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Modernized Irrigation System for Paddy Field

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ABSTRACT: The main aim of the project is to optimize the water which is irrigated to the paddy crop. To maintain the moisture level of paddy crop, irrigation of water is regulated based on the climatic condition (temperature level). Analog value of all sensors is given to an ADC which will convert the analog value into digital value. and given to microcontroller. The sensor values are processed by the microcontroller to take appropriate decision to maintain the paddy field moisture level. Based on the values obtained from the sensors, microcontroller either will ON or OFF the well motor and the current status of the field is messaged to the farmer through GSM Technology. Temperature sensor is used to detect the atmosphere temperature. When the field temperature is very high, the motor is to be in OFF condition. If the reference voltage of the level of moisture is low, Motor goes to ON state. Suppose if the reference voltage of the level is high, then the Motor goes to OFF state. The motor can be going to ON/OFF depends upon the microcontroller output value. Then water level sensor is used to give the information about the water level of well. If the water level of well is below required level then the motor is to be in OFF condition. Otherwise the controller switches ON the motor and provides water to the paddy field. LCD display is used to display the determined sensor values and motor ON/OFF state. This display values are transmitted to the field owner whenever the system going to change the state of functionality.

COMPONENTS USED: PIC microcontroller, Temperature sensor, Soil moisture sensor, Water level sensor, flow level sensor, LCD display and DC motor.

I. INTRODUCTION

In this project we monitor the land soil moisture, temperature value in environment or anywhere. In which the sensors output is given to the amplifier. Then the amplified voltage signal is given to microcontroller. Here the PIC programmable microcontroller in which we have already programmed with our objectives. It receives the signal from humidity, temperature and moisture sensor and displays the parameters via LCD display. Any parameters exceed above the set value microcontroller given the corresponding signal to operate the relays to control. Pump is used to control the water flow. And all the parameter sends to mobile in microcontroller is the flash type wireless communication using GSM modem.

II.HARDWARE USED

A.PIC MICRO CONTROLLER

The micro controller used for this project is PIC microcontroller. PIC microcontroller is the first RISC based microcontroller. This project uses PIC16F877 microcontroller. It includes timer module, serial I/O port and an ADC. 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. Operating voltage range is 2.5V to 5.5V. It has 5 I/O ports and 33 pins for input and output. Its maximum input frequency is 200MHz.

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Fig.1 PIC MICROCONTROLLER

B.SENSOR MODULE

TEMPERATURE SENSOR

Temperature sensor is an electronic device that senses the surrounding temperature. We are using a temperature resistive resistor which is called as thermistor.

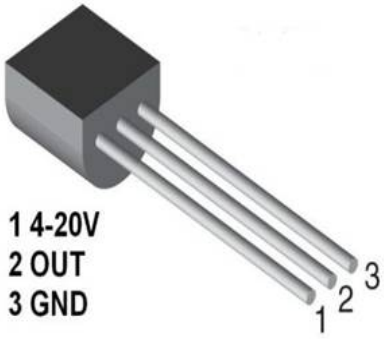

Fig.2 TEMPERATURE SENSOR

Themistor is made by using semiconductor metal oxide materials. We are using negative temperature coefficient thermistor. In this themistor the resistance value decreases while temperature value increases.

SOIL MOISTURE SENSOR

The soil moisture sensor measures the water level in the soil. Moisture sensor is used for measurement device. The moisture sensor consists of an astable multivibrator in which the capacitance is varied depends on the moisture level. The voltage signal is given to the comparator. The comparator is designed by the LM741 operational amplifier.

Fig.3 MOISTURE SENSOR

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The comparator is designed with the reference moisture level and delivered the corresponding error voltage as its output which is given to the next stage.

WATER LEVEL SENSOR

It operates in a condition of low water level. This water level sensor comprises two sensors A and B dipped into the bore well. Sensor B is dipped to the threshold point for pumping and A is dipped to below the bottom of the bore well.

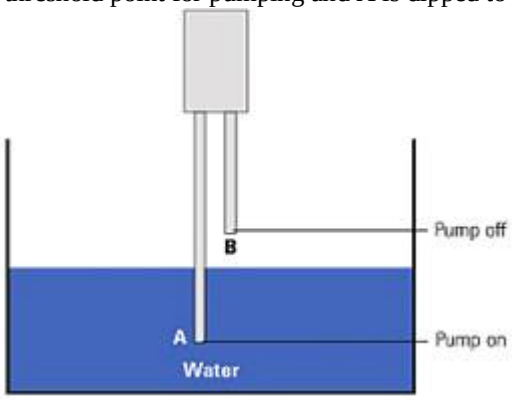

Fig.4 WATER LEVEL SENSOR

When water level in the well is above or at the sensor B the microcontroller has to turn OFF the motor and the water level is at sensor A, the controller has to turn ON the motor and provide water to the paddy field.

FLOW SENSOR

Fig.5 FLOW SENSOR

It is used for controlling the flow of water in well. The flow sensor is placed between the pump and pipe. If the field is dry the flow of water will be high. If the field is wet then the flow will be low.

C.LCD DISPLAY

A **liquid crystal display (LCD)** is a thin, flat electronic display that uses the light modulating properties of **liquid crystals (LCs)**. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. LCDs are usually more compact, lightweight, portable, less expensive and more reliable.

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Fig.6 LCD DISPLAY

In this, the temperature level, soil moisture level, water level and farmer's mobile number are displayed.

DC PUMP

DC pump is used to convert electrical energy into mechanical energy. A 12V DC pump is used. It is very simple operation and very energy efficient.

Fig.7 DC PUMP

D.CIRCUIT DIAGRAM

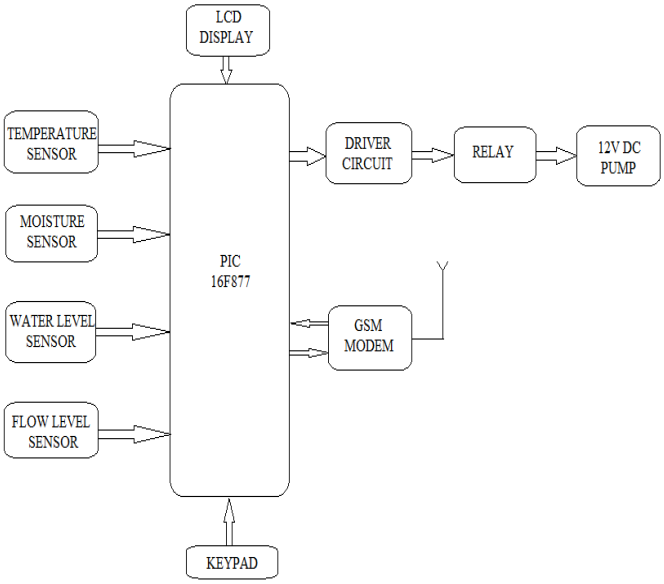

FIG.8 BLOCK DIAGRAM

Temperature sensor, water level sensor, soil moisture sensor and flow sensor are used. The temperature sensor is used to measure the surrounding temperature of the paddy field. The moisture sensor is used to detect the moisture

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level in the paddy field whether it is dry or wet. The water level sensor is used to measure the water level in the well and the flow sensor is used to control the flow of water. . All sensor values are measured and send into the PIC microcontroller. All these values are compared with the set point value. Based on this comparison the microcontroller automatically send message to the farmer and switch ON/OFF the motor.

III. CONCLUSION

Thus, the irrigation system for provides efficient and easy use of management. The proposed system based on PIC microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform several tedious and repetitive tasks. Though it is designed for industry, it can be extended for other purposes such as commercial & research applications.

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