Large amount of pollution is created by industries so these parameters should be monitored. These polluting parameters cause the adverse effect on natural environment. For controlling the pollution first we should monitor all that polluting parameters. Most of the pollution is created by Petro chemical industries, Paper making industries, Water treatment industries and Sugar manufacturing industries. The main objective of our project is to design an efficient and robust system to control the parameters causing pollution and to minimize the effect of these parameters without affecting the plant or natural environment. The controlling action is always taken by the control authorities so it is necessary to inform them when any of these factors goes higher than industry standards. A mechanism using GSM and LabVIEW is introduced in this proposed methodology, which will automatically monitor when there is a disturbance affecting the system. The system is implemented using LabVIEW software. The parameters like CO, CO2, H2S and pH are automatically investigated by using different types of sensors. GSM is used to transfer the values of polluting parameters to control authority. In this system LabVIEW software is used because it is versatile programming language for operating and controlling the pollution monitoring system.
1. Introduction
From industries various polluting factors are illuminated to the atmosphere which affects on human health as well as environment. Because of these type of pollution the human being is suffered from various diagnosis problems like skin cancer, lung cancer etc. to reduce that problems or comfortness of human health because of that reason we need to monitor the polluting parameters.

The process of industrial quality assessment is an evaluation of the industrial quality in relation to standard quality set by pollution control board. Industrial quality monitoring is the collection of information at set locations of different industries and at regular intervals in order to provide the data which may be used to define current conditions, establish trends etc. Due to the complexity of factors determining industrial quality, large variations are found between different industries. Air pollution has become an extremely serious problem for the modern industrialized world. Air pollution may be defined as any atmospheric condition in which certain substances are present in such concentrations that may produce undesirable effects on man and ecosystem. Air pollution was earlier considered as a local problem around large point sources. But due to use of tall stacks and long range transport of pollutants, it has become a regional problem. Uncontrolled use of fossil fuels in industries and transport sectors has led to the increase in concentrations of gaseous pollutants such as CO, CO2, H2S and pH etc.

2. Literature Review
Industries are the main reason for pollution. The pollution is harmful for the environment the workers work in the industries for many hours. The pollution should not affect the health of these workers so there is need to monitor these polluting parameters. [1] Is the paper which deals with the monitoring system by using GSM and LabVIEW? In this project pH, CO, Temperature are monitored. LabVIEW is efficiently used for well graphical representation and whole day analysis. GSM is used to transfer the data which contain information about actual values of parameters.

Humidity is another parameter which should be monitored. It is included in paper [2]. It has used P89V51RD2 microcontroller which is suitable for its operation. In [3] the author has discussed about impact of pollution on the natural environment. Air pollution receives one of the prime concerns in India, primarily due to rapid economic growth, industrialization and urbanization with associated increase in energy demands. Lacks of implementation of environmental regulations are contributing to the bad air quality of most of the Indian cities. Air pollutants produced in any air shed are not completely confined, but at time trespassing all the geographical boundaries, hence do not remain only a problem of urban centers, but spread and affect remote rural areas supporting large productive agricultural land. Air pollutants pose risks on yield of crops depending on the emission pattern, atmospheric transport and leaf uptake and on the plant’s biochemical defense capacity. [4] gives us idea about using GPRS sensor array for air pollution monitoring system. In this project the array of sensors are moving from one place to another. These sensors monitor different polluting parameters in the particular area or city. Then this data is uploaded to internet in the form of packets. By using this project we can monitor pollution levels of different areas in different cities.
3. Functional Block Diagram

**Figure 3.1: Functional block diagram**

**ARM 7 LPC 2148**: It is 16/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package. 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory. 128 bit wide interface/accelerator enables high speed 60 MHz operation. USB 2.0 Full Speed compliant Device Controller with 2 kB of endpoint RAM. In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1 ms.

**GSM**: GSM (Global system for mobile communication) is the world’s first cellular system to specify digital; modulation and network level architectures and services. GSM module is used to send message to user. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

**LCD Display**: Display is interfaced with the ARM 7 LPC 2138. Once the fire is detected, it will display message and it will also display safety instructions on it.

**Power supply**: Power supply is used to provide the power to each block such as ARM 7 LPC 2138, camera, display, RF transceiver, IR sensor, etc.

**PH Sensor**: The Model PHE-45P pH Sensor measures the pH of aqueous solutions in industrial and municipal process applications. It is designed to perform in the harshest of environments, including applications that poison conventional pH sensors. All seals are dual o-ring using multiple sealing materials. The sensor is designed for use with the Omega PHTX-45 Monitor/Analysyr. Our pH sensors measure the hydrogen ion concentration of solution.
**CO2 sensor:** This Application Note begins with an introduction to non-dispersive infrared (NDIR) gas sensing. The use of the LMP91051 NDIR AFE and MSP430F55XX microcontroller to make accurate CO2 NDIR gas measurements is examined. Performance, power, speed, and size are compared against the traditional discrete op amp system.

**CO Sensor:** The 260-CO carbon monoxide (CO) detector is an accurate and reliable means of alerting building occupants of potentially dangerous levels of CO in the protected area. The internal electro-chemical sensor communicates with a sophisticated on-board microprocessor that accurately tracks CO levels over time.

**Hydrogen sulphide sensor:** This sensor is used to sense the hydrogen sulphide gas present in environment.

### 4. Description Of Circuit Diagram

![Figure 4.1: Circuit Diagram](image-url)
This is the diagram of Lab View and GSM based Industrial Pollution Monitoring System Using ARM7 microcontroller is interface with GSM module also it interface with four different sensors. The values of polluting parameters are measured by using respective sensors and these measured values are compared with the standard values stored in database. The sensors pH, H2S, CO and CO2 are connected to the port P0.27, P0.28, P0.29 and P0.21 respectively. Using GSM board we can send message to any mobile number which are stored into database. By interfacing the GSM modem with PC, GSM MODEM, SIM, microcontroller, power supply and also some connecting wires are the common peripherals required for developing GSM based applications.

5. Applications

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

6. Conclusion

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

References


Prof. S.S.Turakane, Sawant Suraj, Gaikwad Ganesh, Ranzane Vijay:
LabVIEW And GSM Based Industrial Pollution Monitoring System Using ARM 7