors for making the villages cleaner and smarter. The system aims to bring smartness in four different aspects of any village such as digital display of the government subsides and offers to farmers, smart garbage management, intensity-based street light monitoring and digital water supply system. The internet of things (IOT) is recent communication paradigm that envisions a near future in which the objects of everyday life will be equipped with microprocesser, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the internet. The IOT concept, hence, aims at making the internet even more immersive and pervasive. Agriculture Field plays a major role in Agriculture were all the crops are grown. To sense the soil, a soil moisture sensor is used. Soil moisture sensors measure the volumetric water content in soil. It measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity.

II. LITERATURE SURVEY

"This paper elucidates the research and implementation of IoT based Smart Village. IoT

(Internet of Things) is a structure which provides an exclusive identity and ability to relocate the data over a network without requiring two way handshaking from human-to-human. It enables the path to connect anytime, anywhere, with anything and anyone ideally using any network topology with a specify service. Hence the divergence on the scenario of a „Smart Globe" has emerged to mean many things to many people. Meaning of "Smart" utilizes sensitive information and communications technology (ICT) remains consistent with the Internet Technologies to address rural challenges. To bifurcate the ideal scenario on the basic occupation of agriculture, the ecosystem control technology and system becomes mature having high level of intelligence. This puts precise significance on efficiency, high quality, secure and sustainable production of facility agriculture. That makes a glance of a smart irrigation as a smart farming, ultimately converging into a „Smart Village". This is all about the outsourcing application, technology and wonders of 1IoT (Internet of Things)

III. METHODOLOGY

This work will be developed The Smart Village concept, Solar Based Smart Agriculture With Iot Enabled For Climatic Change And Fertilization Of Soil integrates with Internet of things (IOT) which is a revamping the agri-business engaging the farmers by the broad assortment of techniques, for instance, accuracy and conservative cultivation to go up against challenges in the field. IOT advancement aids in social affair information on conditions like atmosphere, temperature and productivity of soil, nutrients in the soil, level of water in to the field of cultivation . IOT utilize farmers to get related with his residence from wherever and at whatever point. Remote sensor frameworks are used for checking the farm conditions and little scale controllers are used to control. Use Of Wireless sensor Networks In Precision Agriculture In this project As its name suggests, Precision Agriculture is exact in both the extent of the product territory it screens and in addition in the conveyance measures of water, compost, and so forth. This innovation can separate a solitary plant for checking in the tens or several square feet. The WSN framework requires a brought together control unit with UI via Blynk App. Exactness Agriculture requires a novel programming model for each land territory, the characteristic soil write and the specific harvest or plants. For instance, every area will get its own particular ideal measure of water, compost and pesticide. It's by and large prescribed that information gathering be done on a hourly premise. Visit information gathering doesn't give extra helpful data to the product show and turns into a weight to the Wireless Sensor Network as far as power utilization and information transmission. Less continuous observing might be satisfactory for certain moderate development harvests and regions that have extremely steady, uniform atmosphere conditions.

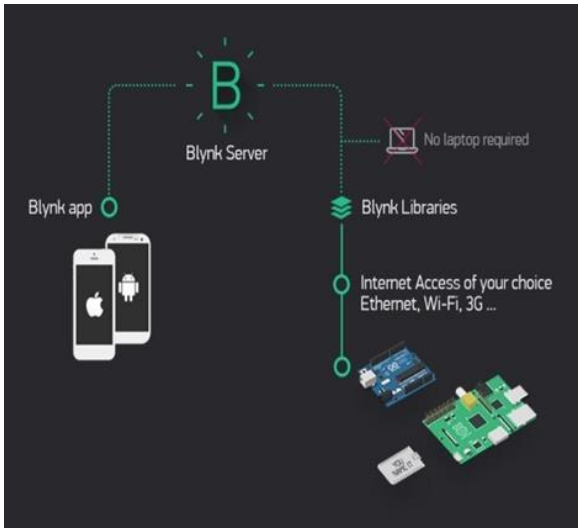

Figure 1. Block diagram of IOT mechanism

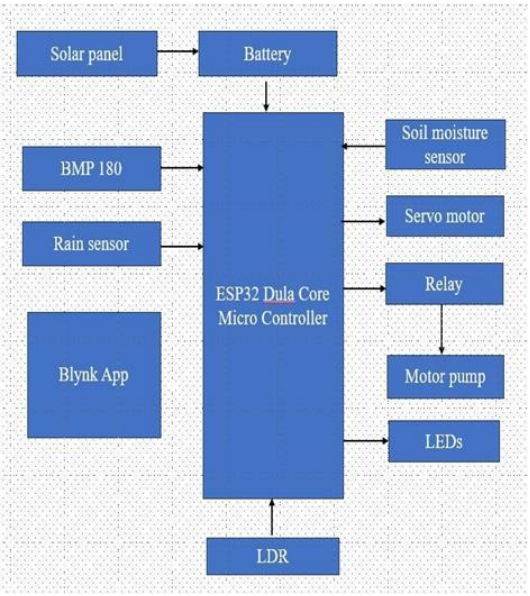

Figure 2. Block diagram of smart irrigation system using IOT

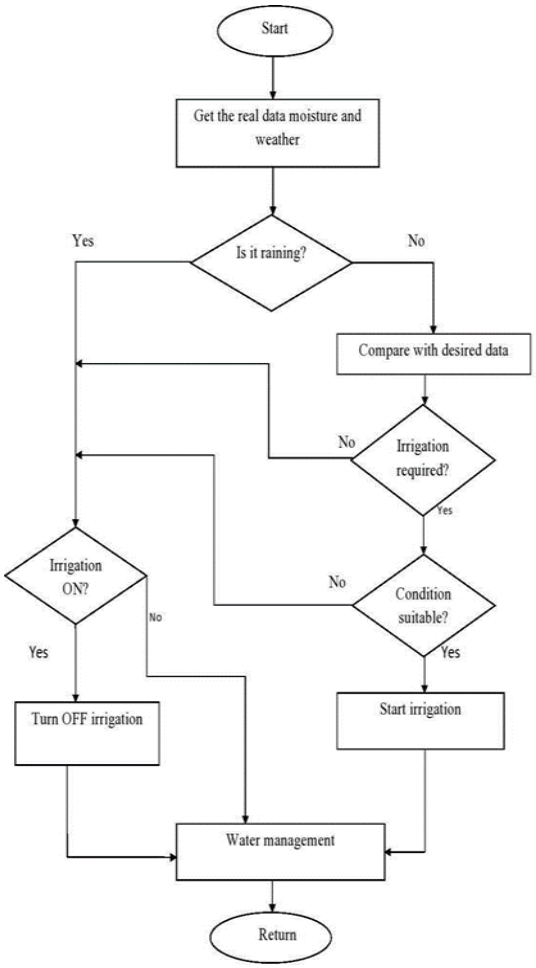

Figure 3. Flowchart of smart irrigation system

IV. RESULT

The working of system is that it will collect real data from different sensors connected to the system regarding to moisture and weather condition and check about rain. If the desired data is not match with collected data then identified whether it required irrigation or not level is low Now if it required the irrigation, turning on the pump and checking the actual data with desired data after some finite interval. If data is match, the system will stop irrigation by turning off pump. In rainy day most of time irrigation is not needed but in winter most of time system will turn on and off the irrigation. While in summer it required more water so most of time system is on.

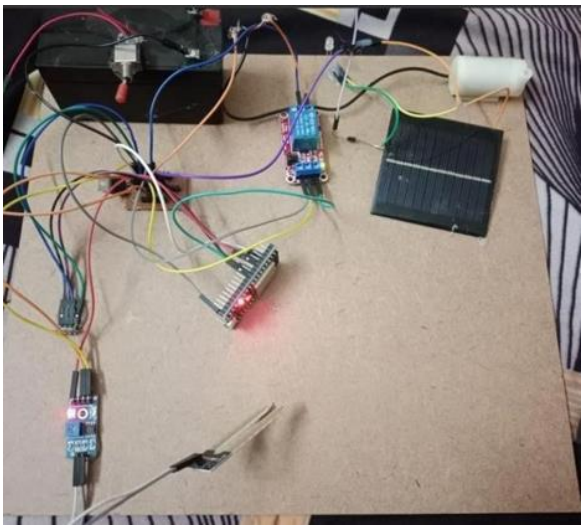

Figure 4. Connection of entire project kit

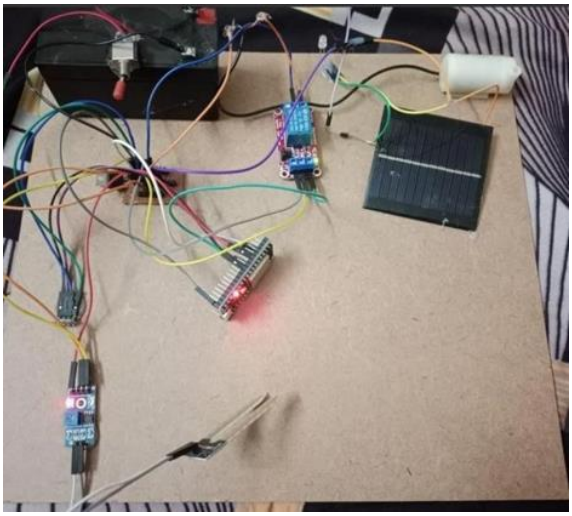

Figure 5. motor will pump water whenever moister level is low

CONCLUSION

A smart irrigation system is best system that can help to detect and measure, and control the amount of water in the soil accurately because it uses sensors that can detect the plant's water needs and satisfy them. The system is basically to control the amount of water that is supplied to the plants and to ensure each plant has enough water and to protect plants from dying by using a humidity sensor, a temperature sensor, a moister sensor and a timer using renewable energy PV system. The device will work as a control system and sense the rate of water, temperature and humidity of plants as well as to detect wither the plants are dry or how much

of water is needed. Its purpose is to save the huge amount of water that goes to waste and to save money. Its goal is to protect plants are dying due to many reasons such as dryness, excessive water and high temperature. The project is accessible, its energy renewable and sustainable, inexpensive and portable, and its components are simple and small. This model is to be implemented for carrying out organic farming in the field areas in colleges. The connectivity will be provided with different fields using the same server. Further it will be extended to other field areas bringing the irrigation under control for a large network. On adding drip and center pivot irrigation technologies would enhance the efficiency of the system. The inventive system will enhance the yield production and improve the economic condition.

FUTURE SCOPE

- Sensors like fire detection sensor can be added to safe guard the yield by any fire accidents.
- To avoid top soil erosion, addition of rain gun device can be added to sprinkle the water.
- This system can be developed by using renewable energy which is solar power to run the "single board computer (SBC)" i.e. raspberry pi, using solar energy will help to reduce future cost.

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