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IOT BASED SMART IRRIGATION SYSTEM:

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Abstract: *Our country India is a nation where 58% of its population is engaged in farming, a process through which we get all the ingredients, used by us to sustain our lives. But due to the increasing population leads to growth in demand and on the other hand scarcity of water resources which is one of the most crucial part in farming, need new revolutionary techniques are needed. We are trying to bridge gaps between the cyber and physical worlds, with the help of IOT (Internet of Things) solution in irrigation system. The proposed system work on several algorithms, which sense the data from weather forecast parameters like air temperature humidity and sunlight for next few days. It also monitors the soil Parameters like soil moisture, temperature and air moisture and decision is controlled by microcontroller. This irrigation system is useful in field where there is limited water resource, smart irrigation also helps in increasing of yield.*

***Index Terms*- Internet of things (IOT), Air temperature sensor and air moisture sensor.**

I. INTRODUCTION

In our era instead of using old conventional agricultural practices for better productivity. In many part the groundwater, water resources are wasted which result in declination of water. From last decade, farmers are using new technologies and software to manage all their financial transaction with other people and keep the track of the corps perfectly even form a distance [1]. In the 21 century were internet is used widely as it plays an important role in today's life, agriculture is changing from conventional mode to software mode where data is stored from different sensors and equipment placed in field (eg :- farm machinery) information is later used to enhance their yields[2]. New system will allow us to operate the bottom to switch ON/OFF from home or the places where farmers is present as switches can be managed from phone. Sometimes in large fields sensed data of one area is not sufficient because it's mandatory to distribute number of sensor nodes and scattered pumping units to pump water to the places covered by sensor units. Automatic irrigation system provides low-cost moisture sensor.

2. LITERATURE SURVEY

2.1 WSN and GPRS module in software-based irrigation system
WSN and GPRS module used in automatic irrigation system to make the best use of water without wanted in agriculture [3]. In this system it is wireless throughout as distribute wireless sensor network with soil moisture and temperature moisture in WSN data is transferred towards the base station by sensor with the help of a gate way units and further commanding the actuator for irrigation control and arrange data of sensor unit algorithm is placed in system for controlling water quality as per requirements and condition of field. Micro controller is programmed which sends command through actuator to control water quality through valve unit the whole system is working on photovoltaic panel. Communication takes place in cellular network mode. Web pages manage all scheduled programming and continuously monitor of irrigation.

2.2 WSN based crop monitoring Bluetooth technology is used for crop monitoring by farmers for agriculture this technology is used farmer to operate his whole farm form remote location with the help of Internet of things. Sensor network is used and energy saving algorithm is used for saving energy. To collect data from mode to base station by using tree-based protocol. There are two modes; one is used for capturing image of crops .The environmental changes are not considered for sensor reading.

2.3 WSN and data mining algorithm data mining algorithm are basically used for making decision on drip irrigation system. In drip irrigation system the WSN is placed in different places all over the farmland and sensor are placed over there [4] WSN uses, and hoc network helps in stabilizing self-configuration and improve flexibility. Data is received using Zigbee as sensor.

Data is passed to base station. Decision is made at base station decision is made at base station because data is processed in base station. Algorithm works on previous data so if there is interruption in data then result is zero [5]. Irrigation control is done by naïve bayes algorithm.

3. COMPONENTS

3.1 Arduino Microcontroller

Arduino is an open-source electronic prototyping platform based on easy – to – use hardware and software [6][7] the Arduino – uno is a micro controller board based on the A.T. mega 328. It can direct input – light on sensor by button – turn it into an output, it activates the motor which further result in turning ON the LED. It is system on a chip, basically single integrated circuit. It has more than one CPOs with memory and programmable input / output peripherals. They are used in implantable medical devices, remote controls and other embedded system [4]the Arduino IDE software is used in which band is measured of how many times the hardware can send O's and I's in a second .

3.2 Sensors

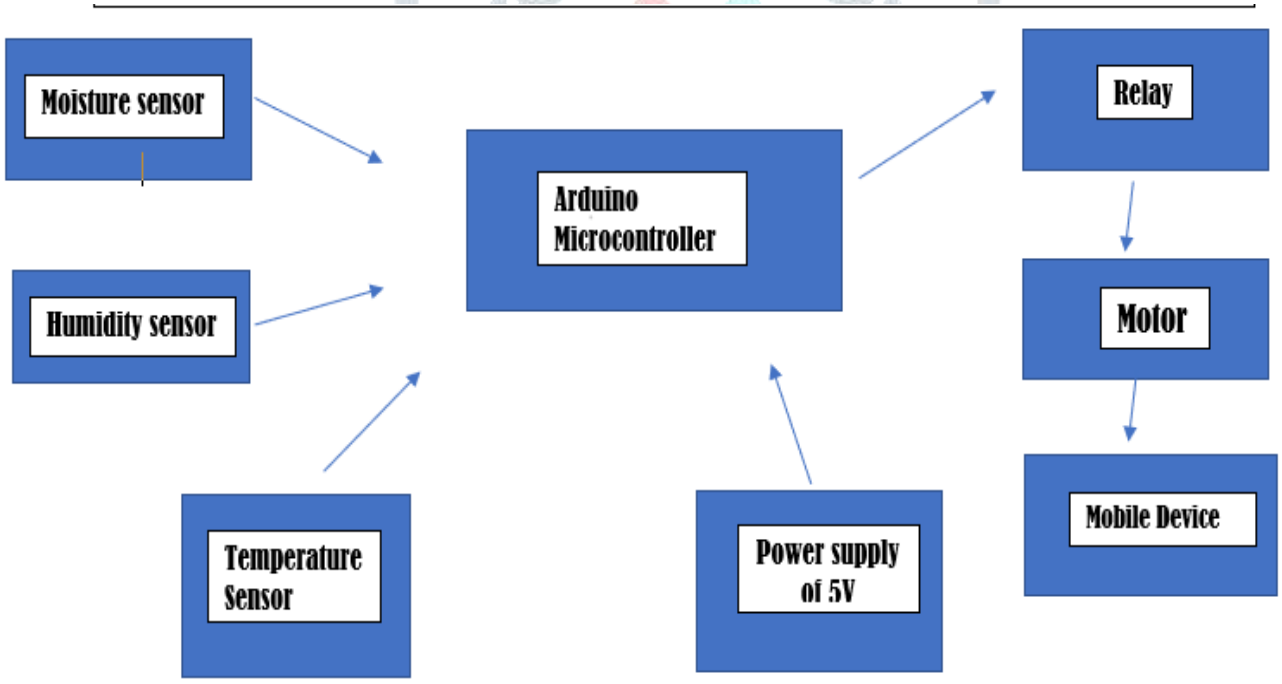
There are two sensors used in system, one is soil moisture sensor and second is temperature and humidity sensor

3.2.1 Soil moisture sensor

Soil moisture sensor measures the volumetric water content in soil [5] the gravimetric measurement of free soil moisture require whole process of removing , drying and weighing of a sample but indirectly it measure the volumetric water content by using some different properties of soil , such as dielectric constant and interaction with neutrons as a proxy for the moisture content it measure soil and gives result by two parameters first by reading resistance of soil for moisture level and electric conductivity as if the soil is dry then more resistance in soil but if soil have sufficient amount of water then soil will have less resistance.

3.2.3 Bluetooth wireless technology

Bluetooth is widely used for connecting phones Laptops and other portable devices, it provides ease of accessibility, higher speed and low power microwave wireless linked technology. Bluetooth does not work on line of sight and it uses modification of wireless LAN technology but it has a benefit as its of small size and low cost is prototype circuits have circuit board of 0.9 cm^2 with the smaller single chip version. this technology is embedded timely, inexpensive, short range transceivers and it operates on radio band of 2.45 GHz and works on speed up to 721kbps . Bluetooth won't drain battery life and it can be protected from radio interferences by frequency happening. Bluetooth technology uses radio waves instead of wires to connect with a device.



BLOCK DIAGRAM OF AUTOMATIC IRRIGATION SYSTEM [15]

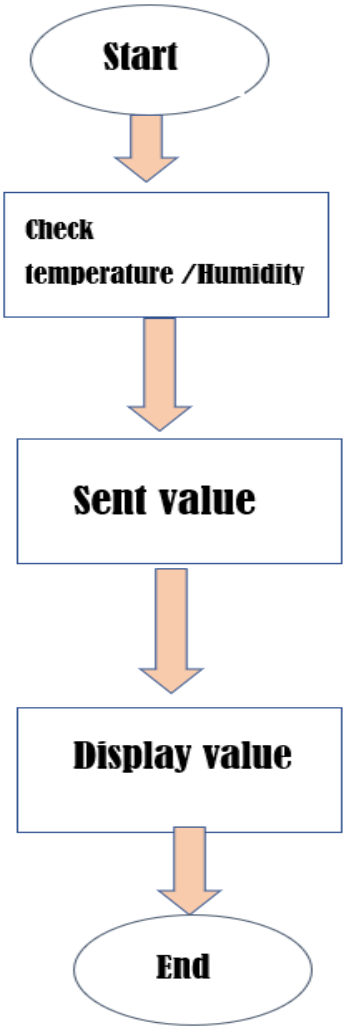
PROPOSED SYSTEM

To get maximum crop yield , the irrigation is automated by using Arduino board which is further connected to soil moisture sensor , temperature and humidity sensor , microcontroller , Bluetooth and Android application is used to process the data collected form farm . Data is given by sensor which is further connected to Arduino boards [8].

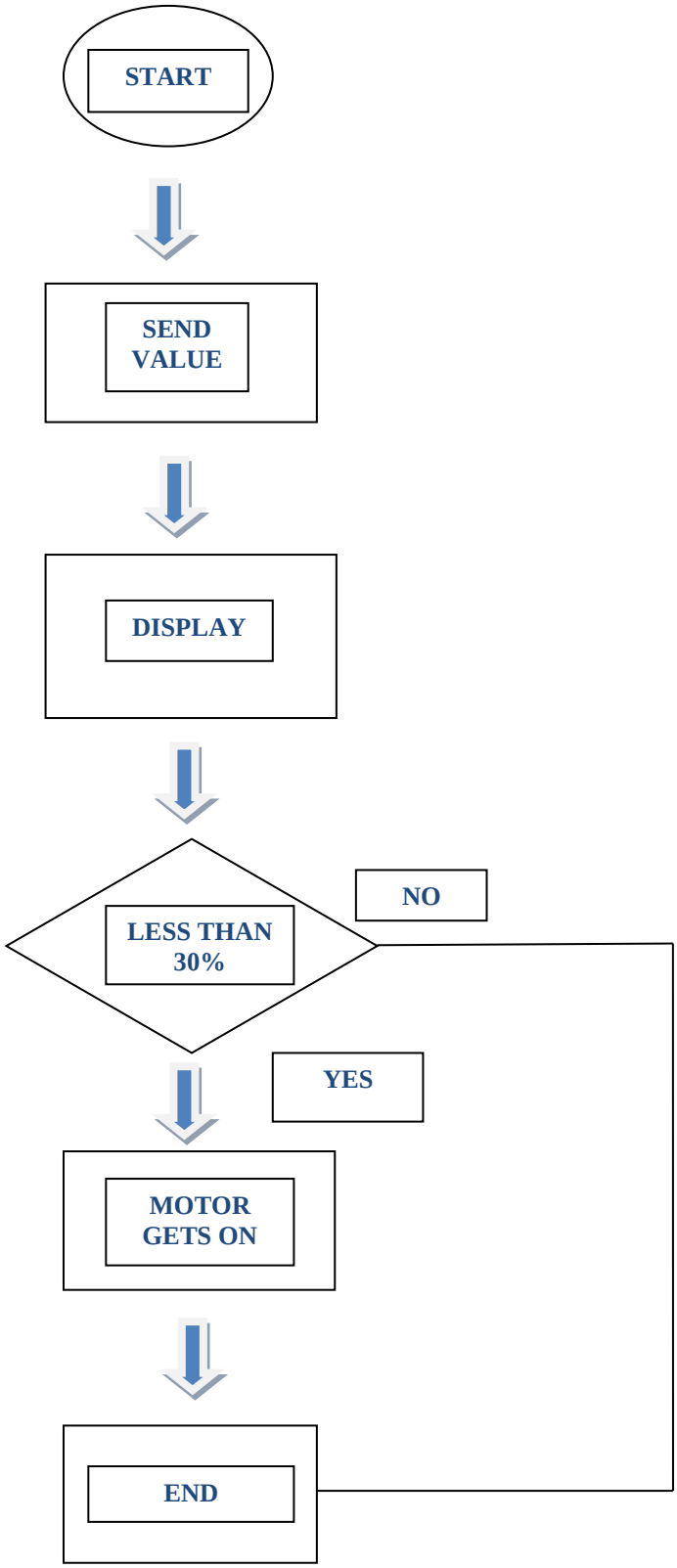
The data which is obtained from the sensor are then further transmitted via wireless transmission to the farmer so that irrigation can be controlled [9].The android applications can be designed and architected in such a way that data is analysed moreover it also checks the threshold values of moisture , humidity and temperature [10].The decision for switch ON/OFF of motor is taken by either automatic mode or by farmer, this application is also used to inform farmer in case of scarcity of reservoir.

The ultrasonic sensor work on principle of piezoelectric effect in which there is an echo pin and trigger pin, so trigger pin acts as a transmitter and echo pin is a reflector then ultrasonic waves are send and it hit the water and get reflected back to echo pin, the duration is used to calculate the water level in the reservoir. If there is not sufficient amount of water then notification is send to farmer's mobile for further tasks and decision. The farmers are very much able to switch ON/OFF the motor form the mobile application even from the remote location [11]. Addition of temperature and humidity value in the soil moisture value makes the system more advanced [12]. All the data is send to mobile application day-to-day [13]. "Irrigation control system using android and GSM for efficient use of water and power "in this system GSM is replaced by WIFI module because of the pocket friendly nature of it [14]."Microcontroller based controlled irrigation system for plantation" controller is used for lesser memory and proposed system is user friendly as it helps in removing the programme easily [16].

In the times of scarcity of water the farmer is already notified before handed so that crop does not suffer in season when there isn't appropriate amount of rain fall .Also automated system helps with data from previous yield so that we can improve the farm in the future and most importantly helps In providing sufficient amount of water level in the farm.



Flowchart of temperature /Humidity sensor [15]



FLOWCHART OF TEMPERATURE/ HUMIDITY SENSOR [15]

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