WIRELESS DATA ACQUISITION SYSTEM FOR REAL TIME APPLICATIONS

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ABSTRACT

This venture introduces the standards of a low operational-cost however adaptable remote information securing framework. The fundamental center of the framework is implanted equipment which uses center ARM-7 processor to fulfil the information securing of the shut environment. Point of the task is to plan a remote information securing framework, for constant information preparing. Create ideal effective framework as far as permitting direct intelligent correspondence. The installed gadget conveys through Global System for Mobile Communication (GSM) which makes it available from anyplace on the planet through Short Message Service (SMS). A novel methodology is acquainted with minimize the operational expenses while working with a lot of information. The framework is shown to be suitable for distinctive implanted applications by connecting a few ongoing modules through proper interfaces. For this we need to exhibit basic installed framework with three sensors of temperature, mugginess and gas. The information ought to be straightforwardly exchanged through SMS by GSM to GSM correspondence to the PC. By utilizing MATLAB yields are plotted on PC. This point examines to construct a little estimated, minimal effort remote information obtaining framework.

INDEX TERMS - Data Acquisition Embedded System, Global System for Mobile Communication (GSM), MATLAB, Real Time.

INTRODUCTION

With their constant advancement, remote correspondences innovations have been connected to life widely. There are a few regular remote correspondence advancements, for example, Bluetooth, WSN [2], wifi, zigbee, IrDA, GSM et al. Be that as it may, there exist numerous issues in the information accumulation procedure, for example, dreary human work, complex link associations, continuous prerequisite of information handling and electromagnetic impedance. Considering the application scope of different procedures, the expense of information transmission, security, dependability and different elements,

Bluetooth correspondences and remote sensor systems are the most suitable strategy in short range remote correspondence and information transmission [4].
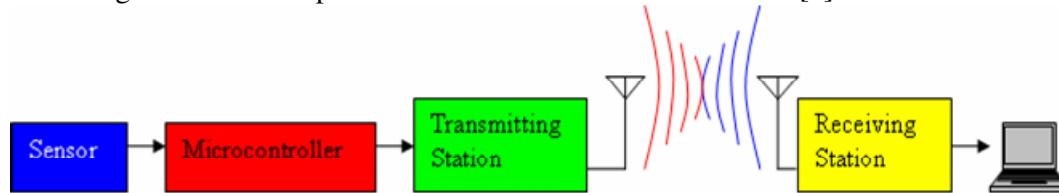

Figure 1: wireless data acquisition system

Remote gadget Networks is partner heavenly innovation that may sense, measure, and assemble data from this present reality and, bolstered some local call strategy transmit the identified data to the server.

GSM is a remote correspondence innovation; most prevalent today for transmitting information anyplace on the planet through SMS with the assistance of versatile phones.[5],[6]

General Packet Radio Service (GPRS) is picked as the particular portable correspondence convention to use as it gives a dependably on-line Inter association with no time based charges. SMS is an internationally acknowledged remote administration that empowers the transmission of alphanumeric messages between versatile endorsers and outside frameworks, for example, electronic mail, paging, and phone message frameworks. It is a store and forward method for transmitting messages to and from mobiles.

SMS advantages incorporates the conveyance of warnings and cautions, ensured message conveyance, solid and minimal effort correspondence system for brief data, capacity to screen messages and return brings in a particular manner and expanded supporter productivity[6].
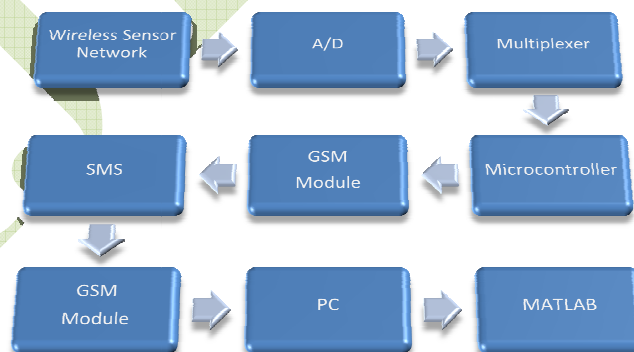
PROPOSED SYSTEM

Figure 2: GSM based Data Acquisition System

METHODOLOGY

Remote sensor systems are a critical pervasive figuring innovation attacking our surroundings. Sensor systems are inspiring more enthusiasm from the exploration and the business groups. They have been imagined in an adaptable number of utilization's like therapeutic, military and natural fields. Remote sensor systems are made out of an expansive number of modest detecting self-fueled hubs which assemble data about their surroundings and collaborate to impart the gathered information in a remote manner to a base station, called the sink [7]. Such systems give unlimited open doors in numerous fields, however extraordinary difficulties are forced by the inborn qualities of sensor hubs communicated as far as the constrained transmission control, the capacity limit and particularly the restricted vitality power.

A WSN more often than not comprises of spatially disseminated self-sufficient sensors to watch physical or natural conditions like temperature sound, weight, vibration, movement, CO, CO2, smoke or toxins and pass learning to base station [8]. Late advances in remote interchanges, regular reasoning and present processing, together with concentrated examination on the circle of WSN, have changed the strategy for propensity to act with the physical environment.

The remote sensor systems are a developing innovation which assumes a most basic part in natural checking and ready frameworks. In light of different relapsing systems any one can ready to screen information from anyplace through any kind of correspondence.
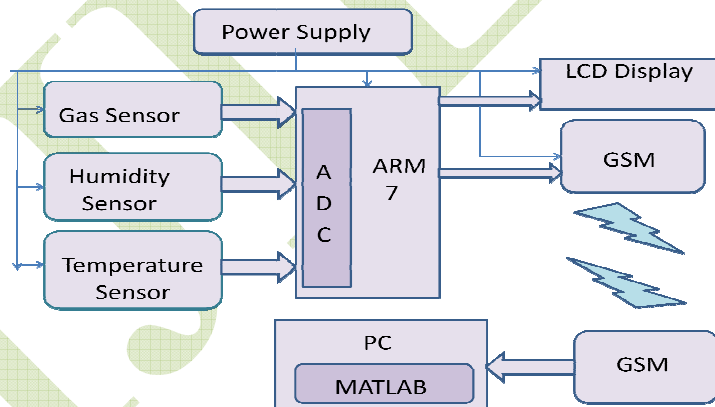
BLOCK DIAGRAM

Figure 3: Block diagram of Wireless Data Acquisition System

HARDWARE INFRASTRUCTURE

The main controlling part is the microcontroller ARM 7. We use LPC2138 microcontroller. Here we utilize remote sensor organize as a three sensors of gas,

Humidity and temperature sensor as indicated in above figure 3. Two numbers of GSM module used one as transmitting segment another as accepting segment. One LCD module is used at remote side and PC at host side is used where MATLAB is programmed to show the outcomes.

LPC 2138 ARM7 microcontroller:-
Features:
- High Performance 32-bit ARM7TDMI-S™ CPU
- 512 KB Programmable Flash Memory provides minimum of 10,000 erase/write cycles and 10 years of data-retention.
- 32 KB Data Memory (SRAM)
- Two 8-channel 10-bit A/D with conversion times as low as 2.44 us per channel.
- Single 10-bit D/A converter provide variable analog output.
- CPU Operating Voltage range of 3.0 V to 3.6 V

GAS Sensor (MQ5):-

Figure 5: Gas Sensor MQ-5

Features:
- High sensitivity to LPG, natural gas , town gas
- Small sensitivity to alcohol, smoke.
- Stable, long life, Fast response.
- Simple drive circuit.

Application:
They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, natural gas, town gas, avoid the noise of alcohol and cooking fumes and cigarette smoke.
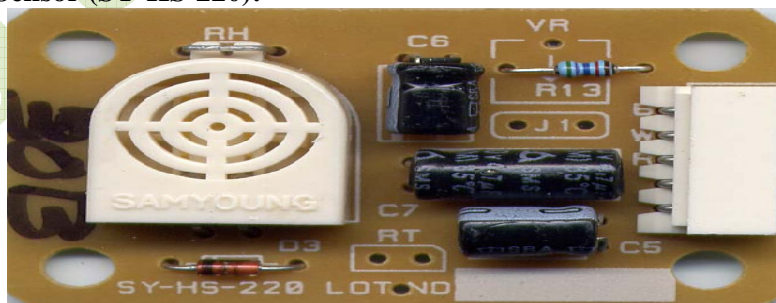
Humidity Sensor (SY-HS-220):-

Figure 6: Humidity Sensor SY-HS-220

Table 1: Specifications SY-HS-220

Items	SY-HS-220
Related voltage	DC 5.0V
Related Power	≤3.0mA
Operating Temperature	0~60°C
Operating Humidity	30~90%RH
Storage Humidity	Within 95%RH
Storage Temperature	-30~85°C
Standard Output	DC 1,980mV(at 25°C 60%RH)
Accuracy	±5%RH(at 25°C 60%RH)
Remarks	PCB unit containing thermistor or diode for temperature compensation

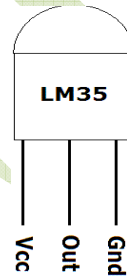**Temperature Sensor (LM35):-**

Figure 7: LM35 temperature sensor pin details

Features:-
- Calibrated directly in° Celsius (Centigrade)
- Linear + 10.0 mV/°C scale factor
- 0.5°C accuracy guarantee able (at +25°C)
- Rated for full −55° to +150°C range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Nonlinearity only ±1⁄4°C typical Low impedance output, 0.1 W for 1 mA load

Communication Media GSM module (SIM 900):-
General Features:
- Quad Band 850 / 900 / 1800 / 1900 MHz
- GPRS Multi-slot class 10 / 8
- GPRS Mobile Station class B
- Control via AT Commands (GSM 07.07, enhanced AT Commands)
- SIM Application Toolkit

- Supply Voltage Range 3.4V—4.5V
- Low Power Consumption

EXPERIMENTAL SETUP

As per the block diagram setup includes WSN with three sensors of gas , humidity and temperature sensor, LCD module, Power supply, Microcontroller, PC, two GSM modules on as transmitter another as receiver etc.

Figure 4 Experimental Setup

RESULTS

- The measured yields of the sensors joined at the remote framework are plotted on the diagram as demonstrated in the figure.
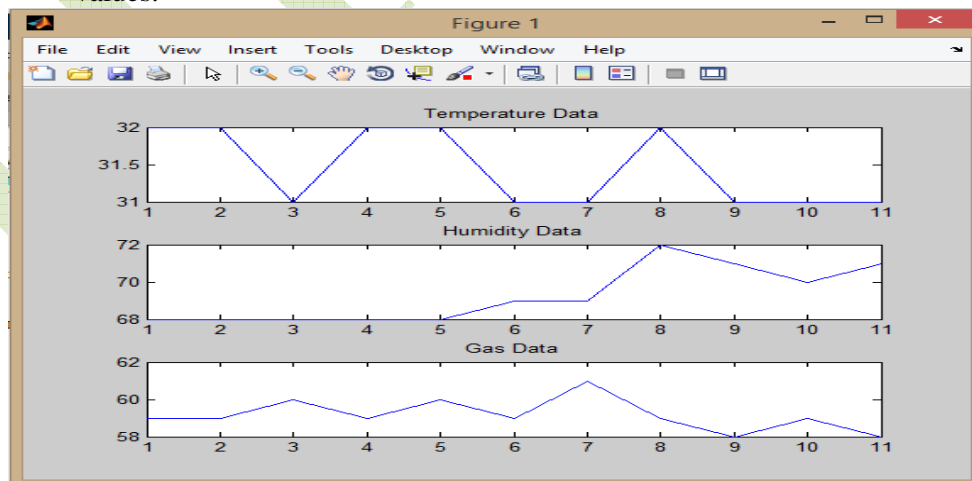- All subplots are plotted by number of readings versus there continuous values.

Figure 8: Plotted graphs of outputs

CONCLUSION

In this venture information is gathered from the remote inserted framework and exchanged to the PC through GSM correspondence. The remote interchanges are in light of the GSM system, on the Short instant message Service (SMS). Accepting the SMS at collector side GSM and is further examined by MATLAB with plotting the chart of constant information.

It has the benefits of not requiring links, low power utilization, shabby expense, great vigor, adaptable expansion, advantageous introducing over the conventional estimation and control framework.

This sort of Data securing framework can utilized for some application by changing the installed environment, for example, whether station checking, green house observing, at industry, activity light control, horticulture watering system framework and so on.

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