ABSTRACT:
A resource that all living species need is Water. It is therefore very precious and for enhancing agricultural productivity it is the critical input. Therefore expansion, of irrigation has been a key strategy in the development of agriculture in country. Today, farmers have several issues in agriculture due to lack of rains and scarcity of water. The main motto of this paper is to save time, money and power of farmer with an automatic irrigation system. Manual intervention is required for the traditional farmland techniques. Human intervention can be minimized with the automated technology of irrigation. By using soil moisture sensor levels of soil moisture can be checked. Whenever there is a change in humidity moisture in the soil this sensor senses the change and an interrupt signal is passed to the microcontroller and depending on this the irrigation system works.

The automated irrigation system provides a web interface to the user so that the user can monitor and control the system remotely i.e., can make the irrigation system ON and OFF remotely.

INTRODUCTION:

In India, agriculture plays an important role for development in food production. In our country, agriculture are depends on the monsoons which is not sufficient source of water. This system will be a substitute to traditional farming method. We will develop such a system that will help a farmer to know his field status in his home or he may be residing in any part of the world. It proposes automatic irrigation system for the agricultural lands. Currently the automation is one of the important role in the human life. It not only provide comfort but also reduce energy, efficiency and time saving. Now the industries are use automation and control machine which is high in cost and not suitable for using in a farm field. So here it also design a smart irrigation technology in low cost which is usable by Indian farmers. An automated irrigation system was developed to optimize water use for agricultural crops. Automation allows us to control appliances automatically. The objective of this paper is to develop IOT based automated irrigation system to reduce water requirement and increase the productivity. This system is best suited for places where water is scarce and has to be used in limited quantity.

EXISTING METHOD:

The project irrigation control using tackle the problems of agricultural sector
regarding irrigation at times, motor pumps are left running for longer than what is necessary because of the effort involved. In the existing system farmers have to travel to fields often at odd hours just to switch on/off the motor due to erratic power supply. Existing aids like auto-starters are especially when a farmer in switching off. To overcome the drawbacks of existing system like high cost, difficult in maintenance and more wired connection, we introduce a new system which will have wireless connection between server and nodes. We introduce a new design of embedded web server making use of GSM network technology in this paper.

Compared to the wired link web server system, this system is characterized by having no wires between the web server and terminal nodes. In proposed system the irrigation will take place only when there will be intense requirement of water.

Irrigation system uses valves to turn irrigation on and off. These valves may be easily automated by using controllers. Automating farm or nursery irrigation allows farmers to apply the right amount of water. To avoid these problems a microcontroller based embedded after the research in the agricultural field; researchers found that the yield of agriculture goes on decreasing day by day.

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Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the extra man power efforts, water requirement and fertilizer requirement. Internet of things helps the things to communicate each other using IOT module.

**Time based system**

In time based system, time is the basis of irrigation. Time of operation is calculated according to volume of water required and the average flow rate of water.

The duration of individual valves has to be fed in the controller along with system start time, also the controller clock is to beset with the current day and time. As the clock of the controller knocks the start time of programme, it start sending signals
to the first automatic valve the programme sequence the pump also start up at the same time. As soon as duration of first valve is over the controller either steps or switches on to next valve. When the operation of last valve is over controller stop sending signals to valve sand sump same process is repeated at next run time.

**Volume based system**

In volume based system the pre-set amount of water can be applied in the field segments by using automatic volume controlled metering valves. Automation using volume based systems are of 2 types. In first type of system automatic watering valve with pulse output provide one pulse after completing one dial of the automatic metering valve. Thus by counting the number of pulses Received by the controller it can count the volume of water passed through. After providing required volume of water through the first valve it closes down and controller switches on the next valve sequence.

In second type of system no controller required. Automatic metering valves are positioned near each field segment. All automatic valves are interconnected in series with the help of control tube. For automatic closing and opening of the valves with the help of water pressure signals components like t-connector shuttle valve and 3 way relay and also installed along the

**Closed loop system**

This type of system requires feedback from one or more sensors. The operator develops a general control strategy. Once the general strategy is defined the control system takes over and makes detailed decisions of when to apply water and how much water apply. Irrigation decisions are made and actions are carried out based on data from sensors. In this type of system, the feedback and control of the system are done continuously.

Closed loop controllers required data acquisition of environment parameters (such soil moisture, temperature, radiation, wind-speed, etc.) as well as system parameters (pressure, flow etc.).

**Real time feedback system**

Real time feedback is the application if irrigation based on actual dynamic demand of the plant itself, plant root zone effectively reflecting all environmental factors acting upon the plant. Operating within controlled parameters, the plant itself determines the degree of irrigation required. Various sensors viz, tensiometers, relative humidity sensors, rain sensors, temperature sensors etc. control the irrigation scheduling. These circuit. During sequential operation only one automatic valve remains open. The next valve in the series opens after the first valve closes.

**Open loop system**
In an open-loop system, the operator makes the decision on the amount of water that will be applied and when the irrigation event will occur. This information is programmed into the controller, and the water is applied according to the desired schedule. Open-loop control systems use either the irrigation duration or a specified applied for control purposes. Open-loop control system typically low in cost and readily available from a variety of vendors.

The drawback of open-loop systems is their inability to respond automatically to changing conditions in the environment. In addition, they may require frequent resetting to achieve high levels of irrigation efficiency. Sensors provide feedback to the controller to control its operation.

**Computer-based irrigation control system:**

A computer-based control system consists of a combination of hardware and software that acts as a supervisor with the purpose of managing irrigation and other related practices such as fertilization and maintenance. Generally, the computer-based control systems used to manage micro irrigation systems can be divided into two categories.

Interactive systems that collect and process information from various points in the system, and allow manual control of the system from a central point by remote operation of valves or other control devices.

- Fully automatic systems that control the performance of the system by automatically actuating pumps, valves, etc. In response to feedback received from the monitoring system. these systems use closed control loops which include.
  - Monitoring the state variables (pressure, flow etc.)
  - Comparing the state variables with their desired or target state.
  - Deciding what actions are necessary to change the state of the system.
  - Carrying out the necessary actions.
  - Performing these functions requires a combination of hardware and software that must be implemented for each specific application.

**PROPOSED METHOD:**

The main aim is to control the water management for an irrigation system by automatic method. This method does not require any manual operators. It is designed to manage the irrigation system based on the response to the real-time status of the soil moisture. Irrigation system controls valves by using automated controller allows the farmer to apply the right amount of water at the right time. Due to the variable atmospheric conditions, some may vary from place to place in large house, which makes very difficult to
maintain the uniformity at all the places in the farmhouse manually.

For this GSM is used, it sends the report through the android mobile. So it reduce runoff from over watering saturated soil, avoid irrigating at the wrong time. It also helps in time and energy saving, removal of human error in adjusting available soil moisture levels and to maximize their net profits.

**COMPONENTS DESCRIPTION:**

**POWER SUPPLY:**

1.1 Block diagram

Connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

**Transformer**

The potential transformer will step down the power supply voltage (0-230V) to (0-15V and 0-9V) a level. If the secondary has less turns in the coil then the primary, the secondary coil's voltage will decrease and the current or AMPS will increase or decreased depend upon the wire gauge. **This is called a STEP-DOWN transformer.** Then the secondary of the potential transformer will be connected to the rectifier.

**SOIL MOISTURE SENSOR:**

It is used to sense the moisture of the soil and sends the signals to the control system. Soil moistures probes can be permanently installed at representative in on agricultural field to provide repeated moisture readings over time that can be used for irrigation management. Soil moisture content may be determined via its effect on dielectric constant by measuring the capacitance between two electrodes implanted in the soil. If the moisture level reaches the preset value, then the water is sent to the crops.

**PIC:**

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complimentary metal oxide semiconductor)
that uses separate bus for instruction and data allowing simultaneous access of program and data memory.

The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques.

PIC (16F877):

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

PIC START PLUS PROGRAMMER: The PIC start plus development system from microchip technology provides the product development engineer with a highly flexible low cost microcontroller design tool set for all microchip PIC micro devices.

RELAY:

Relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages.

GSM MODULE

This is a plug and play GSM Modem with a simple to interface serial interface. Use it to send SMS, make and receive calls, and do other GSM operations by controlling it through simple AT commands from microcontrollers and computers. It uses the highly popular SIM300 module for all its operations. It comes with a standard RS232 interface which can be used to easily interface the modem to microcontrollers and computers. The modem consists of all the required external circuitry required to start experimenting with the SIM300 module like the power regulation, external antenna, SIM Holder, etc.

OPERATION:

An automated water irrigation system to improve the efficient use of water. Water level sensors and moisture sensors are placed in the fields to measure the water level and moisture of soil in the field.
water from the sump will be turned on automatically every day at a particular time period. Immediately after the time period the water will turns off. The turn on and off mechanism will work for the moisture rate around the field area. The system automatically irrigates the field through the entrance valve when the water level is lower than the threshold level and also according to the moisture of the soil. The entrance valve closes after the water level reaches the threshold level and also the GSM modem sends SMS about the time taken to fill the farm with water to the farmer. In the existing system the farmer has to direct the water towards the desired farm manually. Farmer needs to go directly to the field to direct the water to the next farm. Farmers have to monitor the water level continuously to direct the flow of water. The proposed system guarantees the efficient usage of water and also prevents the damage of crops due to overflow of water.

CONCLUSION:

Since earlier days farmer is supposed to visit their agricultural land and check the moisture content of soil manually. This method uses minimum human efforts and it allows the user can monitor and maintain the moisture of the soil to the crop in an effective and an economic way.

REFERENCES: