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MONITORING THE SYSTEM USING GSM TECHNOLOGY IN AGRICULTURE FIELD (USING WSN)

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Abstract— The Wireless Sensors Network (WSN) is nowadays widely used to build decision support Systems to solve many real-world problems. One of the most interesting fields having an increasing need of decision support systems is agricultural environment monitoring. Agricultural environment monitoring has become an important field of control and protection, providing real-time system and control communication with the physical world. An intelligent and smart WSN system can collect and process large amount of data from the beginning of the monitoring and manage air quality, soil conditions, to weather situations. This paper presents hardware architecture, system architecture and software process control of the agriculture environment monitoring system.

I. INTRODUCTION

Wireless Sensor Network (WSN) is the ideal candidate to provide effective and economically viable solutions for a large variety of applications ranging from health monitoring, agriculture, environmental monitoring to military operations.
WSN is a modern technology which integrates the knowledge of sensors, automation control, digital network transmission, information storage and information processing.

WSN is a network of small sensing devices known as sensor nodes or motes, arranged in a distributed manner, which collaborate with each other to gather, process and communicate over wireless channel about some physical phenomena. The sensor motes are typically low-cost, low-power small devices equipped with limited sensing, data processing and wireless communication capabilities with power supply.

II. LITERATURE SURVEY

Kshitij Shinghal et.A1.proposed "wireless sensor network in agriculture :for potatoe farming",2010 this paper proposed how WSN nodes can also be effectively employed to collect data of soil water availability ,soil compaction , soil fertility, biomass yield , plant water status,local climate data ,insect-disease- which-weed infestions , crop yield ,etc

K.Nirmala Kumar and R.Prapakaran present "zigbee WSN Technology study for paddy crop field monitoring system",2011.Analze about real time reading of temperature sensor deployed in paddy crop field with Xbee nodes and Xbow nodes . Result show that Zigbee WSN is resourceful for paddy crop field monitoring .But Zigbee technology limits control signal transmission

III. PROBLEM DEFINITION

In agriculture management system ,there is no system to monitor the field . When the farmers are away from their field. In changing weather conditions it is necessary to monitor the field every time.

IV. EXISTING SYSTEM

Now-a-days there is no system to monitor the field. When the farmers are away from their field they don't know the condition of the field.The weather condition are changing time to time and so the farmers have to stay all the time in the field.

V. PROPOSED SYSTEM

In this project we are using three types of sensor for monitoring the agricultural field. These sensors are enough to capture the weather conditions and also the field conditions. Here we are using one of the technology, called GSM technology for wireless communication of the data.

VI. SYSTEM IMPLEMENTATION

Analysing the working of different sensors. Implementation of hardware connections. Reading the values from sensors

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and controlling the system Getting notifications through GSM modem.

VII. ANALYSING THE WORKING OF DIFFERENT SENSOR

Analysing the working of different sensors.

- Temperature sensor
- Moisture sensor
- Humidity sensor

Temperature sensor

A temperature sensor is to convert temperature value to an electrical value. In the temperature functional module ,we use the LM34 series of temperature.The LM34 does not require any external calibration or trimming to provide typical accuracies of ±1.2°F at room temperature and ±11.2°F over a full -50 to +300°F temperature range.

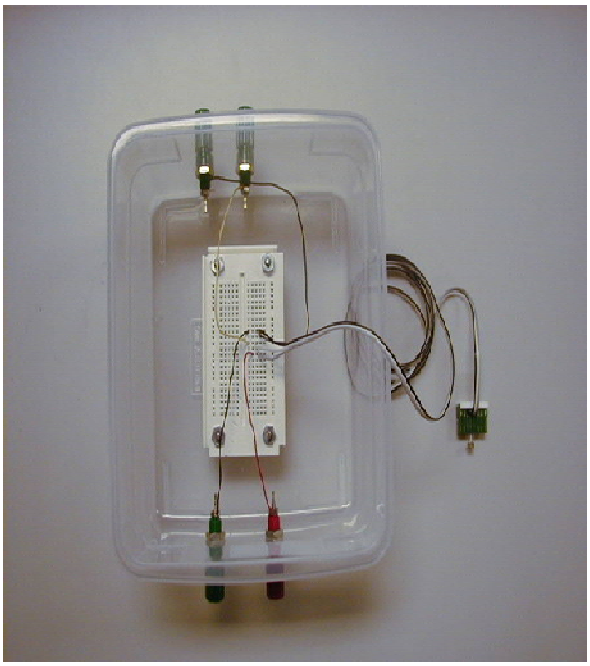

Fig 1 : Temperature sensor

Moisture Sensor

Soil moisture sensor probes enable precise low cost monitoring of soil water content. Probe measures the dielectric constant of the soil using transmission line techniques, it is insensitive to water salinity, and will not corrode over time as does conductivity based probes. They can be inserted and take an accurate reading in under a second.

Fig 2 : Moisture Sensor

Humidity Sensor

Humidity sensor senses, measures and reports both moisture and air temperature. Humidity sensor work by detecting changes that alter electrical currents or temperature in the air. This sensor monitors minute changes in the atmosphere in order to calculate the humidity in the air

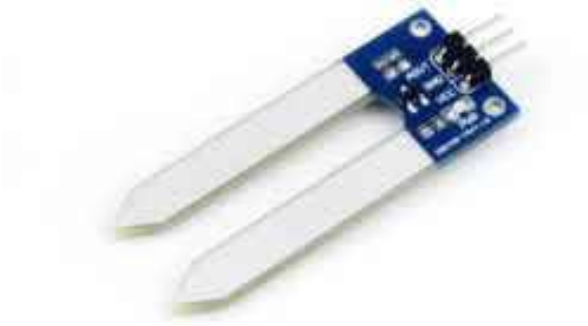

Fig 3 : Humidity Sensor

VIII. HARDWARE DESIGN OF THE SYSTEM

The step down transformer is connected to bridge rectifier to convert AC to DC. Bridge rectifier is connected to filter to get a pure DC. Regulator is connected with micro chip to get a constant DC output. The PIC micro controller is parallely connected with LCD display. And the PIC is serially connected with GSM modem. The temperature, moisture, humidity sensors and pump motor are get connected with microcontroller.

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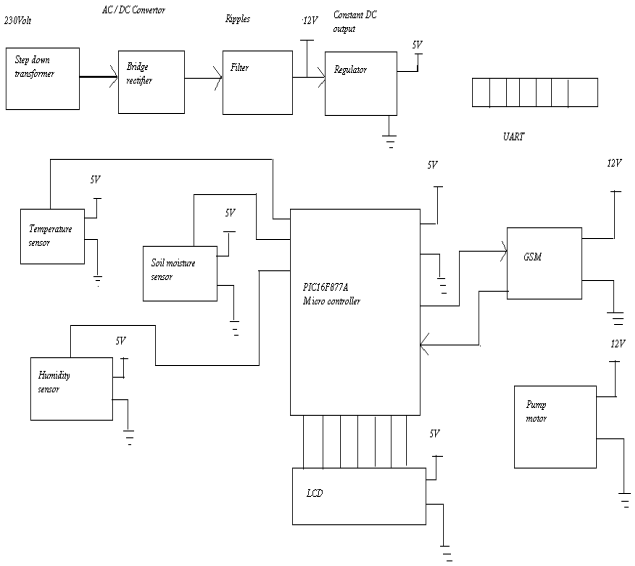

Fig 4 : Microcontroller Chip

The PIC16F877A CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5x, PIC12Cxxx and PIC16C7x devices. It features 200 ns instruction execution, 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire SPI or 2-wire I2C bus, a USART, and a Parallel Slave Port.

Microcontroller Features

- Flash Memory: 14.3 Kbytes (8192 words)
- Data SRAM: 368 bytes
- Data EEPROM: 256 bytes
- Self-reprogrammable under software control
- In-Circuit Serial Programming via two pins (5V)
- Watchdog Timer with on-chip RC oscillator
- Programmable code protection
- Power-saving Sleep mode
- Selectable oscillator options
- In-Circuit Debug via two pins

DC Motor

A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homopolar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty.

By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source—so they are not purely DC machines in a strict sense.

We in our project are using brushed DC Motor, which will operate in the ratings of 12v DC 0.6A which will drive the flywheels in order to make the robot move.

IX. READING THE VALUES FROM SENSORS AND CONTROLLING THE SYSTEM

LCD BOARD

A lcd is a flatepanel display that uses the light modulading properties of liquid crystals.the liquid crystals do not emit light directly instead using back light or reflector to produce image in color or monochrome.lcd are available to display arbitrary image or fixed image with low information content which can be displayed hidden such a preset words,digits and seven segment displays,as in a digital clock they use the same basic technology,expect the arbitrary images are made up of a large no of pixels while other display have larger elements.

GETTING NOTIFICATIONS THROUGH GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. The working of GSM modem is based on commands, the commands always start with AT (which means ATtention) and finish with a <CR> character. For example, the dialing command is ATD<number>; ATD3314629080; here the dialing command ends with semicolon.

The AT commands are given to the GSM modem with the help of PC or controller. The GSM modem is serially interfaced with the controller with the help of MAX 232. Here max 232 acts as driver which converts TTL levels to the RS 232 levels. For serial interface GSM modem requires the signal based on RS 232 levels. The T1_OUT and R1_IN pin of MAX 232 is connected to the TX and RX pin of GSM modem

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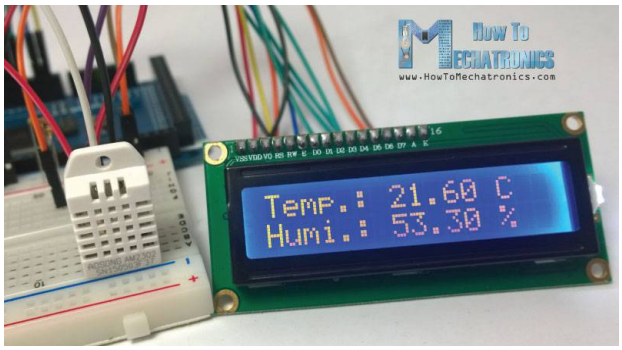
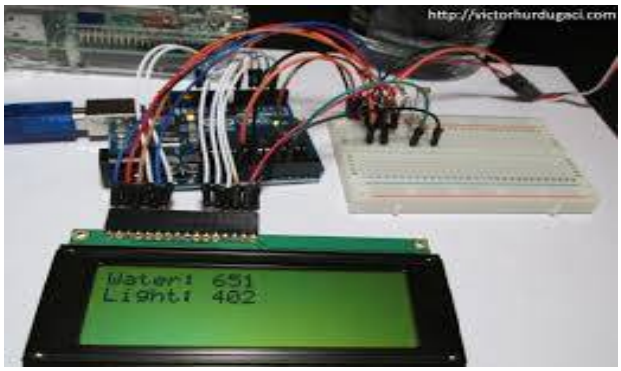
X. RESULT

Agriculture management system is expected to play an important role in improving farming activities. The latest trend is to enable this management system to operate over the mobile phones. Here user can monitor his farm land without actually being there through text messages**.**





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