International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

AN AUTOMATED SMART IRRIGATION SYSTEM MONITORING AND CONTROLLING USING GSM TECHNOLOGY

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ABSTRACT

The project describes that the automation of Irrigation system. This system was developed mainly to optimize the water usage in agriculture fields. The automation can be obtained by using different sensors like temperature sensor, humidity sensor and soil moisture sensor. These sensors will perform different functions. All these sensors are connected to the microcontroller. Here we are using ARM 7 microcontroller which is also known as LPC2148.Here we are using GSM module which is wireless mobile technology are used for the monitoring of sensors in the agriculture field. The status of the sensors in field can be obtained.

Keywords: ***Soil Sensor, Humidity Sensor, Temperature Sensor, Gsm, Microcontroller.***

I. INTRODUCTION

The most necessary factors for the standard and productivity of plant are unit temperature, humidity, light and levels of greenhouse emission. Continuous observance of these environmental elements provides data to the grower to higher perceive, however it'severy issue affects the growth and manage outside crop fecundity. Hyperbolic range of measurement points mustn't dramatically increase the automation system price. It ought to even be doable to simply change the placement of the activity points consistent with the particular desires that rely on the precise plant, on the doable changes within the external weather. The present generation uses more water which is double the speed of population increases. Due to the shortage of water resources, we would like water saving irrigation technology for agriculture. The dry regions having very little quantity of water which has got to be utilised with efficiency and this mechanism will scale back the employment of the cultivator and help maintain appropriate soil conditions for the better crop production. Hence the technology advancement is possible for easy implement of cultivation.

II. LITERATURE REVIEW

The existed system for Agriculture monitoring is involved with Bluetooth technology which is also wireless technology used to check the condition of the Agriculture field. And in this monitoring system we can control devices but it is limited to a certain distance. The drawbacks with the existed systems are it needs more human efforts i,e he should go to the field for monitoring the field condition and estimate the working time for a particular part. Monitoring the field is up to a certain distance around 100 meters.

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ISSN (O) 2319 - 8354
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The proposed system for Agriculture monitoring is to control and monitor the field conditions at longer distance. Here we use GSM technology which is a wireless communication is used to communicate for longer distance. Here the user can send SMS to know the status of water pump i.e. it is running or not and he can operate the pump from his home through SMS. We can get the status of weather conditions at the field through SMS.By using zigbee we can operate the sensors through PC.

III. HARDWARE DESIGN

3.1 Transmission Section

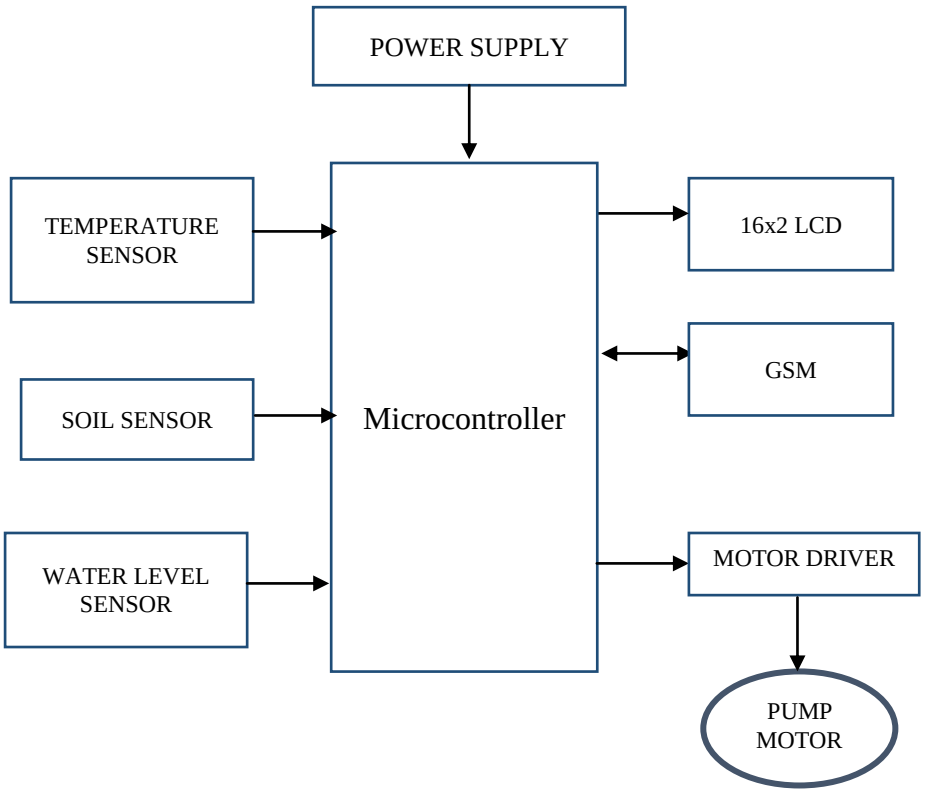

Fig 1: block diagram

It consistsof various software and hardware modules. The above block diagram shows the evaluation of hardware components blanketed in the device.

3.2 LPC2148 Microcontroller

The LPC2148 microcontroller belongs to ARM 7 family. The Lpc2148 board is based on a thirty two-bit ARM7TDMI-S with real-time emulation. It consists of 8 kilobytes to 40 kilobytes of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory; 128-bit huge interface allows high-pace 60 MHz operation, In- system Programming (ISP), unmarried 10-bit DAC affords variable analogue output, 32-bit timers external event counters (with 4 capture and 4 examine channels every), PWM unit (6 outputs) and watchdog, Low strength actual-Time Clock (RTC), more than one serial interfaces which includes two UARTs,rapid I2C-bus (400kbit/s), SPI and SSP with buffering and variable information length competencies.

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ISSN (O) 2319 - 8354
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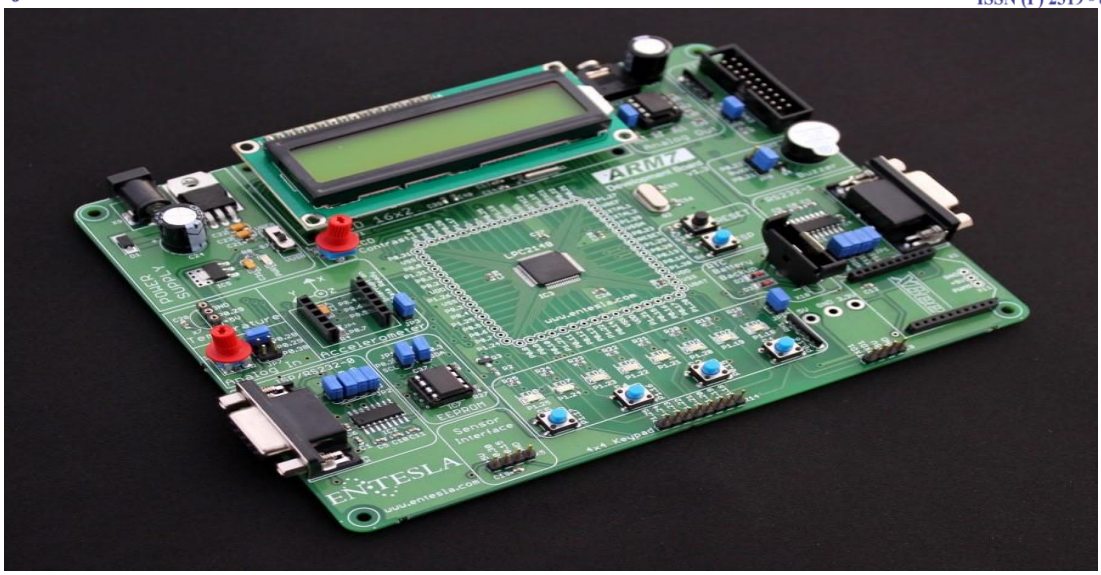

Fig 2: ARM 7 board

3.3 GSM

Global service for mobile communication (GSM) is a cellular network, which means that is mobile phones connect of searching for cellular mobile communication. GSM networks can operate different ranges frequency. The most GSM we can operate the SIM900MHz to 1800 MHz frequency. Some countries in the Americas use the 850 MHz and 1900 MHz In this project if any gas detected the message automatically sends to the user.

Fig3: GSM module

3.4 Temperature sensor

We are using the temperature sensor on the farm fields where we want correct temperature measurements sensor. We are going for the DS1621 that's actual time sensor. DS1621 can measure temperature form -55oC to +125oC with decision of ½oC. DS1621 temperature sensing element is virtual sensor. To talk with the DS1621 we want to fits I2C protocol. This takes traces to speak. The two strains area unit SDA and SCK for info switch and clock severally. Due to the actual fact DS1621 is actual time sensor we will get most correct temperature of the surroundings. Since we area unit victimization virtual sensing element instead of analogue sensing element we will get correct value with high resolution. In preference to high and low we can get the temperature price that is starting from –55 to +125oC. I2C protocol is referred to as Inter enclosed communication. I2C protocol

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ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

communicates in synchronous serial verbal exchange. So the facts loss in synchronous articulation is a smaller amount whereas as compared to the Asynchronous.

Fig 4: temperature sensor

IV. SOIL MOISTURE SENSOR

Soil wet sensors will be placed in soil for the detection of water content in soil. Since the direct measure of free soil wet needs removing, drying, and coefficient of a sample, soil wet sensors live the meter water content indirectly by victimisation another property of the soil, like resistivity, non-conductor constant, or interaction with neutrons, as a proxy for the wet content. The measured property of soil and wet soil should be graduated and will vary betting on environmental factors like soil sort, temperature, or electrical conduction. Mirrored microwave radiation is full of the soil wet and is employed for remote sensing in geophysical science and agriculture. Moveable probe instruments are employed by farmers or gardeners.

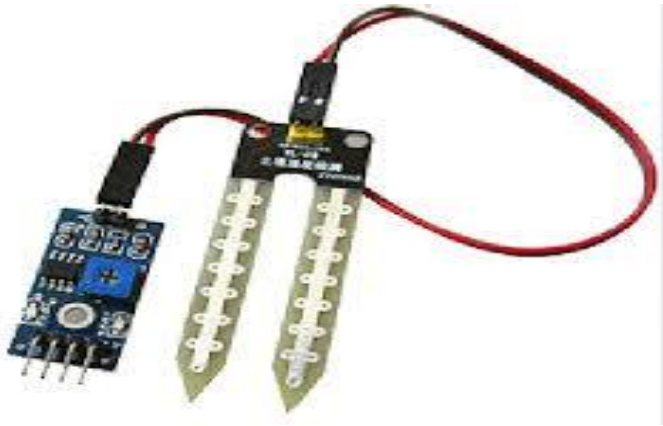

Fig 5: soil moisture sensor

4.1 L293D

The l293d are using high-current gain and half-H drivers. The l293d gains of currents up to 1A at voltage from 4.5vto 36v.both devices are designed to drive inductive loads such as relays. Its connecting dc bipolar stepping motors as well as other high current/voltage loads in positive-supply application.TTL inputs is compatible.

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Fig 6: l293d driver ic

V. PUMPING MOTOR

This is a coffee value, little size Submersible Pump Motor which might be operated from a two.5 ~ 6V power provide. It will take up toone hundred twenty liters per hour with terribly low current consumption of 220mA. Simply connect tube pipe to the motor outlet, submerge it in water and power it. Confirm that the water level is usually over the motor. practice session might injury the motor owing to heating and it'll conjointly turn out noiseNote we've got 2 sorts of Pump Motors, please check on top of photos for additional details. We'll send you one looking on this stock.You'll contact USA if you wish a selected one, however it's subjected to accessibility.

Fig 7: pumping motor

5.1 Water Level Sensor

Global Water's WL400 Water Level detector submersible pressure electrical device consists of a solid state pressure detectorencapsulated in exceedingly submersible stainless-steel 13/16" diameter housing. The water level gauge uses a marine grade cable to attach the water pressure detector to the display. Every of world Water's pressure transducers incorporate a two-wire 4-20 mA high level output, 5 full scales ranges, and is totally temperature and air pressure stipendiary.

The water depth indicator is accessible in an exceedingly 0-3' full scale vary that is good for measure shallow flows or tiny water level changes. The 0-3' vary is nice for measure flows in sewers, storm drains, weirs, flumes, lakes, tanks or any water body that's but 3' deep. The 0-3' water watching detector accurately measures tiny changes in water, even once the water's depth is simply a couple ofinches deep. Different metal foil sort sensors generally have serious issues at low level ranges owing to crinkling, stretching and drifting.

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ISSN (O) 2319 - 8354
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Fig 8: water level sensor

VI. SOFTWARE DESIGN

In this proposed project, we are using LPC2148 microcontroller and we need to use the following software equipment to program for it.

1. KeiluVision
2. Flash Magic

The Keil micro Vision is an IDE for Embedded c programming language. In this IDE, we need to import the utilities and libraries according to the controller. This IDE is very less difficult and in user friendly way to apply. It consists of all the C/C++ compilers, assemblers, and debuggers in it. Here we need to generate a hex file to run the microcontroller. The hex file consists of only binary numbers which is dumped in to the microcontroller. The flash magic is a programmingsoftware. The C/C++ software is written in IDE may be processed into Hex document i.e. hex file. By using the hex file we will dump the file into microcontroller and perform the task with respective application.

VII. WORKING DESCRIPTION

Generally the crops in the field grow in different weather conditions, but some plants are very sensitive to environmental conditions to growth, so we need to provide accurate environmental conditions to their growth. And the main aim of the project is to monitor from one place with respect to accurate readings by using different sensors. The main Aim of the project is monitoring to the environmental conditions and monitoring from one place using ZigBeeand GSM communication. Here, this project was developed on ARM microcontroller by using different sensors like DS1621 temp sensor,Soil sensor and humidity sensors. These functions determines temperature, soil moisture level and humidity content in air, all these features will be monitoredcontinuously. The status of all these sensors can be obtained through SMS from the GSM modem. These sensors are used for automation process and by this we don't need human interactionandthe status of these sensors data can be authorized through PC using ZigBee communication and also with GSM technology.

VIII. RESULTS

The sensors connected to circuit or controller will be initialized after that the status of the environment will be read out from various sensors connected to the controller and sends the same data to authorized PC through ZIGBEE communication and GSM.

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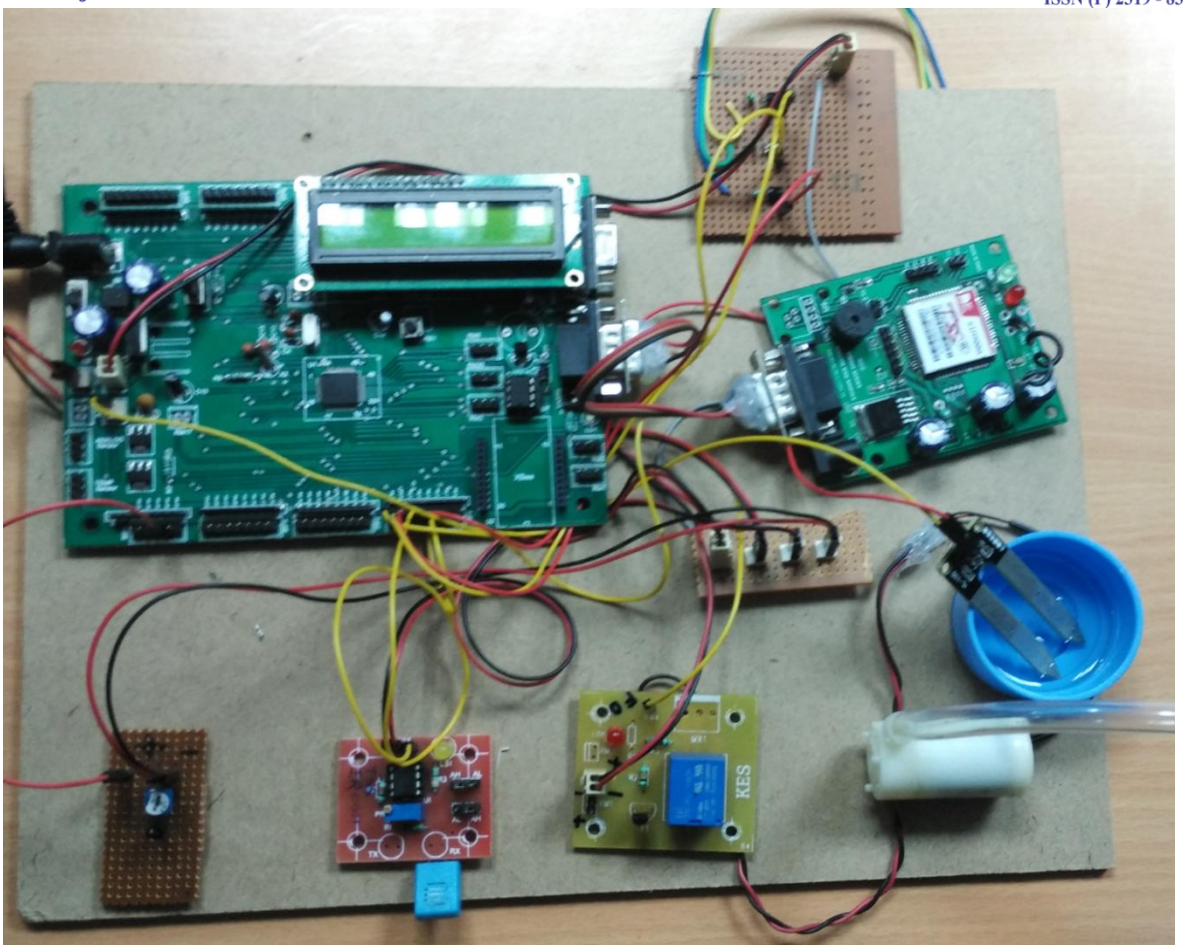

IX. CONCLUSION

This project can be extended to next level by using different sensors like LDR, fire sensor etc. By increasing the sensors and exact measurements we can get accurate values for entire farm field. Hence by increasing more sensors the system provides more flexibility and reliable in nature.

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