SMART IRRIGATION CONTROL SYSTEM USING WIRELESS SENSOR NETWORK

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ABSTRACT

Today we are living in 21st century where automation is playing important role in human life. So all the things are done with the help of automation. Sixty Percent people of our country are doing agriculture and for the irrigation of the farm, we are depending on the rain water. But from the last few years there is uncertainty in the falling of the rain. Therefore the efficient water management and also the smart irrigation is needed. We have planned one low cost smart irrigation system with help of wireless sensor network which is cost effective and a middle class farmer can use it in farm field.

Irrigation schedule of different plants is planned according to their requirement which is based on the data obtained from sensor nodes deployed at different locations. Wireless sensor network is a solution for monitoring environmental conditions and efficient utilization of water.

Keywords: *Arduino microcontroller, Soil moisture sensor, Zigbee, Water density sensor, Electromagnetic valve*

1. INTRODUCTION

India is the country in which the 60% of the people are depends on the agriculture. In most part of our country the agriculture is done with help of traditional irrigation system. For that we need more man power and the more water will be consumed. But for the water we totally depending on the rainfall. So due to uncertainty in the rainfall the farmer faces the more problems of the water management.Here we have design the "Smart Irrigation System" for efficient water management. With the help of the this farmer can operate the whole irrigation system automatically with mobile phone. There is no need of man power of operating this system. The cost is also low because all the farmers can implement it in his farm field.

This are various components used for developing the system: a) Soil moisture sensors, b) Arduino,c)Zigbee, d)Electromagnetic valve, e)water density sensor f)Mobile phone. we can implement it in any type of the farm field whether it is regular or irregular. There are number of soil moisture sensor are placed in the field for sensing the moisture and the humidity in the soil.With the help of that readings the motor is ON/OFF and the direction of the water is decided.The moisture of the water is sensed by the soil moisture sensor and the readings will given to the "ARDUINO-UNO(ATMEGE 328)". The arduino calculates the percentage of the dryness in the water with help of sensed value. the it will further give to the "ZIGBEE" for deciding the direction of flow of the water. the electromagnetic 3D valve is controlled by the ZIGBEE. then by considering the percentage the valve is open and closed at particular direction. Zigbee collect all the data and send the SMS to the mobile phone which is register on the zigbee. Zigbee is monitored with the screen to see the status of the irrigation and change the setting of user required.

2. SMART IRRIGATON SYSTEM USING WSN

Smart irrigation control system not yet widely used by the Indian farmers. So the cost and also other factors will take in consideration.

2.1 Soil Moisture Sensor

A soil moisture sensor include comparator(LM393) which convert the analog data to dicrete.it is having two thin probes having length 5cm immersed in the soil for testing. This will give voltage output corresponding to the conductivity of the soil. the soil between two probes act as variable resistance whose value depend on the moisture contain in the soil. These readings will given to the arduino for calculation.
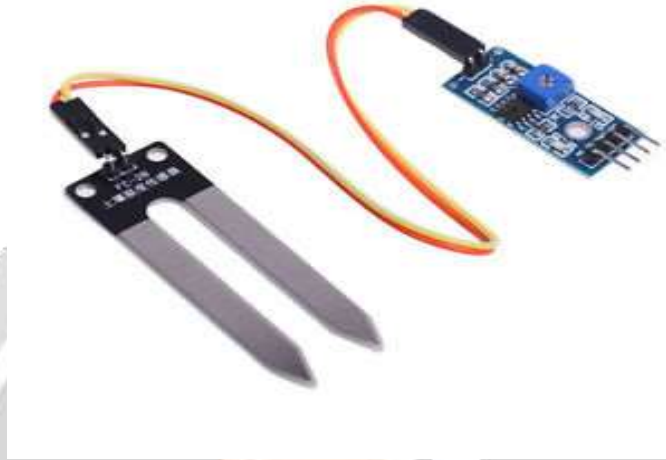

Fig- 1: Soil Moisture Sensor

2.2 ARDUINO

It is the microcontroller which is based on the ATmege328 having 14 digital input/output pins(6 can be used as PWM outputs),6 analog inputs, a 16MHZ ceramic resonator, a USB connection, a power jack, an ICSP header and one reset button. power it with AC or DC adapter or battery to get started.

Fig- 2: Arduino

2.3 ZIGBEE

ZigBee is a IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios.

Fig- 3: Zigbee

2.4 ELECTROMAGNETIC VALVE

The solenoid is an electromagnetic part of valve with coil, core tube ,core and enclosure. The selection of 3-way, 2-way, 4-way solenoid valve designed to handle the most demanding fluid control application. Suppose one orifice is open another two are closed and vice versa.

Fig- 4: ELECTROMAGNETIC VALVE

2.5 WATER DENSITY SENSOR

propose the system for surveillance purpose of risk-sensitive areas using a team of unmanned aerial vehicles (UAVs), which keeps the track of the areas that are already surveyed and time of the previous survey.PARCov is used for detection of risk by using quad copter in risk sensitive area which are under its coverage. It is able to cover more area andprovide continuous surveillance. A nonlinear optimization formulation is also used in this paper to determine the optimal altitude for quadcopter flying with maximized data sensor quality and minimizing risk.

Fig- 5: WATER DENSITY SENSOR

CONCLIUSION:

We present a prototype for automatic controlling a irrigation system. Here prototypes includes sensor node and control node. The sensor node is deployed in irrigation field for sensing soil moisture value and the sensed data is sent to controller node.On receiving sensor value the controller node checks it with required soil moisture value. When soil moisture in irrigation field is not up to the required level then the motor is switched on to irrigate associated agriculture field and alert message is send to registered mobile phone. The experimental results show that the prototype is capable for automatic controlling the experimental results show that the prototype is capable for automatic controlling of irrigation motor based on the feedback of soil moisture sensor.

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