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IOT BASED CROP-FIELD MONITORING AND IRRIGATION AUTOMATION

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***ABSTRACT*-Main Aim of the project is to real time monitoring of agriculture field by using IOTReal-Time Automation of Agriculture for Social Modernization of Agricultural System attracts great attention nowadays. Efficient water management is a major concern in many cropping systems in semi-arid and arid areas. Distributed in-field sensor-based irrigation systems offer a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving water. Among the important things that may come to the farmers interest is how to control the used of natural sources and natural environment which agriculture depend on. Therefore, this problem has captured farmers interest to implement agro-environmental remote monitoring method in their agriculture industries. This can be implemented in various situations such as in monitoring qualities of soil and water design and instrumentation of variable rate irrigation, a wireless sensor network, and software for realtime in-field sensing and control of a site-specific precision linear-move irrigation system is discussed here. Here the crop field area can be monitored without human interaction. In this paper we have detailed about how to utilize the sensors in paddy crop field area and explained about WSN, sensor applications and the results are implemented. We can also store all the details in the cloud and can be monitored and controlled using IOT.**

Keywords:Real time monitoring,efficient water management,wireless sensor network,irrigation system.

INTRODUCTION

Real-Time Automation of Agricultural Environment for Social Modernization ofIndian Agricultural System attracts great attention these days. Efficient water management is a major concern in many cropping systems in semi-arid and arid areas. Distributed in-field sensor-based irrigation systems offer a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving water.Design and instrumentation of variable rate irrigation, a wireless sensor network, and software for real-time in-field sensing and control of a site-specific precision linear-move irrigation system is discussed here. The crop field area can be monitored without human interaction. Sensors are the essential device for precision agricultural applications. In this paper we have detailed about how to

utilize the sensors in paddy crop field area and explained about Wireless Sensor Network (WSN), sensor applications and the results are given when implemented in real time environment.

In irrigation process we using the pH level sensor, temperature sensor,humidity sensor as well as water level sensors. If any fire occurs in crop, it will detect by temperature sensor.Depending on the moisture content, automatically the motors will switch ON using Relay with help of solar panel.Here we using pumping,sprinkling and shunt motors.If moisture content very low in soil means automatically sprinkling motor will switch ON to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone.Else water content very high in plants, shunt motors will switch ON to exit the excess water from the soil.Then the pumping motor is used to fill the tank level if water is empty are low, it could be find using level sensor.This updated information will send to the server using wireless communication network(WSN).

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LITERATURE SURVEY

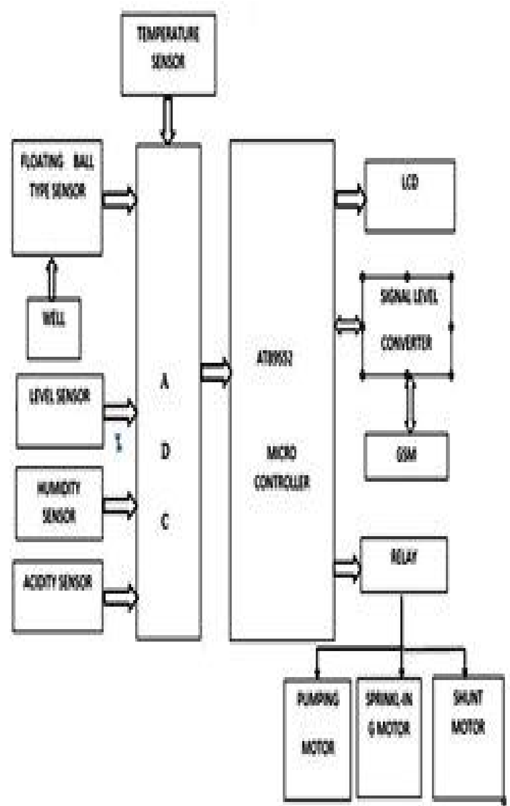
Agricultural vehicle navigation includes both on-road and on-field operations. The objective for on-road navigation is to guide the vehicle traveling on paved or prepared road according to a scheduled path plan, and for on-field guidance is to guide the vehicle following crop rows without overrun on crops. In this paper, the authors have presented an on-field navigation system with redundant sensors of a vision sensor, a fiber optic gyroscope (FOG), and RTK GPS. A steering controller has been developed to implement steering control based on guidance information obtained from guidance sensors.

PROPOSED SYSTEM:

This project "Remote GSM module monitoring and wind mill system control" Efficient water management is a major concern in many cropping systems in semiarid areas. Temperature sensor, level sensor, pH sensor connected with ATMEL. Microcontroller transmits the data's using Global system for mobile communications Modem, this project offered stable remote access to field conditions and real-time control and monitoring of the variable-rate irrigation controller.

BLOCK DIAGRAM:

AGRICULTURE MONITORING:



Microcontroller:

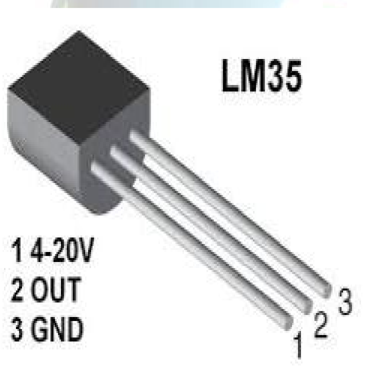
A microcontroller is a compact microcomputer designed to govern the operation ofembedded systems in motor vehicles, robots, office machines, complex medical devices, mobile radio transceivers, vending machines, home appliances, and various other devices.

ACD:

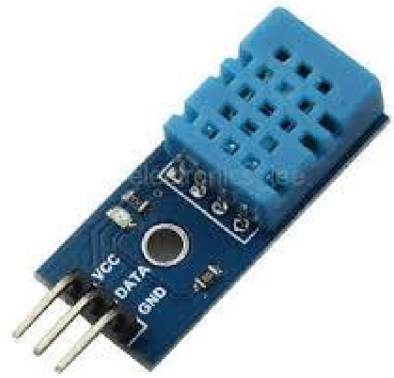
The ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique.

Sensor acquisition:

A temperature sensor is a device, typically, a thermocouple or RTD, that provides fortemperature measurement through an electrical signal.A thermocouple (T/C) is made from two dissimilar metals that generate electrical voltage in direct proportion to changes in temperature.



- A humidity sensor (or hygrometer) senses, measures and reports the relativehumidity in the air. It therefore measures both moisture and air temperature. Relativehumidity is the ratio of actual moisture in the air to the highest amount of moisture that can be held at that air temperature.



Description:

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.

The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out.

The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory pro-grammars. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly- many embedded control applications.

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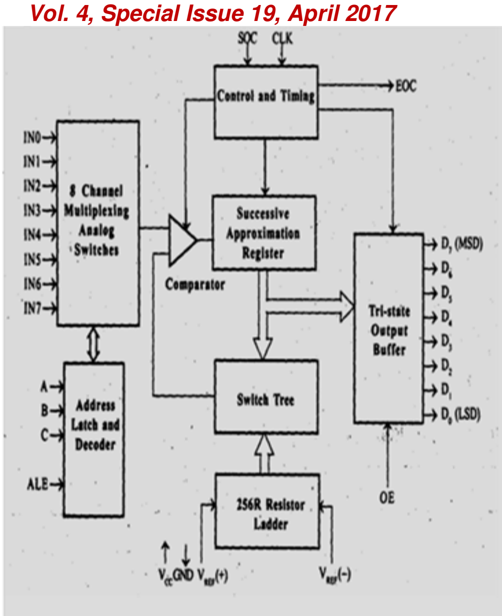

Port Pin	Alternate Functions
P3.0	RXD (serial input port)
P3.1	TXD (serial output port)
P3.2	$\overline{INT0}$ (external interrupt 0)
P3.3	$\overline{INT1}$ (external interrupt 1)
P3.4	T0 (timer 0 external input)
P3.5	T1 (timer 1 external input)
P3.6	$\overline{WR}$ (external data memory write strobe)
P3.7	$\overline{RD}$ (external data memory read strobe)

Port Pin	Alternate Functions
P3.0	RXD (serial input port)
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P3.6	$\overline{WR}$ (external data memory write strobe)
P3.7	$\overline{RD}$ (external data memory read strobe)

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. [4] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management.

In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning.

The Power-down mode saves the RAM con-tents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

Power supply is turned off and everything is still…the program is loaded into the microcontroller, nothing indicates what is about to come…

Power supply is turned on and everything starts to happen at high speed! The control logic unit keeps everything under control.

It disables all other circuits except quartz crystal to operate. While the preparations are in progress, the first milliseconds go by.

Power supply voltage reaches its maximum and oscillator frequency becomes stable. SFRs are being filled with bits reflecting the state of all circuits within the microcontroller.

All pins are configured as inputs. The overall electronis starts operation in rhythm with pulse sequence. From now on the time is measured in micro and nanoseconds.

Program Counter is set to zero. Instruction from that address is sent to instruction decoder which recognizes it, after which it is executed with immediate effect.

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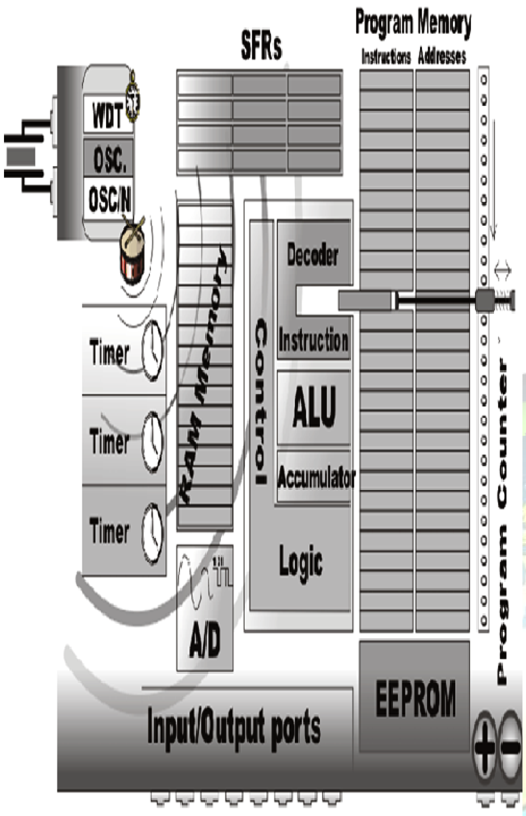
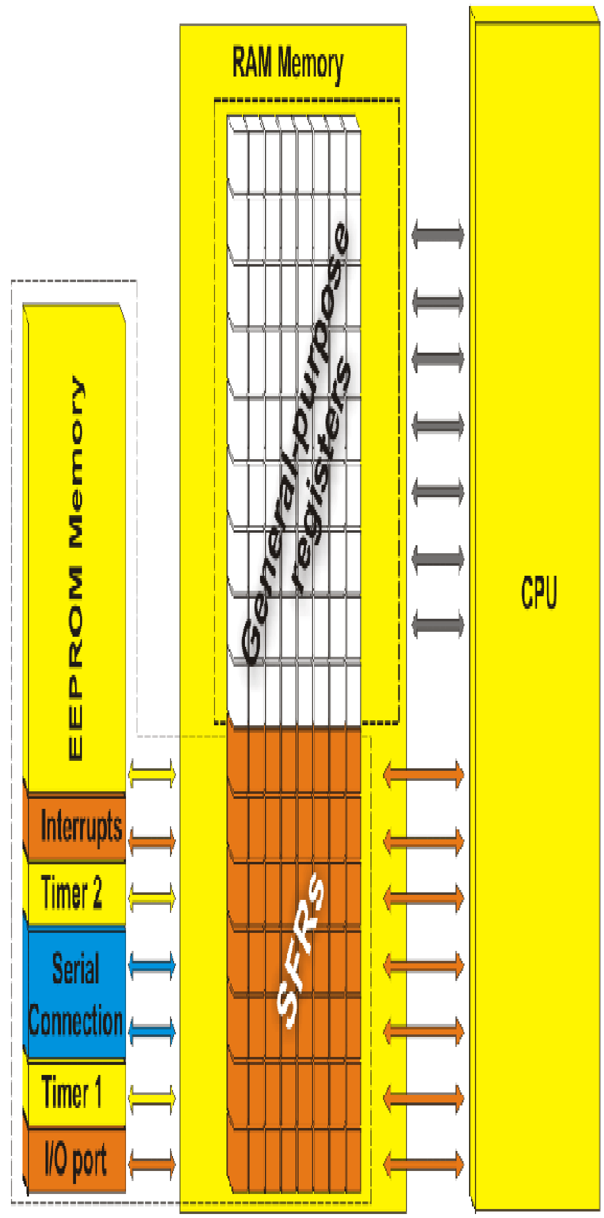
The value of the Program Counter is incremented by 1 and the whole process is repeated...several million times per second.



The EEPROM is a special type of memory not contained in all microcontrollers.

Its contents may be changed during program execution (similar to RAM), but remains permanently saved even after the loss of power (similar to ROM).

It is often used to store values, created and used during operation (such as calibration values, codes, values to count up to etc.), which must be saved after turning the power supply off.



Power Supply Circuit:

There are two things worth attention concerning the microcontroller power supply circuit:

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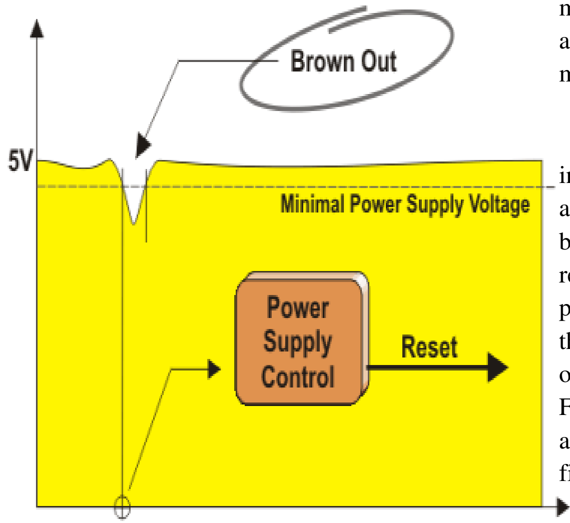


Brown out is a potentially dangerous state which occurs at the moment the microcontroller is being turned off or when power supply voltage drops to the lowest level due to electric noise.

As the microcontroller consists of several circuits which have different operating voltage levels, this can cause its out of control performance. In order to prevent it, the microcontroller usually has a circuit for brown out reset built-in.

This circuit immediately resets the whole electronics when the voltage level drops below the lower limit.

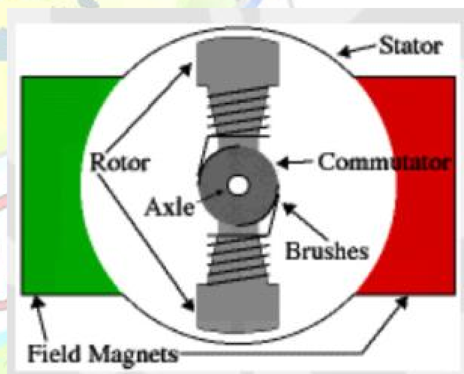
Reset pin is usually referred to as Master Clear Reset (MCLR) and serves for external reset of the microcontroller by applying logic zero (0) or one (1) depending on the type of the microcontroller.

DC MOTOR:

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

The shunt motor is different from the series motor in that the field winding is connected in parallel with the armature instead of in series. You should remember from basic electrical theory that a parallel circuit is often referred to as a shunt. Since the field winding is placed in parallel with the armature, it is called a shunt winding and the motor is called a shunt motor. Figure shows a diagram of a shunt motor. Notice that the field terminals are marked Fl and F2, and the armature terminals are marked Al andA2. You should notice in this diagram that the shunt field is represented with multiple turns using a thin line.

Let's start by looking at a simple 2-pole DC electric motor (here red represents a magnet or winding with a "North" polarization, while green represents a magnet or winding with a "South" polarization).



Conclusion:

The reral time monitoring of the agricultural field was not done in the existing system where the labour cost was high,so real time monitoring of the agricultural field can be done using the IOT where the process can be viewed from anywhere and thus this increases the monitoring of the field at any instant with more accuracy.

FUTURE WORK-

The system can be enhanced by using raspberry pi.Additional factors,sensors can be used to make the process a more better with many specifications.

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