

Crop Field Safety System Using Wireless Sensors and Gsm Technology

M.Vijayakumar¹, M.Sushma Sankari², K.Swathi³, M.Tamizharasi⁴, B.Vijayasri⁵

^{1,2} Associate Professor

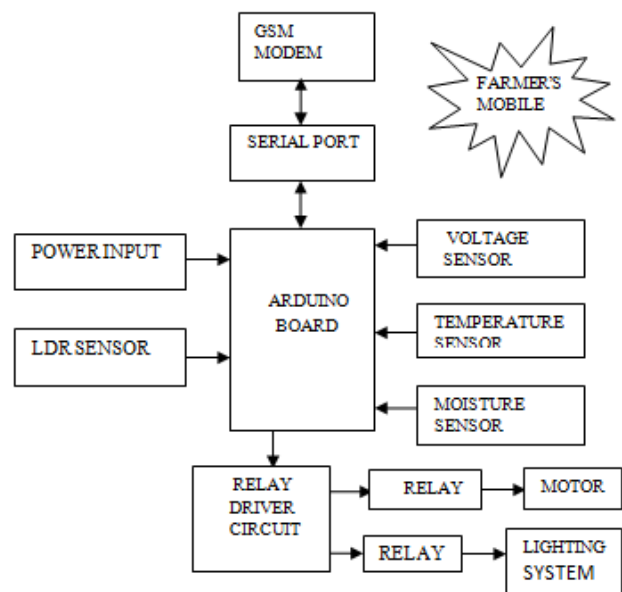
^{1,2} E.G.S Pillay Engineering College, Nagapattinam

Abstract- The main objective of this project is to provide efficient solution for automatic control of irrigation motor, power status and field status for Delta Farmers. This basic idea gave origin to the project is GSM based, irrigation monitoring and controlled system. In this research we have to soil moisture sensor, temperature sensor, LDR sensor, GSM modem, power circuit, relay, relay driver, motor etc., Here the automation process is done through the micro controller based technology. In our task, we make use of one controller which is dedicated at the water pump, GSM modem, sensor and relay The farmer can also look at the sensory data and decide course of action himself. We have made the interface of our project keeping in view the educational and financial background of average Indian farmer. we are proposed a low cost and efficient wireless controlled and irrigation monitoring system to acquire the soil moisture sensor from various locations of field and power finding circuit based, ON or OFF the main motor. The SMS send from control station to the farmer's mobile phone , that includes moisture level in soil, voltage level, temperature level and power failure status.

Keywords- Arduino, Soil moisture sensor, LDR Sensor, temperature sensor, Motor

I. INTRODUCTION

In, India agriculture plays an important role for development in food and great impact on the economy of our country. The Cauvery delta region is also known as the rice bowl of Tamilnadu. The natural conditions such as soil type , water quantity an availability have main impact on irrigation field . Nowadays farmers takes various crops in his field like paddy, gingelly, ground nut or black gram as like older methods, so in this way very significant factor to the farmer is like time, water, and also the money are get wasted. And also the farmers are revenue crops which is totally depends on the meteorological conditions or expected conditions. If too little water is applied different problems arise such as field exhaustion. The most important in irrigation is striking to correct balance for best plant life with best use of water. The irrigation controller is a device to operate programmed irrigation systems such as grass sprinklers and dribble irrigation systems.



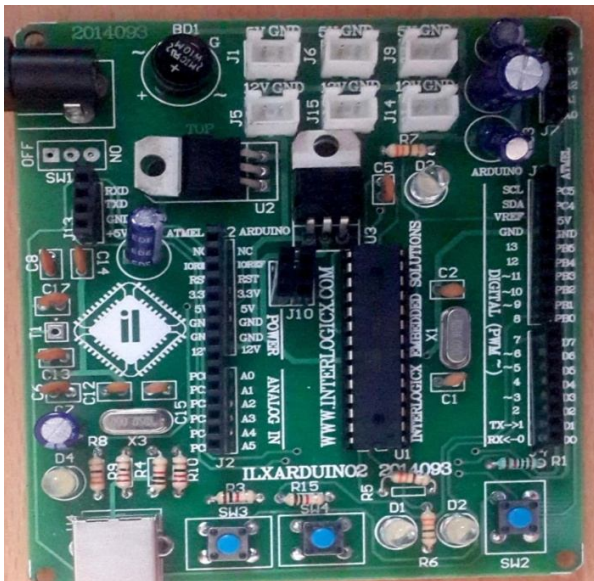
COMPONENTS REQUIRED:

- Arduino Controller
- Relay driver
- Relay
- Soil moisture sensor
- Temperature sensor
- LDR Sensor
- Motor
- Serial port
- GSM modem

SOFTWARE REQUIREMENTS:

- Embedded c
- Arduino Software

III. ARDUINO BOARD



Atmega328

(PCINT14/RESET) PC6	1	28	PC5 (ADC5/SCL/PCINT13)
(PCINT16/RXD) PD0	2	27	PC4 (ADC4/SDA/PCINT12)
(PCINT17/TXD) PD1	3	26	PC3 (ADC3/PCINT11)
(PCINT18/INT0) PD2	4	25	PC2 (ADC2/PCINT10)
(PCINT19/OC2B/INT1) PD3	5	24	PC1 (ADC1/PCINT9)
(PCINT20/XCK/T0) PD4	6	23	PC0 (ADC0/PCINT8)
VCC	7	22	GND
GND	8	21	AREF
(PCINT6/XTAL1/TOSC1) PB6	9	20	AVCC
(PCINT7/XTAL2/TOSC2) PB7	10	19	PB5 (SCK/PCINT5)
(PCINT21/OC0B/T1) PD5	11	18	PB4 (MISO/PCINT4)
(PCINT22/OC0A/AIN0) PD6	12	17	PB3 (MOSI/OC2A/PCINT3)
(PCINT23/AIN1) PD7	13	16	PB2 (SS/OC1B/PCINT2)
(PCINT0/CLKO/ICP1) PB0	14	15	PB1 (OC1A/PCINT1)

1. VCC

Digital Supply voltage.

2. GND

Ground

3.PortB(PB7:0) XTAL1/XTAL2/TOSC1/TOSC2

Port B is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port B output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port B pins that are externally pulled low will source current if the pull-up resistors are activated. The Port B pins are tri-stated when a reset condition becomes active, even if the clock is not running.

4. Port C (PC5:0)

Port C is a 7-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The PC5..0 output buffers have symmetrical drive characteristics with both high sink and source capability.

As inputs, Port C pins that are externally pulled low will source current if the pull-up resistors are activated. The Port C pins are tri-stated when a reset condition becomes active, even if the clock is not running.

5. PC6/RESET

If the RSTDISBL Fuse is programmed, PC6 is used as an I/O pin. Note that the electrical characteristics of PC6 differ from those of the other pins of Port C. If the RSTDISBL Fuse is unprogrammed, PC6 is used as a Reset input. A low

This is the new arduino Uno R3. In addition to all the features of the previous board, the UNO now uses an ATmega16U2 instead of the 8U2 found on the Uno (or the FTDI found on previous generations.)

This allows for faster transfer rates and more memory. No drivers needed for Linux or Mac (in f file for Windows is needed and included in the Arduino IDE), and the ability to have the Uno show up as a keyboard, mouse, joystick, etc.

The Uno R3 also adds SDA and SCL pins next to the AREF. In addition, there are two new pins placed near the RESET pin. One is the IOREF that allow the shields to adapt to the voltage provided from the board. The other is a not connected and is reserved for future purpose.

Features:

- ATmega328 microcontroller
- Input voltage 7-12V
- 14 Digital I/O Pins (6 PWM outputs)
- 6 Analog Inputs
- 32k Flash Memory
- 16Mhz Clock Speed

level on this pin for longer than the minimum pulse length will generate a Reset, even if the clock is not running. Shorter pulses are not guaranteed to generate a Reset.

6 . Port D (PD7:0)

Port D is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive characteristics with both high sink and source capability.

7. AVCC

AVCC is the supply voltage pin for the A/D Converter, PC3:0, and ADC7:6. It should be externally connected to VCC, even if the ADC is not used. If the ADC is used, it should be connected to VCC through a low-pass filter. Note that PC6..4 use digital supply voltage, VCC.

8. AREF

AREF is the analog reference pin for the A/D Converter.

9. ADC7:6 (TQFP and QFN/MLF Package Only)

In the TQFP and QFN/MLF package, ADC7:6 serve as analog inputs to the A/D converter. These pins are powered from the analog supply and serve as 10-bit ADC channels.

IV. SPECIFICATION

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12v
Input Voltage (limits)	6-20v
Digital I/O pins	14
PWM Digital I/O Pins	6
Analog I/O Pins	6
DC Current per I/O pins	20 mA
DC Current for 3.3V pin	50 mA
Flash memory	32KB (ATmega328P)
SRAM	2KB (ATmega328P)
EEPROM	1KB (ATmega328P)

Power

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. Externally (non-USB) power can come either from an AC- to – DC adapter (wall wart) or battery. The adapter can be connected by plugging a 2.1mm center positive plug into the board’s power jack. Leads from a from battery can be inserted in the Gnd and Vin pin headers of the POWER connector.

Memory

The ATmega328 has 32KB (with 0.5 KB used for the boot loader). It also has 2KB of SRAM and 1KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output

Each of the 14 digital pins on the Uno can be used as input or output using pin Mode(), digital Write() and digital Read() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 k Ohms. In addition, some pins have specialized functions

Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data.

PWM: 3, 5, 6, 9, 10 and 11. Provide 8-bit PWM output with the analog Write() function.

LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it’s off

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though it is possible to change the upper end of their range using the AREF pin and the analog Reference () function.

POWER SUPPLY

Power Supply is the device that transfers electric power from a source to a load using electronic circuits. Power supplies are used in many industrial and aerospace applications and also in consumer products.

RELAY DRIVER

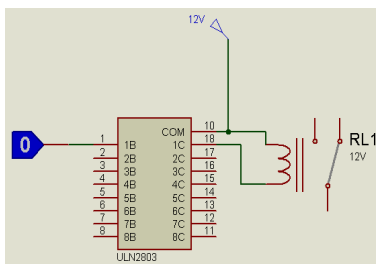
Relays have been around for a long time and though often now replaced with solid state switches, they have unique properties that make them more robust than solid state devices

and are not going away. The unique properties are high current capacity, ability to withstand ESD and drive circuit isolation.



ULN2803 as a relay driver

A ULN2803 is an Integrated Circuit (IC) chip with a High Voltage/High Current Darlington Transistor Array. It allows you to interface TTL signals with higher voltage/current loads. In English, the chip takes low level signals (TTL, CMOS , PMOS, NMOS – which operate at low voltages and low currents) and acts as a relay of sorts itself, switching on or off a higher level signal on the opposite side.



RELAY

Motor driving circuit is a relays an electrical switch that opens and closes under the control of another electrical circuit. In the original form, the switch is operated by an electro magneto open or close one or many sets of contacts.

GSM MODEM

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS.



SINGLE-PHASE MOTORS

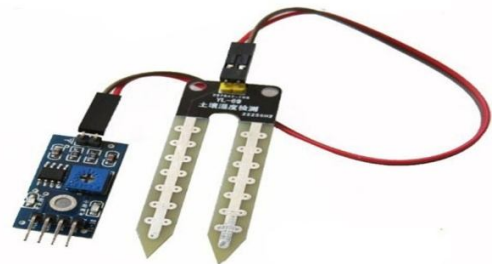
Single phase motors are the most familiar of all electric motors because they are extensively used in home appliances, shops, offices etc. It is true that single phase motors are less efficient substitute for 3-phase motors but 3-phase power is normally not available except in large commercial and industrial establishments. Since electric power was originally generated and distributed for lighting only, millions of homes were given single-phase supply.

SENSORS

- Soil Moisture Sensor
- Temperature Sensor
- LDR Sensor

SOIL MOISTURE SENSOR

Soil moisture sensor measure the water content in soil. Measuring soil moisture is important in agriculture to help farmers manage their irrigation systems more efficiently.



The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, Modern impedance dew point sensors are typically constructed using state-of theart thin and thick film techniques.

TEMPERATURE SENSOR

