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**ATMOSPHERIC CO<sub>2</sub> GAS AND TEMPERATURE MEASUREMENT ROBOT**

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**ABSTRACT**

In the age of industrial revolution the atmosphere is disturbed by the human acts one of which is the global warming, a major threat of this century. Thus in order to control these adverse effects an monitoring of atmospheric CO<sub>2</sub> and temperature robotic system is developed the system to collect data through various sensors. It gives a review of these systems based on existing technologies and also proposes an economical and generic automatic environment pollution control system based on wireless sensors with GSM for environment pollution control system controller and remote monitoring system. This system has simpler features of low cost and effective with less power consumption using sensors for remote monitoring and controlling devices which are controlled via SMS using a GSM module.

The system informs user about any abnormal conditions like temperature rise, even concentration of CO<sub>2</sub> via SMS from the GSM module to the higher authority mobile and actions are taken accordingly by the authority personnel. In future, the industry will be able to monitor and control the parameter by GSM technologies, and to provide safety and security for humans.

**KEYWORDS:** PIC 16F877A Microcontroller, LM35-Temperature Sensor, MQ7-Gas Sensor, MAX232, L293D Motor Driver, GSM Module

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**INTRODUCTION**

The increase in the development of technology and the human race, we failed to take care about the surroundings in which we live in. Thus we polluted the environment and thereby reducing the quality of the place we live. Even though there are several aspects of pollution such as soil, air and water pollution, out of these air pollution acts as the serious aspect as the other can be detected visually and by taste, but the polluted air cannot be detected as it can be odourless, tasteless and colourless. Hence there is a growing demand for the environmental pollution monitoring and control Robotic systems.

The system proposed in this work measures carbon dioxide using a gas sensor of a semiconductor type based on tin dioxide (SnO<sub>2</sub>) and is mainly a process of understanding the air quality to meet in one hand to a goal of miniaturization, low cost and portability, and it is a portable desktop instrument which measures carbon dioxide concentration and temp in air, within range of 20-2000 ppm and a resolution of 1ppm.

The LCD can display outputs concentration immediately in ppm. On the other hand to carry out either punctual measures in different places or to determine the temporal variations of a fixed site the concentration of carbon dioxide and temperature. This system offers two options for display: the first on an LCD display and the second via microcontroller via a MAX232 link. Considering the importance of temperature, its measurement is therefore incorporated into the measurement entity.

**MATERIALS AND METHODS**

PIC 16F877A

This is a CMOS FLASH based 8 bit, 40 pin microcontroller. It has five I/O ports. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface or the 2-wire Inter-Integrated Circuit bus and a Universal Asynchronous Receiver Transmitter (USART). It works at an operating voltage range of 2V to 5V. The microcontroller



*Table 1 The Motor Truth Table*

ENB	IN1	IN2	IN3	IN4	Description
0	0	0	0	0	Stop
1	0	1	0	1	Forward
1	1	0	1	0	Backward
1	0	0	0	1	Right Direction
1	0	1	0	0	Left Direction

The given assembly is controlled displacement has achieved by the DC motors. The synchronized working of two motors is performing the operation of moving on X and Y axis with forward and backward direction. The X axis for the horizontal lines Y axis for the vertical lines which has achieved by combines functioning of two motors. By giving command through master (Mobile) of "FF" it will receive by GSM *i.e.* slave and move, similarly for "RR","BB","LL". We are giving "DD" for data receiving at master side (Authority).

## RESULTS AND DISCUSSION

Experimental Results of Atmospheric CO<sub>2</sub> Gas and Temperature Measurement Robot as per samples are as shown in tables below.

*Table 2 The Output Table of Measured Temperature and CO<sub>2</sub> in different medium*

Sr. No.	Medium	Temperature		Gas (PPM) Standard	Gas (PPM) Average Measured	Present Content in Medium	% of CO <sub>2</sub>
		M	E				
1	Laboratory	23	24	400-500	397	FECL <sub>3</sub> , CO <sub>2</sub> Thinner, NH <sub>3</sub>	99.45
2	Smoke	26	24	>1500	1411	NO <sub>2</sub> , SO <sub>2</sub> , H <sub>2</sub> S, CO <sub>2</sub>	94.09
3	Petrol Pump	25	25	>700	604	CO, CO <sub>2</sub> , N, O <sub>2</sub>	86.4
4	Flames	45	44	500-700	438	HEAT, LIGHT, Carbon, Smoke	73.13
5	Home Environment	25	25	350-400	318	O <sub>2</sub> , CO <sub>2</sub> , CO, LPG, N	90.85
6	Kitchen	26	26	<600	438	LPG, O <sub>2</sub> , CO <sub>2</sub>	73.10
7	Square Point	25	25	>600	494	O <sub>2</sub> , CO <sub>2</sub> , CO, N, SO <sub>2</sub>	82.36
8	Bike Silencer	25	25	>1500	2285	CO, CO <sub>2</sub>	152.37

Table are showing the readings of both sensor of various possible medium to calculate the percentage of gas in that medium for getting the results of different given parameter.

In the above table the samples of temperature and CO<sub>2</sub> have been taken. For considering the readings are taken in different Medium, and taken the readings for more accuracy for giving the output of the system and the result of Percentage of CO<sub>2</sub> is calculated. The Output Table of Calibrated Temperature and CO<sub>2</sub> in different medium in Percentage

## CONCLUSION

By this system we can measure how the percentage of CO<sub>2</sub> is present in environment of different medium Industrial gas sensing and capturing in City of CO<sub>2</sub> pollution measurement. At the same time temperature is also measured.

Hence we get a very efficient PIC based controlled robot which will be very useful and gives a detailed mechanism of detection of temperature and CO<sub>2</sub> using Robot as well as send SMS through GSM to the authorised person. Such system helps human kind to work smoothly and comfortably in home, office or society for safety and security reasons.

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