

# Design and Development of Industrial Pollution Control System using LabVIEW

Isha Gupta, Rashpinder Kaur

**Abstract**—Many applications of pollution controlling systems are in industries. The control of the parameters which causes pollution in the industrial and natural environment pattern is a great challenge and has received interest from industries especially in paper making industries, chemical industry, Water treatment industries, Sugar manufacturing industries and grain mills. The main objective of project is to design an efficient and remote system to control the parameters causing pollution and to minimize the effect of these parameters without affecting the natural environment. The proposed methodology is to model a system to read, monitor and control pollution parameters and to inform pollution control authorities when any of these factors goes higher than industry standards. GSM and LabVIEW is introduced in this proposed methodology, which will automatically monitor and control when there is a pollution affecting the industrial environment. The system will be implemented using LabVIEW software. The system monitor level of pH in industry effluents, level of CO gas released during industrial process, temperature of the machineries and humidity in industry environment. With the design of GSM, the signals can be effectively transferred and the actions can still be made accurate and effective. Thus through this methodology we try to control pollution and the data can be transferred through SMS. LabVIEW is the powerful and versatile programming language for operating and controlling the pollution monitoring system and GSM is suitable for interactive environment for transferring signal.

**Index Terms**— GSM, LabVIEW, Humidity, pH, CO, temperature, Microcontroller (p89v51rd2).

## I. INTRODUCTION

Due to recent technological advances, the construction material for small and low cost sensors became technically and economically feasible. Even though, Industrialization increase the degree of automation and at the same time it increases the air pollution by releasing the unwanted gases in environment especially in industrial areas. So there should be a system to monitor and assess the industrial pollution. The terms monitoring and assessment are frequently confused and used synonymously. The process of industrial quality

assessment is an evaluation of the industrial quality in relation to standard quality set by pollution control board. Particular attention is given to factors which may affect human health and the health of the natural system itself. Environmental quality assessment includes the use of monitoring to define the condition of water, to provide basis for detecting trends and to provide the information enabling the establishment of cause effective relationships. Industrial monitoring is the collection of information at different locations of industries and at regular intervals of time in order to provide the data which may be used to define current conditions. Due to the complexity of parameters large variations are found between different industries. Similarly, the response to industrial impacts is also highly variable. Remote Monitoring, Control and intelligent maintenance is one of the most important criteria for maximizing production and process plant availability. The use of monitoring has also evolved to determine trends in the quality of the water, air and soil environment and how they are affected by the release of contaminant, and by waste treatment operation. More recently, monitoring has been undertaken to estimate nutrient or pollutant fluxes discharged to rivers, ground waters, lakes, oceans and soil or across international the boundaries. However, it should be noted that industrial environmental quality is very variable depending on local conditions.

Recently, there has been much interest in remote monitoring and control in the field of the industrial automation. A new surge of growth will come through new technology (Wireless) [1], production at the lowest cost for global distribution, and fast time-to-market. There has also been much interest in wireless communication [2] in industrial sector for uses in automation as well as to increase the safety and security standards. There is a great benefit for industries to adopt the wireless communication to control the systems. Due to the complexity of factors determining industrial qualities, large variations in parameters are found between different industries. Similarly, the response to industrial impacts is also highly variable [3]. A Wireless Industrial Automation communications system, at the present time, presents a mixture of standardized and proprietary technology.

## II. LITERATURE REVIEW

The control of parameter which causes pollution and deteriorates the industrial and natural environment pattern is a great challenge and has received interest from industries especially. This shows that in the industrialization especially where worker has to work for hours in the industry

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environment it become necessity to monitor the industry environment remotely and control the parameter which causes pollution in industry. The work presented in [4] introduced the wireless solution, based on GSM network for the monitoring and control of humidity in industries. This system provides ideal solution for monitoring critical plant on different sites. The wireless system is used which is [3] therefore more adaptable and cost effective it provides the password security against operator misuse. The GSM technology used in the system provides ubiquitous access to the system for the security and automated monitoring and control of humidity. In [5] designed a system which continuously monitors the soil moisture, water level of the well, temperature, humidity, dew point, weather conditions and provides the details about the field to user though SMS service to the controller.[6] this paper study is concentrated on comparison of various GSM approaches in irrigation system. The work presented in [3] is the system which investigates level of pH in industry effluents, level of CO gas released during industry process and temperature of the machineries. Thus through this project the author tried to prove that control of pollution can be computed and the data can be transferred online. The paper concludes that the method is more accurate to derive the desired parameters. In [7] has done the detailed survey on the Wireless Sensor Networks (WSN) as they are gaining the ground in all sectors homes to factories, traffic control to environmental monitoring. The air pollution monitoring system contains sensors to monitor pollution parameter in environment it simulated the three air pollutants gases including sulphur dioxide, carbon monoxide and carbon dioxide in air because these gases decides the degree of pollution level. This simulation creates the awareness in people in the cities.

### III. JUSTIFICATION OF RESEARCH

Industrial pollution monitoring is must as the Industrialization increase the degree of automation and at the same time it increases the pollution. This work proposes a PC based signal acquisition system. Its analysis can be efficient using LabVIEW and it is also cost effective method for industrialization pollution monitoring.

### IV. OBJECTIVES

The main objective firstly is to design hardware setup for pollution control and monitoring system. Secondly to design a virtual instrument to monitor humidity, temperature, pH level and CO level. Thirdly to interface the hardware system with software and other objective is to if the value increased by the threshold value do send the alert SMS.

### V. PROPOSED APPROACH

The industrial environment parameters is continuously sensed using different sensor, the first step is to sense the different parameters humidity level, pH, CO level, temperature. Sensor's output is in the form of analog signal as microcontroller take digital value so ADC will be used.

Secondly if there any change in the parameters it will be displayed on LCD and if the value of the different parameters exceed their threshold value the alert SMS will received through GSM module to the controller to take the control action the whole system will be controlled remotely by using LabVIEW software and GSM system

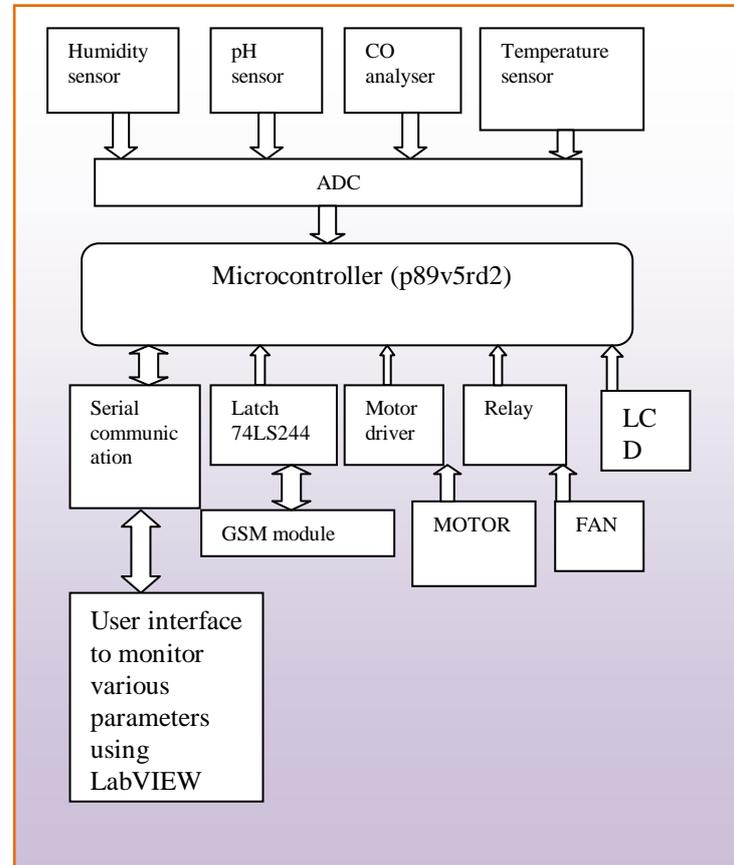


Fig. 1: Functional Block Diagram

### VI. APPLICATIONS

- For irrigation to remotely control the soil moisture and pH level as well as the temperature.
- In Petro chemical industry to check out the entire industrial environment by sitting away from site area.
- Reduce manpower as to regular monitor the pollution temperature, humidity, pH level and CO gas as control will done through sensors.
- In paper making industry to control the parameters which causes pollution and deteriorates the industrial and natural environment.

### VII. FUTURE SCOPE

The field of pollution monitoring and control is very wide and this is an attempt to monitor and regular inspections by the utility of Global System for Mobile communications. For alleviating these problems, advanced GSM system with LabVIEW is used. The performance and remotely the

pollution monitoring and control system can further be improved by implementing sensors for controlling dust, noise, smoke and other parameters, thereby improving the industrial and natural environment.

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