MONITORING AND CONTROL FOR INDUSTRIAL PARAMETERS USING LABVIEW AND MYRIO BOARD

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Abstract: ***Monitoring and controlling the signals for industrial applications using LabVIEW is one of the indirect methods of measuring the industrial equipments. Monitoring the industrial equipments are the one, which determines the physical parameters of the sensors whether the signals are within the range or out by analysing the physical parameters. It can measure the parameters in industrial equipments such as room temperature, direction of the myRIO board, pollution and distance. The main objective of the paper is to design the parameter and control the efficient signals from the industrial environment. In proposed system the LM35 sensor continuously measures the temperature in terms of Celsius, IR sensor continuously measures the object from the short distance in terms of centimetres, inbuilt accelerometer is used for moving the direction of myRIO board left, right, up and down and MQ-6 gas sensor detects the pollution level in percentage. The entire design is implemented in LabVIEW. In this paper sensors are embedded with myRIO board and to acquire the data from LabVIEW and are processed from the parameters, when it is exceeds the limit then alerts to the buzzer.***

IndexTerms: ***myRIO board, LabVIEW, LM35 Temperature sensor, MQ-6 gas sensor, IR range sensor, Industrial equipments.***

I. INTRODUCTION

The monitoring of industrial parameters and control the data can be done in factories and industries etc. In the industrial field to monitor the parameters such as temperature, pollution in air, to measure the distance of object. It is one of the most approaching problems on the industrial zone. If the parameters are not observed and controlled accurately, it leads to destructive situation. When the industries are facing these kind of position, because of some physical mistakes. The different sensors can be used to monitor the parameters such as LM35 temperature sensor, MQ-6 gas sensor and IR range finder sensor. These sensors can be used to analyze the values and sensed the parameters and handled by the LabVIEW software. If the processed values are within the limit there is no alert from the buzzer and if the processed values are cross the limit get the alert from the buzzer.

II. LITERATURE SURVEY

In this paper [1] , The LabVIEW for continuous information obtaining and checking through the arduino board. Arduino is a straight forward microcontroller board which has client characterized I/O sticks and also simple information on pins .The thermistor is continuously monitor the temperature that is directly connected with Arduino board to monitor the constant temperature in real time and it has been plotted on the chart as well in the front panel. Based on the control value to set the system and LED is ON for example, fans, high temperature cautions for the proper moves to be made to maintain a strategic distance from risky occasions.

The dominant part uses of industries and observing the frameworks to control the device [2], the control of the parameters which causes contamination and crumbles the mechanical and common habitat design is an incredible test and has gotten enthusiasm from ventures. The fundamental goal is to outline a productive and powerful framework to control the parameters causing contamination and to limit the impact of these parameters without influencing the plant or indigenous habitat. The proposed strategy is to display a framework to screen and contamination parameters and to illuminate contamination control specialists when any of these variables goes higher than industry gauges.

In this paper [3], the wind mill factories are exceptionally normal and fundamental now a day. The consecutive observing of the information is conceivable through the LabVIEW and any variety that must be made to keep up the solidness of the control system is finished with the assistance of ethernet network. The continuously monitor the information is possible through the LabVIEW and any variations done with system to keep the security of the control framework is finished with the help of Ethernet at any time.

The monitoring of human natural signals utilizing LabVIEW is one of the backhanded strategies for estimating the human organic parameters [4]. Natural parameters are the one in which decides if the individual is in ordinary condition or in irregular condition. Human body temperature, beat rate, pulse and breath rate are a portion of the human natural parameters which are utilized to decide the human body wellbeing condition. The parameters or the signs of the human body are estimated from the outer surface of the body in which it is known as the backhanded strategy.

III. DESIGN METHODOLOGY

The proposed system of the prototype is shown in Figure 1. The main part of the paper is NI myRIO board which is interface with LabVIEW software for analyzing the parameters such as temperature, distance and pollution in air. The NI myRIO connected to the sensors and sensed the data or control the data by using the graphical programming language in LabVIEW. The Reconfigurable input and output board consist of inbuilt functions such as SPI, accelerometer, UART and FPGA etc. The inbuilt function of the accelerometer is used to write the code by using the graphical user interface in labVIEW for analyzing the directions of up, down, right and left by using the board. To monitor the temperature in some physical quantities such as boiling the water, human temperature or freezing in ice cube etc, and control the data through the LabVIEW. To monitor the distance from the object by using the resolution method to control the data in graphical user interface. To monitor the smoke in air pollution by using the gas sensor and control the data in labVIEW. When all the parameters are cross the limit the user is alerted.

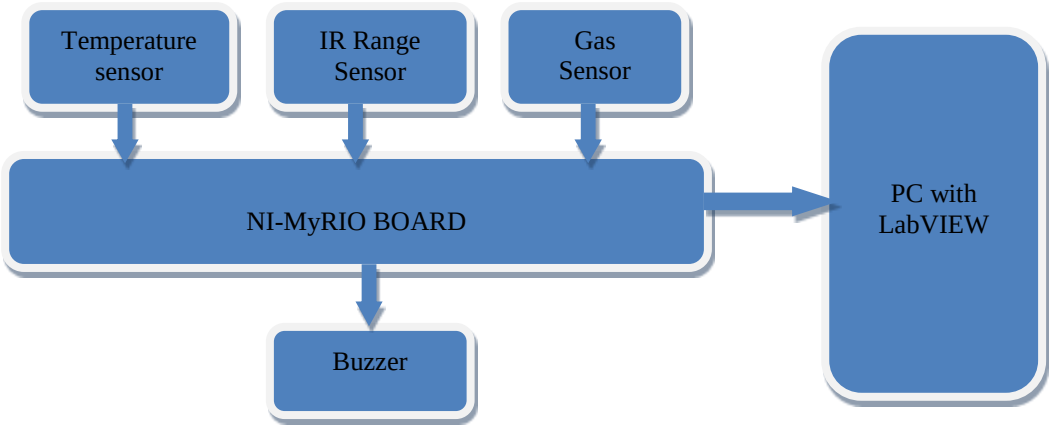

Figure 1: Block diagram of proposed system

IV. HARDWARE DESCRIPTION

The hardware that is used for implementation is the temperature sensor(LM 35), the gas sensor (MQ-6), the IR sensor (sharp GP2Y0A21YK0F) and myRIO board.

4.1 Temperature Sensor (LM35)

The attributes of temperature sensor are that in which it as a accuracy integrated circuit temperature devices with an output voltage directly corresponding to the centigrade temperature. The features of LM35 work at a operating voltage of around 4V to 30V as shown in Figure 2. The LM 35 comprises of 3 terminals where the primary pin is for Vcc, the second pin is for yield and the third pin is for GND. The input voltage (Vcc) will be as around 5V. The output is obtained from millivolts however the temperature is obtained degree in Celsius.

Figure 2: LM 35

4.2 Gas Sensor (MQ-6)

The MQ-6 gas sensor can be used to measure the gases like LPG and butane. When the measuring the gas in parts per million (PPM) can be used by the analog pin. It has TTL driven logic and it works on the 5V as shown in Figure 3.

Figure 3: Gas Sensor

4.1 IR Sharp sensor

The IR sharp sensor is used to measure the distance from the object. It has a specific light sensor to detect a possible selected light wavelength in the infrared spectrum. When the object is close to sensor, the light from the LED bounces off the object and into the light sensor.

V. SOFTWARE IMPLEMENTATION

LabVIEW is a graphical programming language for designing the different parameters by using the equations. It consists of front panel and block diagram. In the front panel consist of various control and indicators and block diagram consist of different input and output functions. The design of all three parameters can be used in labVIEW to obtain the correct format result. The parameters are used for simulation that is temperature sensor, gas sensor and IR range sensor.

5.1 Design of temperature sensor in labVIEW.

The implementation of the temperature sensor as shown in Figure 5. The design of temperature sensor can be connected to myRIO board and interface with labVIEW program to obtain the result in millivolt form and multiply by the scaling factor 100 and get the temperature is degree in Celsius. If the temperature is above the 35^0C and below the 25^0C by using the alert of indicator and compare the range in true block of case structure it shows the temperature is out of limits.

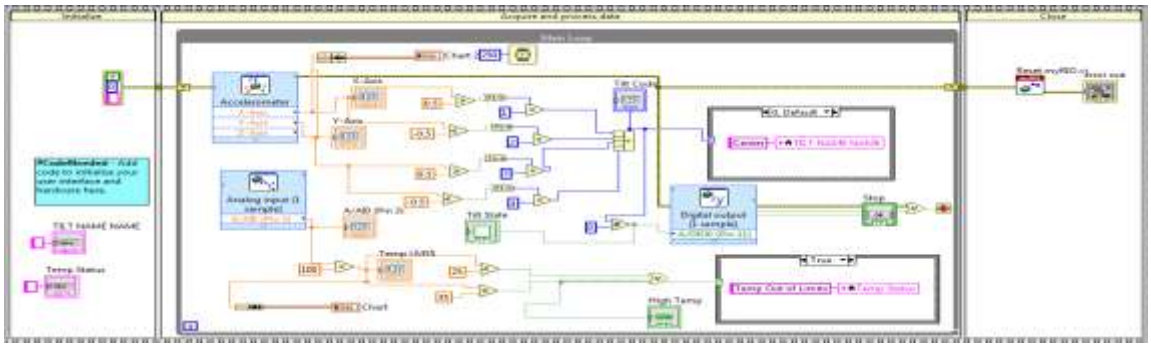

Figure 5: Implementation of temperature sensor

5.2 Design of gas sensor in LabVIEW.

The implementation of the gas sensor as shown in Figure 6. Here mq6 gas sensor is used to detect the pollution in air. If the clean air is one and full pollution is one by using the normalized method, and multiply by the scaling factor 100 for the normalized result and get the result is percentage level of the pollution. If the pollution is exceeds the 50%, So the user alerted from the buzzer.

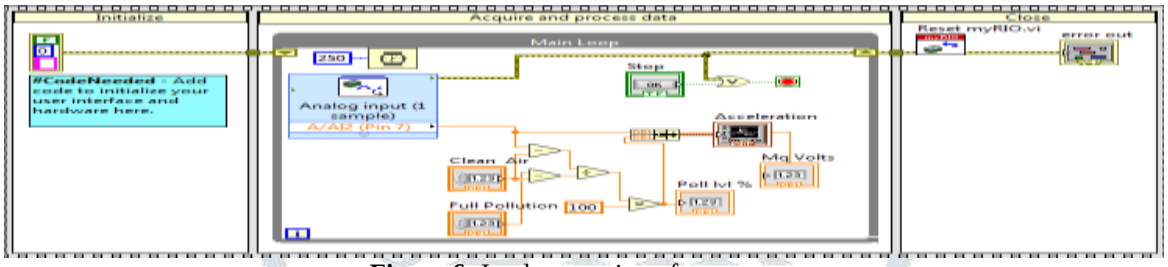

Figure 6: Implementation of gas sensor

5.3 Design of IR sensor in LabVIEW.

The implementation of the IR range sensor as shown in Figure 7. To measure the distance from the object by using the resolution method and obtained the distance in centimeters. If the distance is below the 15cm, so the user is alerted from the buzzer.

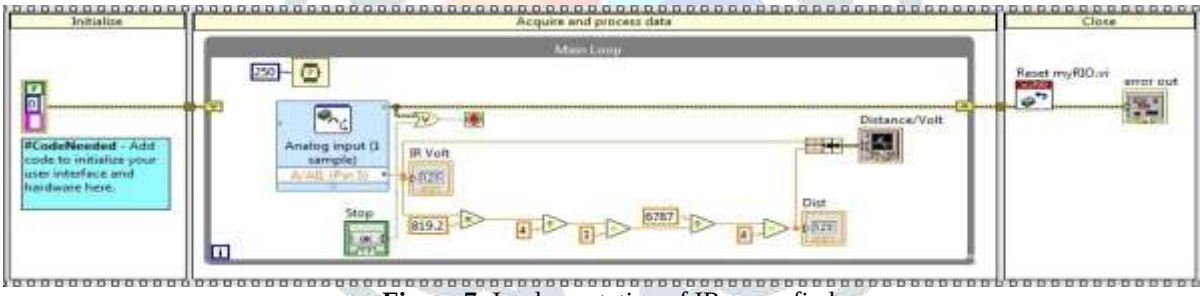

Figure 7: Implementation of IR range finder

VI. RESULTS AND DISCUSSION

The simulation results obtained from the industrial parameters such as temperature, gas and IR rangefinder sensors. The output is obtained from the front panel of the labVIEW as shown in following simulations.

6.1 Simulation of Temperature sensor

The output is obtained from the sensor is millivolt form to degree in Celsius. The range of the temperature is 25 to 35 ^{o}C and the signal is within the limits as shown in Figure 8(a). The range of temperature is below the 25^{o}C and above the 35^{o}C it indicates on the Temperature is out of limits as shown in Figure 8 (b).

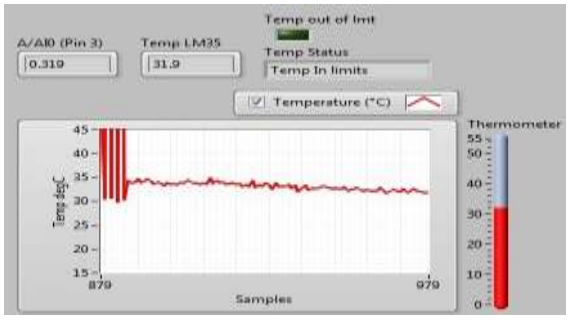

Figure 8(a): Temperature is within the Limits

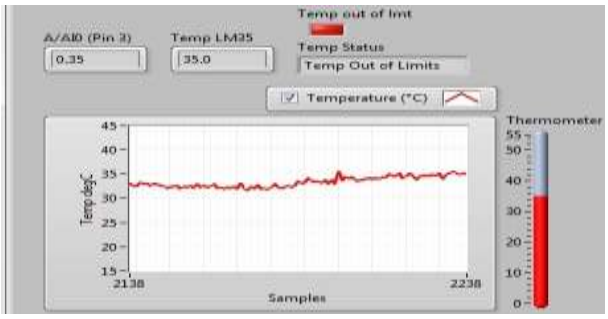

Figure 8(b): Temperature is out of Limits

6.2 Simulation of Gas sensor

The output of the voltage is obtained from the gas sensor. Normalization can be done with when the clean air is minimum and the full pollution is maximum and the percentage of pollution level is increased as shown in Figure 9.

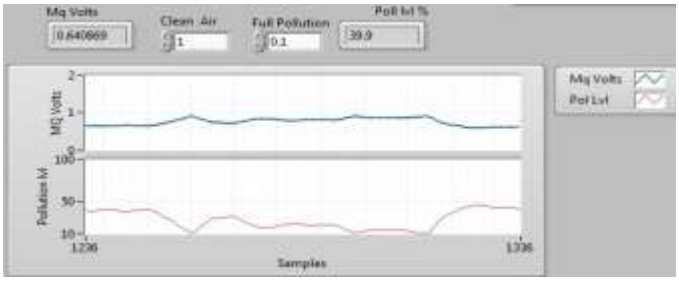

Figure 9: Simulation of gas sensor

6.3 Simulation of IR sharp distance sensor

The output of the voltage is obtained from the sensor. When the distance is increase the voltage is decrease by using the resolution method. It is used to measure the distance from the object in centimeters as shown in Figure 10.

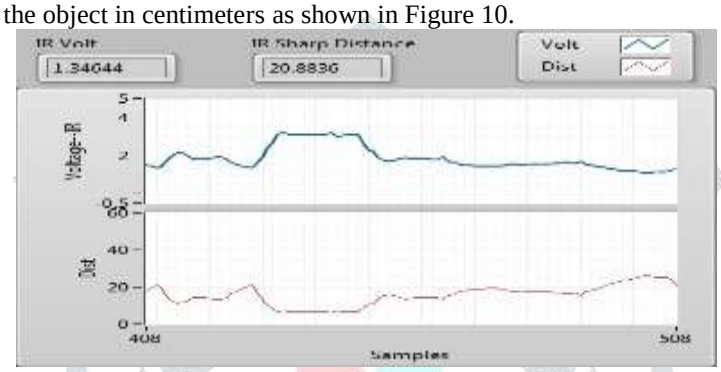

Figure 10: Simulation of IR range finder

The comparison of parameters results such as temperature, distance and pollution in air as shown in Table 1 and plot the graph of different values as shown in Figure 11.

Table 1: Comparison of Different parameters

SL NO	No. of Samples	Temperature in ^{o}C	Distance in cm	Pollution in ppm
1	1-100	25	20	35
2	101-200	35	15	45
3	201-300	40	10	50
4	301-400	45	5	80

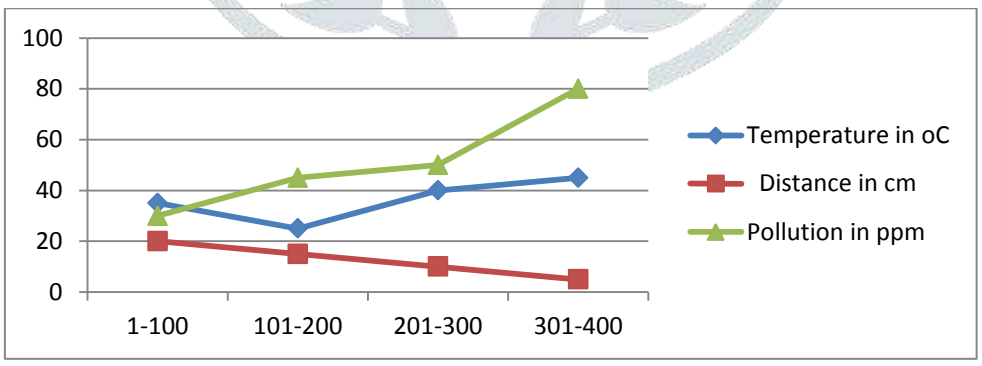

Figure 11: Plot the different parameters of Temperature, Distance and Pollution in air

VII. CONCLUSION

The signals are being acquired from the sensor and it is being noted down with the assistance of LabVIEW. The LabVIEW is interface with the myRIO board and embedded with different sensors for monitoring and control the parameters by using the alert system. So, the unusual and ordinary condition is being noted down. This kind of industrial signals observing is one of the most straightforward approach to monitor the parameters. The manner by which the signals is observed in the myRIO strategy. In this manner the signals are gotten in most straightforward way and the typical and unusual state of industries is additionally being noted down. The different industrial parameters are analyzed and further improvement on the wirelessly access the data from the parameters by using the myRIO and send the SMS through the GSM technique for monitoring the authority.

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