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LOCATION BASED INDUSTRIAL PARAMETER MONITORING USING IOT

P.VEERA NAGAMMA [1] **Y.RAJU [2]**
nandiniiit8@gmail.com[1] raju.raju353@gmail.com[2]

[1] PG Scholar, Dept Of ECE, Kasireddy Narayan reddy college of Engineering & research, Abdullapur(v), Hayathnagar Mandal , Rangareddy Dist, Telangana, India.

[2] Guide, Assistant Professor, Dept Of ECE, Kasireddy Narayan reddy college of Engineering & research, Abdullapur(v), Hayathnagar Mandal , Rangareddy Dist, Telangana, India.

Abstract-Energy consumption for Data collection accounts for a significant part of the budgets of individual and collective users. This increases the importance of issues related to the monitoring of environmental parameters, in the first place, minimization of energy consumption. The goal of this paper is to develop, by employing Global Positioning System receivers, measurement techniques that are suited to the continuous monitoring of the Industrial parameters. This paper presents the design and implementation of GPS/GPRS (Global Positioning System/General Packet Radio Service) system for low power data acquisition using LPC2148 NXP based microcontroller for monitoring of the Industrial parameters. The system is implemented in Industry for a temperature, Humidity and unwanted gases monitoring. It contains GPS/GPRS gateway and analog sensor inputs. Acquisition module and the server base station are suitable for industrial applications, home applications and for other appliances. The proposed measurement procedures, which are different from commercially available measurement units, are based on general-purpose acquisition hardware and processing software, thus guaranteeing the possibility of being easily reconfigured and reprogrammed according to the specific requirements of different possible fields of application and to their future developments.

***Keywords**: GSM, GPS, LDR, CO.*

INTRODUCTION

Efficient power saving techniques must be designed and developed to control energy consumption by sensor nodes, which are tiny and can easily get damaged if battery power fails. Global Positioning System (GPS) is main technique used in Location Based Service (LBS) like wild life tracking, smart phones, cars etc. However, due to heavy computations, GPS increases the energy consumption.

World Wide Web, wireless communication tools and Gadgets are being extensively utilized by the youth via social networks, smart phone and GPS technologies. While on the move, young home owners are utilizing GPS and GIS technologies for road and personal navigation, texting each other using smart mobile devices, using social media to communicate and follow each other's news instantaneously. The wide spread popularity, acceptance and usage of these technologies has presented an opportunity to research and development engineers as well as information technology service providers to develop and provide Value added services. One such value added service can enable the digital native generation to access and interact with their home appliances and to monitor and control their home systems in addition to smart energy conservation while on the move. Recent developments in publically available web based Geographical Information Systems (GIS) and the availability of low cost integrated General Packet Radio Service (GPRS)/Global Positioning Systems

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(GPS) modem have enabled the development of embedded standalone Industrial monitoring systems.

LITERATURE REVIEW

In numerous environmental factors, temperature, Humidity, Light intensity is the most important and the most difficult to control environmental factor. And in some industrial areas there are some special requirements for it. In addition in recent years, energy and environmental problems become the hot topics that people concern, so we need energy conservation and Environmental protection. [1] Monitoring and control is very important in realizing industrial automatization and high efficiency [2]. With the development of modern industry, the requirement for industrial monitoring system is getting higher. The system is required to be able to acquire, save, analyze, and process real time data. It is also required controlling related instruments to change those environment factors and monitoring in long distance so that it realizes modern, intelligent, and accurate control [3]. Currently, most environment monitoring systems are using a distributed framework. However, under the framework, wired communication is usually used between host and frontend node, because of difficult wiring, limitation of control range of the system and high maintenance cost, this system can't be used widely. In order to solve these problems, focus on the combination of embedded technology, GPRS and internet technology to realize industrial monitoring system. [4].So, we use embedded technology& Ethernet technology for monitoring & controlling action. We will replace SCM (single chip microprocessors) with microprocessors based on ARM technology, which will greatly improve the overall performance of the system. The application of Ethernet and embedded technology makes the remote monitoring possible and give the stability, reliability, security, and real time of the data transmission.[5] It will effectively improve the scalability and maintainability of the control system and reduce the cost of the equipment maintenance. Base on these reasons, the system will meet the requirement of the centralized control.

PROPOSED SYSTEM

The position Based Industrial Monitoring & system using GPRS wireless technology is used to monitor the different industrial nodes through web server. In this project we design and implement a low price feature which is based on embedded platform for Industrial appliances monitoring as well as home appliances. In this we are using ARM7 based microcontroller for data analysis. Temperature, CO2, Humidity, LDR Sensors are gives analog data that will be given to the analog pins of the Microcontroller. GPRS, GPS communication devices are interfaced to microcontroller by using UART Protocol.

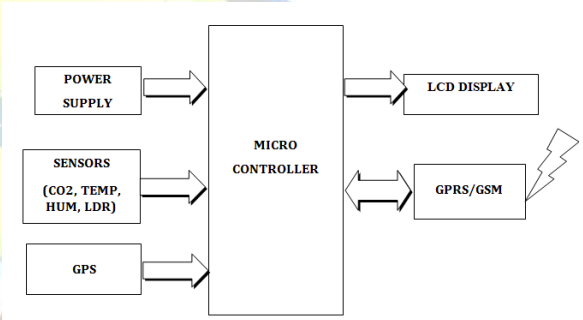

Fig.1. Block diagram

METHODOLOGY:

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

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Liquid-crystal display (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Temperature sensor:

A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting over current protectors, and self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of 1°C. [7] 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. The database stores the current month and also all the previous month data for the future use. Hence the system saves a lot amount of time and energy. Due to the power fluctuations, there might be a damage in the home appliances. Hence to avoid such damages and to protect the appliances, the voltage controlling method can be implemented.

Fig.2. Temperature sensor

Humidity sensor:

Humidity sensor is a device that measures the relative humidity of in a given area. A humidity sensor can be used in both indoors and outdoors. Humidity sensors are available in both analog and digital forms. An analog humidity sensor gauges the humidity of the air relatively using a capacitor-based system. The sensor is made out of a film usually made of either glass or ceramics. The insulator material which absorbs the water is made out of a polymer which takes in and releases water based on the relative humidity of the given area. This changes the level of charge in the capacitor of the on board electrical circuit. A digital humidity sensor works via two micro sensors that are calibrated to the relative humidity of the given area. These are then converted into the digital format via an analog to digital conversion process which is done by a chip located in the same circuit. A machine made electrode based system made out of polymer is what makes up the capacitance for the sensor. This protects the sensor from user front panel (interface).

Fig.3. Humidity sensor

Co2 sensor:

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, i-butane, propane, methane, alcohol, Hydrogen, smoke. The surface resistance of the sensor Rs is obtained through effected voltage signal output of the load resistance RL which series-wound. The relationship between them is described:

Rs\RL = (Vc-VRL) / VRL

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Fig.4. Co2 sensor

LDR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically. The animation opposite shows that when the torch is turned on, the resistance of the LDR falls, allowing current to pass through it. This is an example of a light sensor circuit: When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light. However, when light shines onto the LDR its resistance falls and current flows into the base of the first transistor and then the second transistor. The LED lights on. The preset resistor can be turned up or down to increase or decrease resistance, in this way it can make the circuit more or less sensitive.

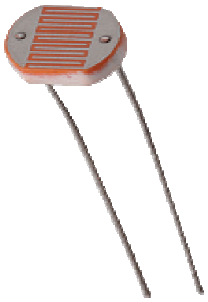

Fig.5. LDR

GPS:

Global Positioning System (GPS) technology is changing the way we work and play. You can use GPS technology when you are driving, flying, fishing, sailing, hiking, running, biking, working, or exploring. With a GPS receiver, you have an amazing amount of information at your fingertips. Here are just a few examples of how you can use GPS technology.

GPS technology requires the following three segments.

- Space segment.
- Control segment.
- User segment

Space Segment

At least 24 GPS satellites orbit the earth twice a day in a specific pattern. They travel at approximately 7,000 miles per hour about 12,000 miles above the earth's surface. These satellites are spaced so that a GPS receiver anywhere in the world can receive signals from at least four of them.

Control Segment

The control segment is responsible for constantly monitoring satellite health, signal integrity, and orbital configuration from the ground control segment includes the following sections: Master control station, Monitor stations, and Ground antennas.

User Segment

The GPS user segment consists of your GPS receiver. Your receiver collects and processes signals from the GPS satellites that are in view and then uses that information to determine and display your location, speed, time, and so forth. Your GPS receiver does not transmit any information back to the satellites.

The following points provide a summary of the

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technology at work:

- The control segment constantly monitors the GPS constellation and uploads information to satellites to provide maximum user accuracy
- Your GPS receiver collects information from the GPS satellites that are in view.
- Your GPS receiver accounts for errors. For more information, refer to the Sources of Errors.
- Your GPS receiver determines your current location, velocity, and time.
- Your GPS receiver can calculate other information, such as bearing, track, trip distance, and distance to destination, sunrise and sunset time so forth.
- Your GPS receiver displays the applicable information on the screen.

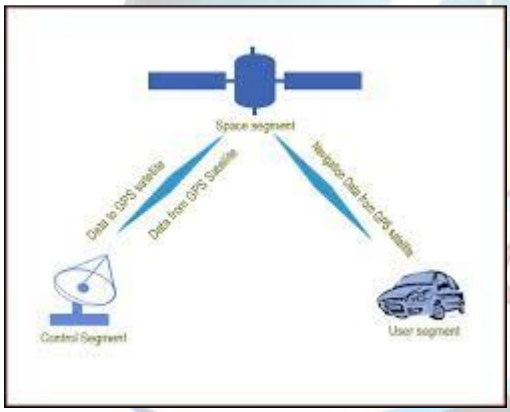

Fig: GPS Working

GPRS:

GPRS (general packet radio service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

Fig.6.GPRS module

CONCLUSION:

Motivated by the possibility of offloading GPS processing to the cloud, we propose a novel embedded GPS sensing approach called CO-GPS. This control system is designed for multiple input and output arrangements for industrial applications. The module is small, simple and flexible which performs different I/O operations remotely over GPRS module. There are different drawbacks of existing system like difficult of wiring, high maintenance cost and limitation of control range of the system. This system is implemented to overcome the drawbacks of existing system. System eliminates the need to send the service person to the particular application & control the industry. Thus it saves labour, time & money.

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AUTHOR'S PROFILE

P.Veera Nagamma is currently a PG scholar in ECE Department from Kasireddy Narayanreddy College of Engineering and Research. She received B.TECH degree from RGUKT- IIIT BASAR. Her current research interest includes Analysis & Design of embedded System Design.

Y.RAJU M.Tech, is received the Bachelor's degrees in Electronics and communication. He is currently working as Assistant Professor in Electronics and communication Engineering Department in Kasireddy Narayanreddy College of Engineering and Research.