iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4 **Issue:** II **Month of publication:** February 2016

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Design and Development of Embedded based System for Monitoring Industrial and Environmental Parameters for Analyzing the Health of Human beings

P. Srilakshmi[1], N.Lakshmandas[2], C.Manikumar[3]
Department of Electronics/Physics, Gitam Institute of Science, GITAM University

Abstract— Pollution plays a major role in environmental and climatic changes and affects the health of human beings and animals also. The cause behind the increase in pollution is due to increase in number of vehicles and industries. Air pollution is one of the major problems which makes the living beings less comfortable and less happy. There is a need to monitor the pollutant levels and prevent the human beings to enter that polluted area for a while. The main objective is to design a system to monitor the environmental and industrial parameters of areas in Visakhapatnam. In this system, the temperature, wind, humidity, smoke, carbon monoxide (CO) levels are observed continuously to give alert to the human bodies from the environmental and industrial pollution when it crosses the specified safe level. The system is designed using ARM Processor LPC2148, GSM modem and various sensors. The Graphical User Interface (GUI) is designed using Visual BASIC.
Keyword— Arm processor, CO sensor, LDR, temperature sensor, GSM modem, Visual Basic.

I. INTRODUCTION

Pollution is increasing in our day by day life in the society. This pollution spoils the surroundings, water, soil and air of these pollution acts as serious aspects as the other can identify visually by taste, but the polluted air cannot be identified and it can be tasteless and colorness[1].Because of the air pollution causes many serious problems including weather,loss biodiversity,acidrain and stress on the food production [2]system.somany very dangerous gases spreading over the environment and damaging the climate[3].They are many causes of increasing the pollution there are smoke from automobile industries,vehicles,radioactive substance from chemical factories etc[4]. Air pollution is a major problem-not only for human bodies, but also the plants and stop growing properly. From these circumstances global warming is appearing and damaging the ozone layer [6]. To reduce the pollution many instruments are designed for environment. There are various improvement in the instrument of environment monitoring but still cannot built the good and healthy environment [7].

System is a way of working, organizing or performing one or many tasks according to a fixed set of rules, program or plan. In other words, an arrangement in which all units assemble and work together according to a program or plan. An embedded system is a system that has software embedded into hardware, which makes a system dedicated for an application (s) or specific part of an application or product or part of a larger system. It processes a fixed set of pre-programmed instructions to control electromechanical equipment which may be part of an even larger system (not a computer with keyboard, display, etc).A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. “Embedded” reflects the fact that they are an integral part of the system. In many cases, their “embeddedness” may be such that their presence is far from obvious to the casual observer.

II. BLOCK DIAGRAM

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

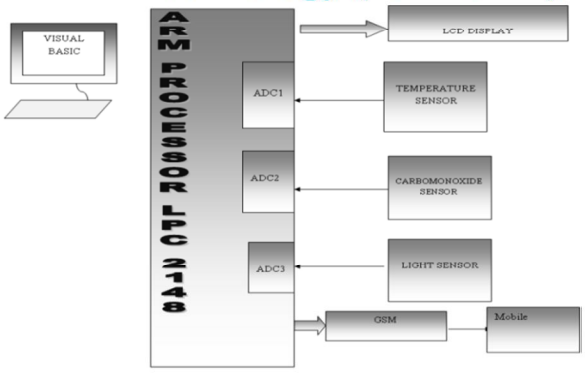


Fig.1.Block Diagram of the system

A. Co sensor

The MQ7 is a simple-to-use Carbon Monoxide (CO) sensor suitable for sensing CO concentrations in the air. It can detect CO-gas concentrations anywhere from 20 to 2000ppm. The sensitivity can be adjusted by the potentiometer. This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance. The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC.In this system co sensor device used to measure the co levels in overtime and sounds the alarm the sensor comes to dangerous level in the co accumulate in environment, giving precaution in that area the co concentration is high

Fig.2. CO sensor and its Circuit diagram

B. Light sensor

Light-dependent resistor (LDR) or photocell is a light-controlled variable resistor. The resistance of a photo resistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity.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 1MΩ, but when they are illuminated with light resistance drops dramatically. LDRs are using in electronic devices that need light detection capability, such as alarms, street lamps and clock radios.

Fig.3.LDR and its Circuit diagram

C. Temperature sensor

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

LM35 is a precision IC temperature sensor with its output proportional to the temperature (in oC). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. It also possess low self heating and does not cause more than 0.1 °C temperature rise in air.

Fig.4.LM35 and its Circuit diagram

D. LCD display

A liquid crystal display or lcd the name it is defining. It is combination of two states of matter, the solid and th e liquid .lcd uses liquid crystal to produce a visible image.lcd are super thin technology display screen that are generally used in laptops , computer and tv screens. Lcd' s technologies allow displays to be much thinner when comparing between cathode ray tube technology. The 16x2 display means it is displaying 16 characters per line and there are 2such lines. In this lcd each character is displayed in 5x7 pixel matrix.

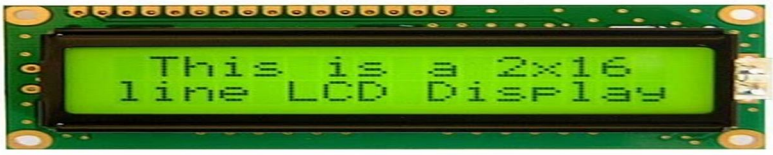


Fig.5.16X2 LCD Panel

E. GSM modem

A gsm modem is a specialized type modem which accepts a sim card, and operates over a subscription to a mobile operator just like a mobile phone .The gsm modem look like a mobile phone. where as a gsm modem communicate with computer through a serial cable, this allows the computer used to communicate over the mobile network. these gsm modems are most frequently used to provide mobile internet connectivity many of them also be using for sending and receiving sms and mms and information about the circuit also .Talking the readings from the circuit and sending the information which is displayed in the lcd that information has been sent to gsm and sending the data to mobile .

Fig.6. GSM module

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

F. Visual basic

VB is a third generation event driven programming language and integrated development environment from Microsoft for its com programming model. VB is defined from the basic programming language. There are some programming languages but those are text type language and there are not appow the user to work directly on graphics but the vb language user can directly access the graphics [9].

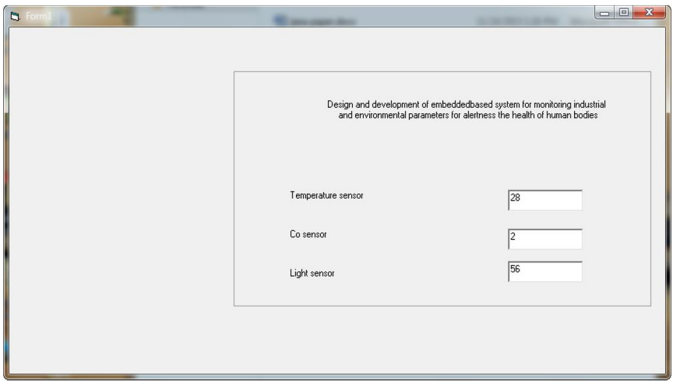


Fig.6.VB Screen

III. EXPERIMENTAL SETUP

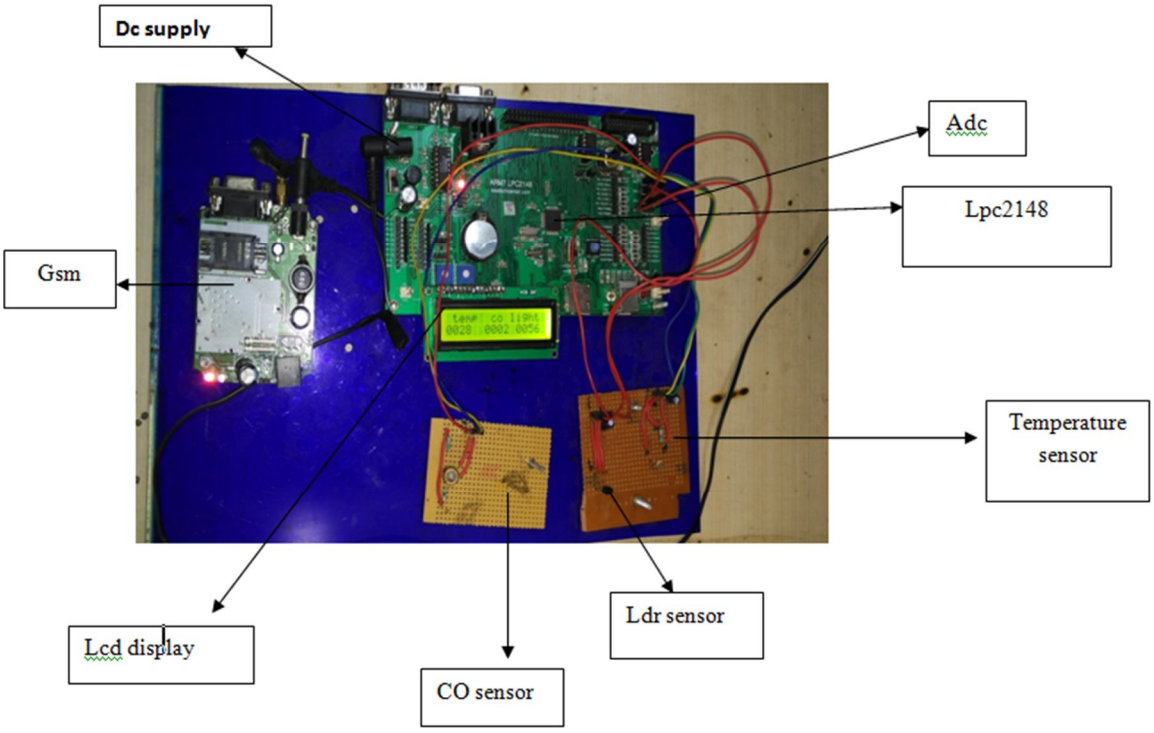


Fig.7.Experimental Setup

A. System hardware

The block diagram of microcontroller based system for monitoring industrial and environmental parameters is presented in fig. The system hardware consists of carbon monoxide unit, light intensity unit with photodiode unit as sensor, temperature measurement unit a 12bit analog to digital converter and lpc2148 arm microcontroller. The hardware is built with lpc risc microcontroller. It is a 32 bit Arm 7 TDMI-s processor with 128 kbon chip flash program memory and 64 kb on chip static ram. This device operates with a clock frequency with two uart units one with full modem interface,pwm unit,two 32 bit timers,realtime clock and watch dog timer.

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

This system is continuously monitors the temperature, light intensity, CO levels in the environment and industry regions. The system implemented by lpc2148 microcontroller for the issue of CO levels in the air pollution [2]. The embedded system is designed for the monitoring the co level in the environment and industrial area .The system measures the temperature, while morning hours temperature is low at that the pollution is less. Ldr measures light intensity of the system to but when light increases and the temperature gradually the pollution increases and the co level also increases at the moment the system will give the alertness to the people these the area of the co level is increases so that the the diseases can be attacked those are lung cancer ,headache etc…,to avoid diseases the alertness will be given to the human bodies.

B. Temperature sensor

In this system temperature sensor used for environmental conditions and is interfaced with lpc2148 .This system based on weather conditions.

TABLE 1: Temperature sensor output

	Dates			
Time	22-10-15	23-10-15	24-10-15	25-10-15
2:30am	28	27	28	28
5:30am	27	27	27	28
8:30am	29	30	30	29
11:30am	32	32	32	32
14:30pm	32	32	32	33
17:30pm	30	30	30	30
20:30pm	30	30	29	29
23:30pm	28	29	29	29

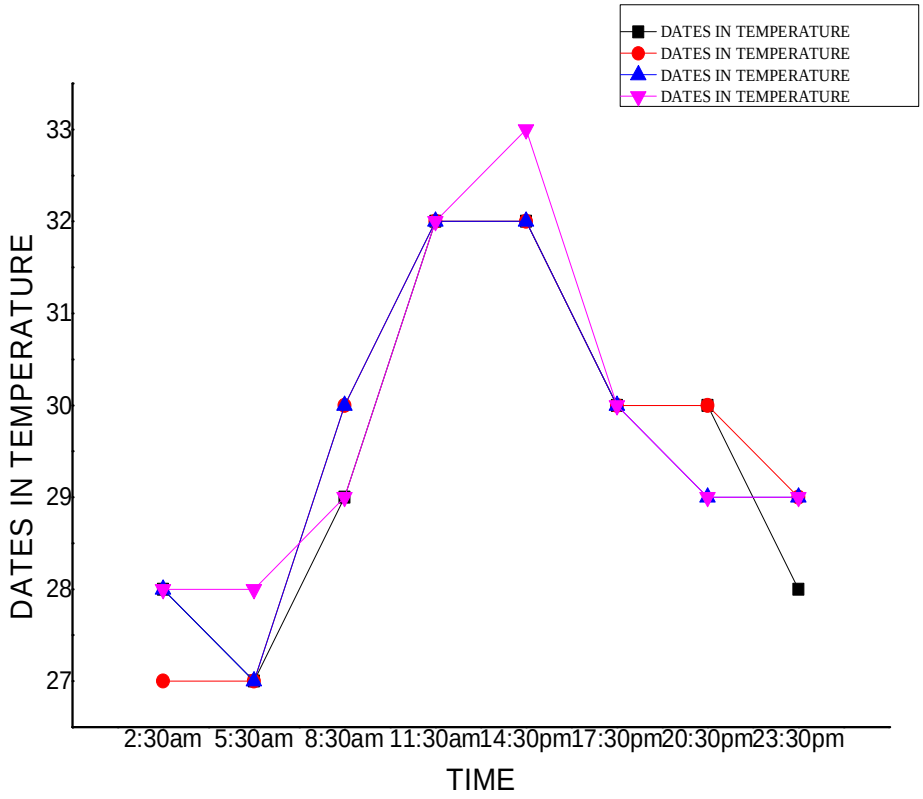


Fig.8.A simple graph of temperature versus date related to table 1

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

TABLE 2: Temperature Vs Time

Time	Temperature in °c	
2:30am	28	26.2
5:30am	27	27
8:30am	29	28.4
11:30am	32	31.9
14:30pm	32	31.8
17:30pm	30	29.9
20:30pm	30	29.2
23:30pm	28	27.1

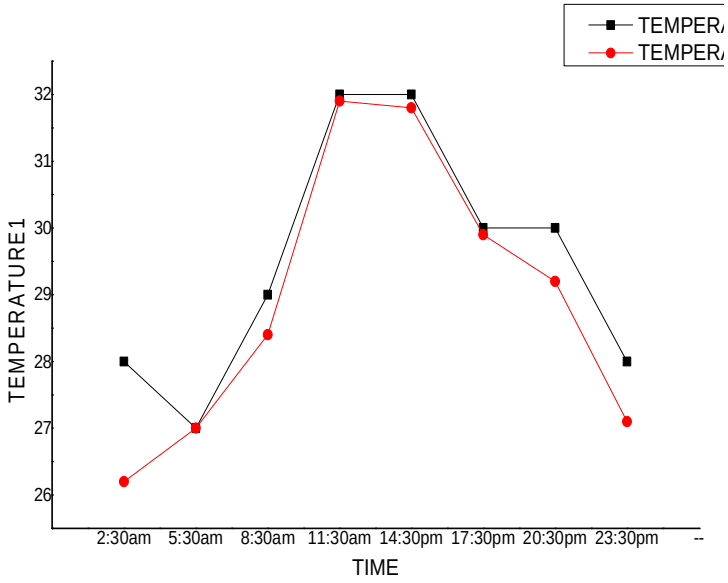
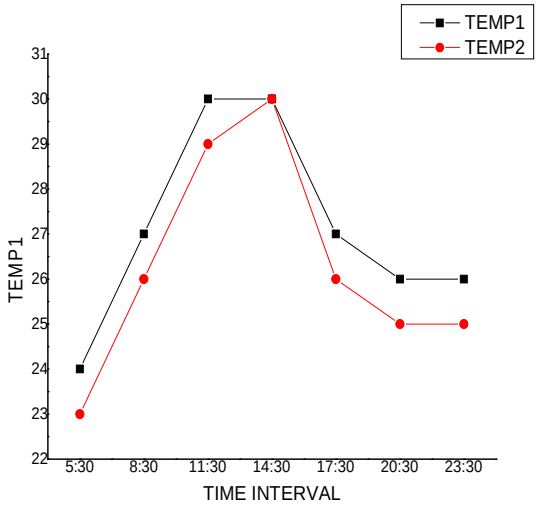


Fig.9.Graph related to table2

TABLE 3: Different Temperatures at Different times

Time	temp1	temp2
5:30	24	23
8:30	27	26
11:30	30	29
14:30	30	30
17:30	27	26
20:30	26	25
23:30	26	25



related to Table Fig.10.Graph

Volume 4 Issue II, February 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

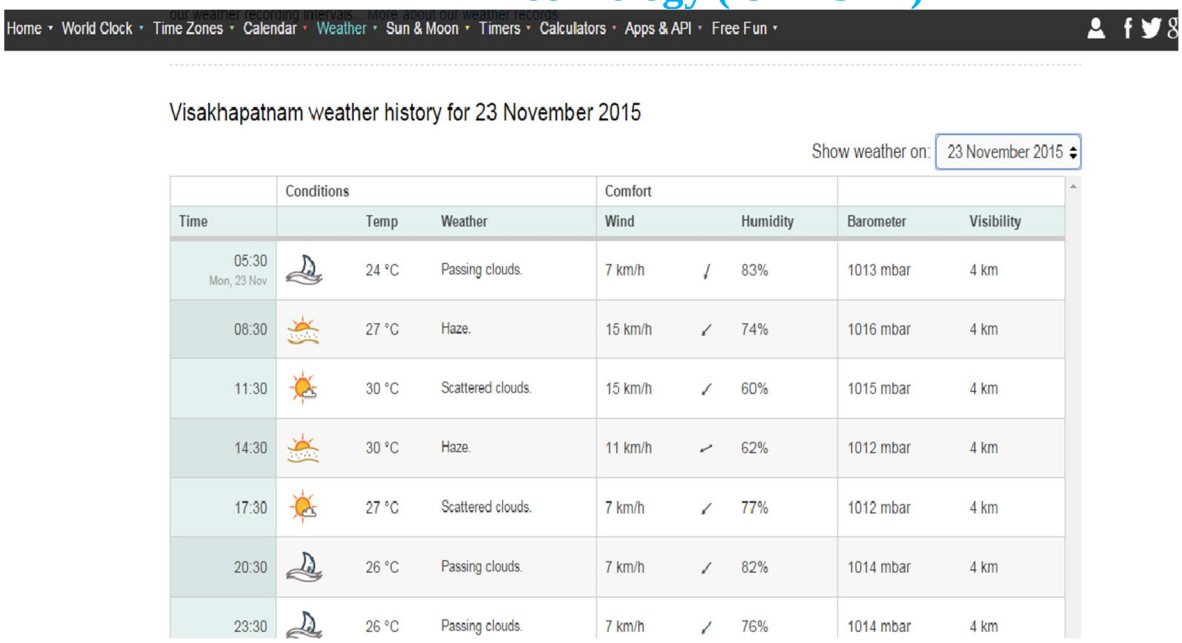


Fig.11.using temerature sensor the data has been taken again by using the machine and on that day weather forecast[8]

Website allowsdisplaying the temperature in the environmentover the Google weather report. with the help of internetconnectivity it is possible to display the temperature in environment using weather forecast system and the system also taken the temperature readings in this environment .by the values both the has been compared and plotted in the graph.[9]

C. CO sensor

In this system co sensor used for the purpose of carbomonoxide in the air on the day pollution increased and co is increased but some of the days less pollution also noted.CO concentration increases due to vehicles emission that's reason the pollution day by day increasing those the vehicles are increasing day by day also for that reason the health problems are increasing to avoid that problem the range of CO level is observed here.[10].

TABLE 4: Co sensor table*:*

	Dates			
Time	22-10-15	23-10-15	24-10-15	25-10-15
9:00	1.3	1.5	1	0.9
11:00	1.7	1.8	1.7	0.9
13:00	2	1.9	2	1.1
15:00	1.8	2.2	1.7	0.8
17:00	2.2	2	1.9	1
19:00	2.5	2.5	2.1	0.9

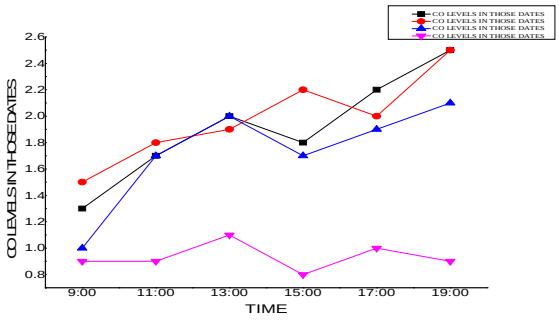


Fig.12.Graphical representation of CO sensor output

D. LDR sensor

Measurement of light intensity is a prime necessity in several occasions. such kinds of measurements are needed to design optimum lighting conditions of a whether the intensity of light in standard unit. This project is about a microcontroller based light intensity

meter where an LDR light sensor is calibrated. The microcontroller used in this project is lpc2148.

TABLE 5: LDR output

Time	Value
11:00pm	56
1:00 AM	90
3:00am	91
5:00am	75
9:00am	59
12:00	1.8
2:00pm	5.1
4:00pm	9.6
6:00pm	24.4
8:00pm	28.8

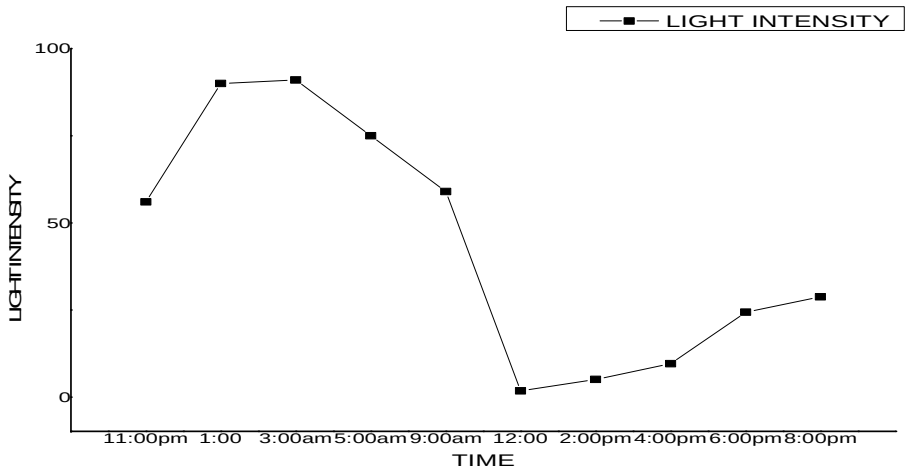


Fig.13.Graph of LDR output

IV. RESULT

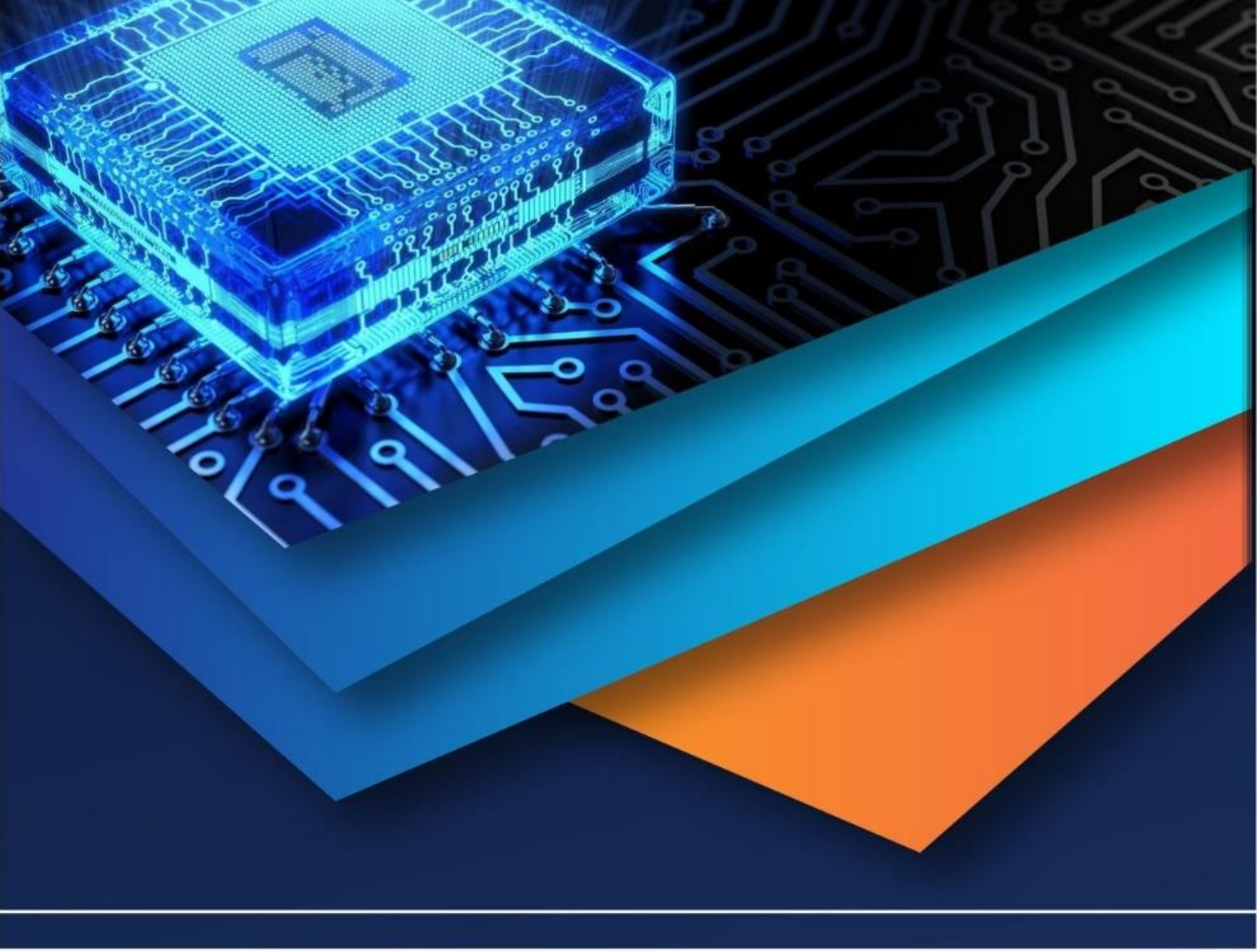
This system is compared with etl machine near port area .The error factor of this system ±1(one).the graph of temperature also Compared with weather forecast machine in google website nearby ±1 difference observed.

V. CONCLUSION

This system provide montoring the temperature light and co in environmental conditions prevention the health of humban bodies from the pollution. This system can place in both industry and environmental areas .

REFERENCES

[1] G.michael"an efficient interface for monitoring air pollution by using microcontroller base sensors","international journal of innovative research in computer and communication engineering," vol1,issue3,march 2013 ,ppn0 [622-627],ISSN (Print) : 2320 – 9798,ISSN (Online): 2320 – 9801.
[2] WHO, “Global Environmental Change,” World Health Organization,Geneva, Switzerland, 2005
[3] D. D. Lee and D. S. Lee, “Environmental gas sensors,” IEEE Sensors,J., vol. 1, no. 3, pp. 214-215, Oct. 2001 .
[4] Snehal Sirsikar and Priya Karemore"Review Paper on Air Pollution Monitoringsystem," International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 1, January 2015, ISSN (Online) : 2278-1021ISSN (Print) : 2319-5940
[5] Gaikwad Varsha Bhagwan and Puranik V.G "Real Time Air Pollution Monitoring UsingMobile Phone".International Journal of Innovative Research in Science, Engineering and Technology Volume 3, Special Issue 4, April 2014 ,An ISO 3297: 2007 Certified Organization, ISSN (Online) : 2319 – 8753ISSN (Print) : 2347 – 6710
[6] Aruljothi.R , “Air Pollution Measuring System with Mobile Sensor Arrays” International Journal of Scientific & Engineering Research,Volume 4, Issue 5, May-2013 ISSN 2229-5518.
[7] Haibao Wang, Tingting Wu ,And Guangjie Wu,”Air QualityMonitoring System Based On Frequency Hopping System 2010 IEEE.
[8] http://www.timeanddate.com/weather/india/visakhapatnam/historic.
[9] Elias Yaacoub,Abdullah Kadri,Mohammad Mushtaha,And Adman,Abu-Dayya,”Air Quality Monitoring And Analysis In Qatar Using A Wireless Sensor Network Deployment”596-601,2013 Ieee.
[10] Abdulkadir Baba HASSAN, Matthew Sunday ABOLARIN, Onawola Hassan JIMOH," The Application of Visual Basic Computer Programming Language to Simulate Numerical Iterations”,leonard journal of sciences, issue 9,july-december 2006,PGNO125-136,ISSN 1583-0233.
[11] Jen-Hao Liu, Yu-Fan Chen, Tzu-Shiang Lin, And Da-Wei Lai,Tzai-Hung Wen, Chih-Hong Sun, And Jehn-Yih Juang,Joe-AirJiangdeveloped Urban Air Quality Monitoring System Based OnWireless Sensor Networks 2011 Ieee.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY