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DESIGN AND IMPLEMANTATION OF AUTOMATED IRRIGATION SYSTEM IN AGRICULTURE USING WIRELESS SENSOR NETWORK

Macha Pavani[1], Dr. K. Hemachandran [2], H.Raghupathi (HOD)[3]

[1]Pursuing M.Tech (ES), [2]Professor, [3]AssistantProfessor

Visvesvaraya College of Engineering and Technology, Patelguda, Ibrahimpatnam

Rangareddy Dist. Telangana, (India)

ABSTRACT

Agriculture plays the major role in economics and survival of people in India. Nowadays Indian agriculture faces a two major problem. They are as follows we know government has promoted a free supply of electricity for farmers to run their motors and pumps for irrigation purpose. But it is found that the farmers misusing the electricity to run their home appliances such as radio, TV, fans, etc. This misuse of electricity has brought a considerable problem for government to supply free electricity. The main aim of this project is to design low cost Automated Irrigation System using a Wireless Sensor Network and GPRS Module. The Purpose of this project is to provide embedded based system for irrigation to reduce the manual monitoring of the field and get the information in the form of GPRS. This proposed system recognizes whether the free electricity has been used other than electric motors for pumping water and if so electricity is being misused, it shuts the total supply for the farmers through a tripping circuit. By using wireless networks we can intimate the electricity board about these mal practices. The development of this project at experimental scale within rural areas is presented and the implementation was to demonstrate that the automatic irrigation can be used to reduce water use.

Keywords*— *Soil Sensor, Humidity Sensor, Temperature Sensor, GSM/gprs, Microcontroller.

I. INTRODUCTION

An computerized irrigation machine was developed to optimize water use for agricultural crops. The machine has a allotted wi-fi community of soil-moisture and temperature sensors located within the root zone of the flora. In addition, a gateway unit handles sensor facts, triggers actuators, and transmits data to a web software. An set of policies become advanced with threshold values of temperature and soil moisture that changed into programmed proper into a microcontroller-based totally gateway to manipulate water amount. The device become powered with the useful resource of photovoltaic panels and had a duplex verbal exchange hyperlink based on a mobile-Internet interface that allowed for facts inspection and irrigation scheduling to be programmed through an internet page. The automatic tool changed into tested in a sage crop discipline for 136 days and water monetary financial savings of up to ninety% in comparison with traditional irrigation practices of the agricultural vicinity had been finished. Three replicasof the automatic device were used successfully in

other locations for 18 months. Because of its power autonomy and coffee rate, the machine has the ability to be useful in water limited geographically isolated regions.

II. LITERATURE REVIEW

Existing System

The existed structures for Agriculture monitoring is involved with Bluetooth technology which is likewise Wi-Fi technology used to check the situation of the Agriculture area. And in this tracking system we are able to manipulate gadgets but it's far restricted to a positive distance. The drawbacks with the existed structures are it desires greater human efforts i.E. He should go to the sector for monitoring the sector circumstance and estimate the operating time for a particular element. Monitoring the field is up to a sure distance round 100 meters. Till date many techniques have come into existence in which the region water is limitedly fed on. A approach in which monitoring water reputation and located on repute of water whether or not it's far excessive or low irrigation is scheduled that's located on temperature of plant.One more system is utilizing expertise on volumetric water content and save water, as a substitute of the scheduled irrigation at a normal time of day and presenting water simplest for a chosen duration. This above approach sincerely opens the valve and deliver water to bedding vegetation when volumetric content material of water is low. In the existing machine there have been used sensors with Bluetooth technology. The Bluetooth is a device so that you can speak to a confined distance. In order to overcome this trouble the subsequent present gadget were delivered.

Proposed System

Agriculture plays the essential position in economics and survival of humans in India. Nowadays Indian agriculture faces a two fundamental problem. They are as follows we recognize government has promoted a loose deliver of strength for farmers to run their automobiles and pumps for irrigation purpose. But it is found that the farmers misusing the strength to run their home home equipment including radio, TV, fans, and so forth. This misuse of energy has introduced a sizable problem for authorities to supply loose strength. The principal intention of this venture is to design low price Automated Irrigation System the usage of a Wireless Sensor Network and GPRS Module. The Purpose of this challenge is to provide embedded primarily based gadget for irrigation to reduce the manual tracking of the sector and get the records within the shape of GPRS. This proposed gadget acknowledges whether or not the unfastened strength has been used aside from electric motors for pumping water and in that case strength is being misused, it shuts the full deliver for the farmers via a tripping circuit. By the use of wi-fi networks we will intimate the strength board approximately these mal practices. The development of this assignment at experimental scale within rural areas is provided and the implementation became to illustrate that the automated irrigation can be used to reduce water use.

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BLOCK DIAGRAM:

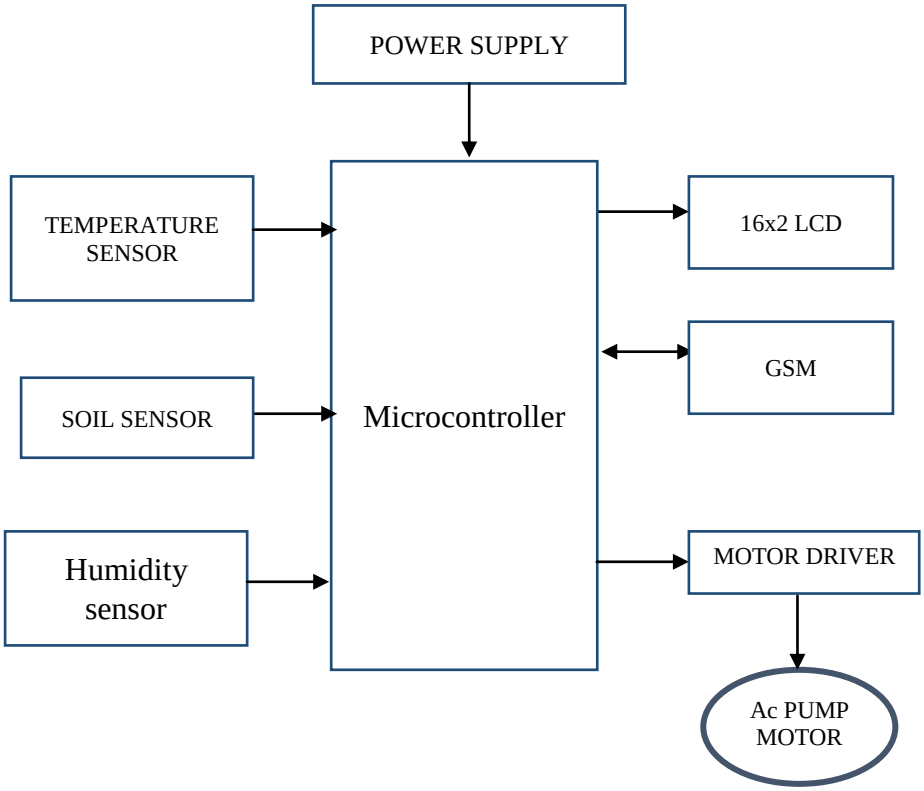

Fig 1: block diagram

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.

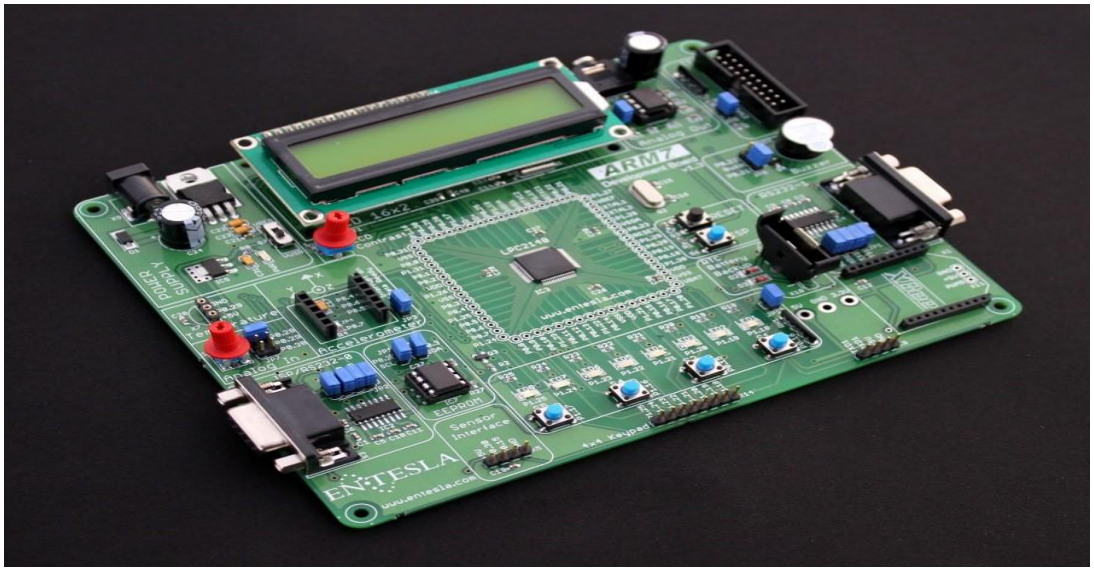

Fig 2: ARM 7 board

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

Temperature sensor

The LM35 series are precision protected-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 for that reason has a bonus over linear temperature sensors calibrated in Kelvin, because the person isn't always required to subtract a massive steady voltage from its output to obtain convenient Centigrade scaling. The LM35 does no longer require any outside calibration or trimming to provide popular accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a complete −55 to +150°C temperature variety. Low rate is confident through trimming and calibration at the

wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or manipulate circuitry specially clean. It may be used with unmarried electricity additives, or with plus and minus elements. As it attracts most effective 60 μA from its deliver, it has very low self-heating, much less than zero.1°C in nevertheless air. The LM35 is rated to carry out over a −55° to +150°C temperature variety, while the LM35C is rated for a −40° to +110°C variety (−10°with progressed accuracy).

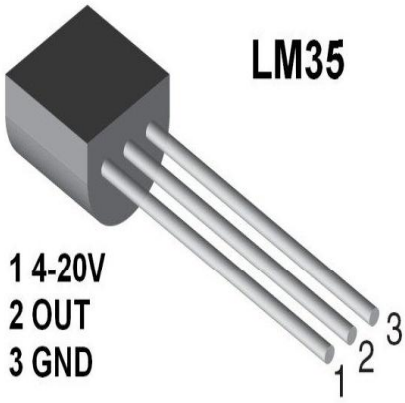

Fig 4 :temperature sensor

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. Movable probe instruments are employed by farmers or gardeners.

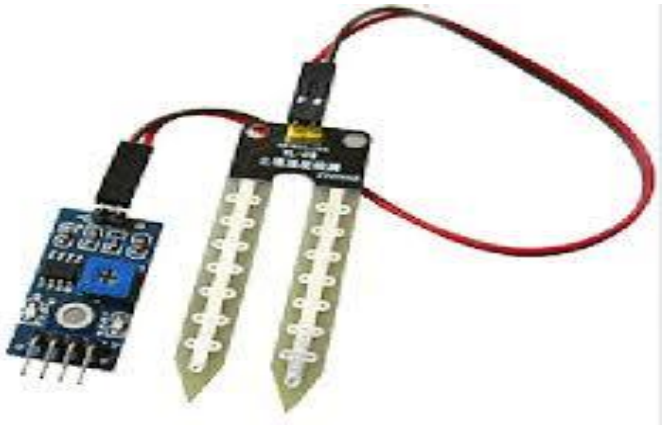

Fig 5:soil moisture sensor

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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.

Fig 6: l293d driver ic

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

III. 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. Keil uVision
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.

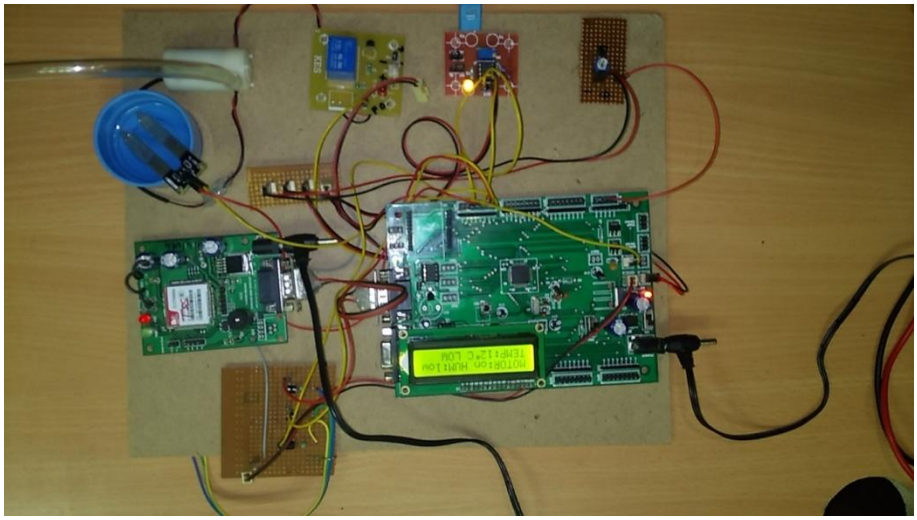
The flash magic is a programming software. The C/C++ software is written in IDE may be processed into Hex document i.e. hex file. By using the hex file we will dump the file into microcontroller and perform the task with respective application.

IV. 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 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.

V. 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.



VI. 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.

REFERENCES

[1.] Ahonen, T., Virrankoski, R., Elmusrati, M. (2008). Greenhouse Monitoring with Wireless Sensor Network. Proceeding of Mechtronic and Embedded Systems and Applications, 2008. MESA 2008. IEEE/ASME International Conference, pp. 403-408.

[2.] BeomJin, K., DaeHeon, P., KyungRyung, C., ChangSun, S., SungEon, C., JangWoo, P. A Study on the Greenhouse Auto Control System Based on Wireless Sensor Network. Proceeding of Security Technology, 2008. SECTECH '08, pp. 41-44.

[3.] S.Othman. Journal of Scientific Research, Vol.33, No.2, pp. 249-260.

[4.] Yang, S., Zhang, Y. (2010). Wireless Measurement and Control System for Environmental Parameters in Greenhouse. Proceedings of the Measuring Technology and Mechatronics Automation (ICMTMA), 2010, Vol 2, pp. 1099-1102.

[5.] K.Anuj et al.,"Prototype Greenhouse Environment Monitoring System," Proceedings of the International Multi Conference of Engineering and Computer Scientist, March 2010, Vol 2, pp.17-19

[6.] Vu Minh Quan, Gourab Sen Gupta, Subhas Mukhopadhyay, Intelligent Wireless Greenhouse Management System, Proceedings of Electronics New Zealand (ENZCon 2010), 22-23 November, 2015, Waikato, New Zealand (to appear)

Author Details

	**MACHA PAVANI** pursuing M.Tech (ES) from, visvesvaraya college of engineering and technology, Patelguda, Ibrahimpatnam, Ranga Reddy dist, Telangana,INDIA.
	**Dr.K. HEMACHANDRAN** working as professor, from visvesvaraya college of engineering and technology, patelguda, Ibrahimpatnam, Rangareddy dist, Telangana,INDIA.

	**H.RAGHUPATHI(HOD)**, working as assistant Professor from Visvesvaraya College Of Engineering And Technology, Patelguda, Ibrahimpatnam, RangaReddy dist, Telangana, INDIA.