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Solar Based Smart Irrigation System Using IOT

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ABSTRACT: Smart irrigation system is a very good example of Internet of things. Nowadays the supply of power and water is insufficient to satisfy the farmer's needs, hence drip irrigation is one among the efficient irrigation method that saves water and fertilizer by allowing the water to drip slowly to the roots of the plants, either into the soil surface or directly on to the basis zone through a network of valves, pipes, tubing and emitters. This system is suitable for all crops and also the demand for power is rising faster than the demand can be met (power crisis), as the need increases power saving actions of every one will make a significant difference. Throughout the planet , irrigation schedules are supported farmer's experience and changes consistent with weather fluctuation which may be handled by smart irrigation system. So this method may be a cost effective and controlled one in terms of power and waste

KEYWORDS: Smart irrigation, IOT, Efficient irrigation, Power saving

I. INTRODUCTION

Agriculture is that the primary occupation in our country for ages. But now due to migration of people from rural to urban there is hindrance in agriculture. There are many techniques available for the precision agriculture to watch and control, environment for the expansion of the many crops. Due to unequal distribution of rain water, it is very difficult to satisfy the requirement needed by farmer to manage the water equally to all the crops in whole farm so it requires some irrigation method that suitable for any weather condition, soil types and variety of crops. So to beat this problem we choose smart agriculture techniques using IOT. Agriculture is that the major source of income for the most important population in India and is major contributor to Indian economy. However, technological involvement and its usability have to be grown still and cultivated for agro sector in India. Although few initiatives have also been taken by the Indian Government for providing online and mobile messaging services to farmers related to agricultural queries and agro vendor's information to farmers. Based on the survey it is observed that agriculture contributes 27% to GDP, and Provides employment to 70% of Indian population. IoT is changing the agriculture domain and empowering farmers to fight with the huge difficulties they face. The agriculture must overcome expanding water 2 deficiencies, restricted availability of lands, while meeting the expanding consumption needs of a world population

II. SYSTEM MODEL

In this project, four categories are proposed. One involves the information about temperature, humidity, soil moisture in the farm field to the farmers through IOT. Another category involves water management system which informs the farmers about water flow over the farm field based on required quantity after sensing the moisture content in the soil. Third category involves ultrasonic sensor which is used to identify the plant growth. And also detect the water level during rainy season through water level detector and pump out the excess amount of water to the tank. Fourth, energy harvested by solar panel for irrigation, and to monitor the power from solar panel.

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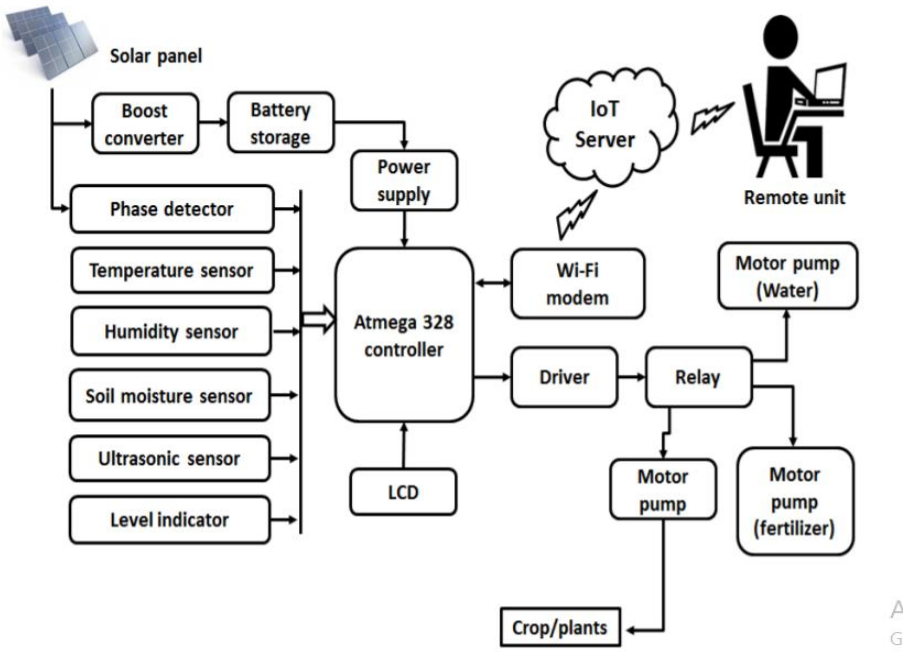
BLOCK DIAGRAM



III. ANALYSIS AND DECISION MAKING

Based on the sensed values, decision **is formed** by the microcontroller. As an initial step, the software for the controller must be configured. Before reading the analog inputs from the sensors, **the edge** values **for every** parameter must be predefined. The moisture threshold value is set to 800 units in this project. The threshold temperature value is 24 degree Celsius. The EC value ranges from 5.5 to 6.5 units. The sensors are connected to the respective pins of the microcontroller. The software implementations includes simple coding in C language. The controller first checks for the moisture value. When the moisture goes above 800, then it checks for the temperature. When the temperature is below the threshold value it means that plant can sustain for few more days without water. But if it goes above **the edge** value, the plant must be irrigated.

IV. WORKING OPERATIONS

A photovoltaic cell , or solar cell , is an device that converts the energy of sunshine directly into electricity by the photovoltaic effect. Boost converter, is used to boost the voltage from solar panel and stored in battery. Battery is used to store energy and gives supply to all units. In this project used ATMEGA 328 microcontroller, which acts as a processor for the arduino board. It consists of 28 pins, the inputs can be controlled by transmitting and receiving the inputs to the external device. It also consists of pulse width modulation (PWM). Temperature sensor LM35 is used to measure the temperature. Soil moisture sensors measure the volumetric water content in soil. Humidity sensor SY-HS-220 is used to sense the humidity of the air in the atmosphere. Level sensor is used to measure the water level. Ultrasonic sensor is used to identify the plant growth. Solar panel power also measured and is given to controller. Controller receive the sensor data and take action through webpage via IOT at remote location. Wi-Fi is used to as communication between controller and webpage. Controller to control the pump through driver unit. driver used ULN2003. it is used to drive the motor through relay. Relay is act as a switch. LCD use 16*2 LCD display. which use to display the our project title message and information message

V. OUTPUT ANALYSIS

- Minimum use of available water.
- Low labour and relatively low operation cost.
- No soil erosion. ϖ Maximum Crop yield.

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- The output reading is accurate and each value is regularly updated.
- Less evaporation losses of water as compared to surface irrigation.
- Improved infiltration in soil of low intake.
- No runoff of fertilizers into ground water.

VI. CONCLUSION

Agriculture is the main aspects of development countries like India. Due to lack of rainfall and draining of water resources, we need to save water for future. This can be overcome by using automatic drip irrigation. This project is mainly focus on automatic drip irrigation and security control. By using this concept agricultural development in our country is increased with less water usage and also make a green environment without any interruption.

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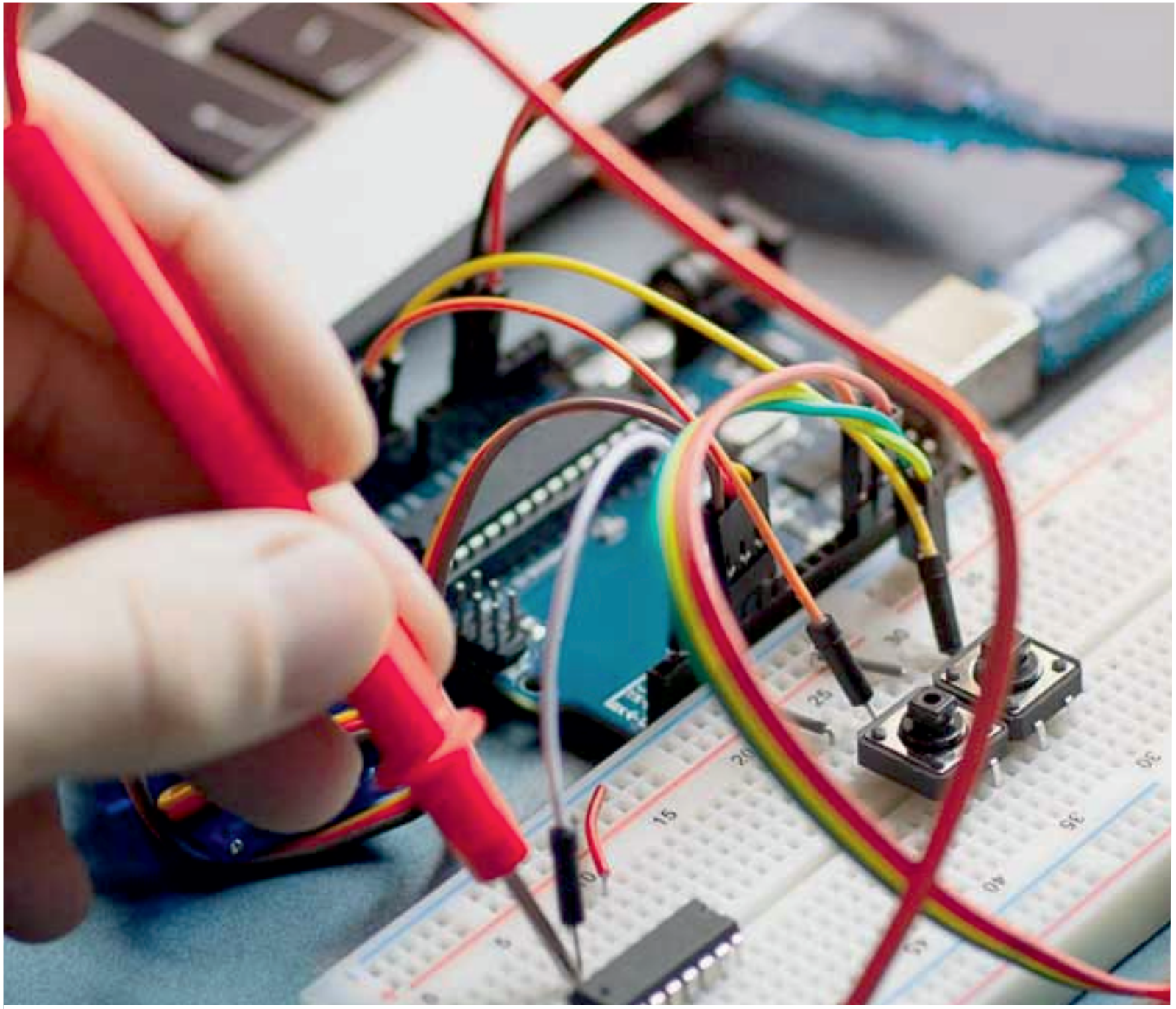

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