

Automatic Industrial Fault Detection And IOT Based Remote Monitoring

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Abstract- Industrial safety requires continuous monitoring to identify hazardous conditions before they cause damage or disruption. This paper presents an Automatic Industrial Fault Detection and IoT-based Remote Monitoring System. Sensors monitor temperature, smoke/gas, fire, light intensity, and human motion. Arduino Uno processes the readings and checks them against predefined thresholds. When an abnormal condition is detected, the system can activate an alarm or suitable output and send an alert through a GSM/GPRS module. Sensor information can also be sent to an online platform for remote monitoring. The proposed system aims to improve awareness of industrial hazards, support faster responses, and reduce dependence on manual inspection.

Keywords- IoT, Industrial Safety, Arduino Uno, Fault Detection, GSM/GPRS, Sensors, Remote Monitoring

I. INTRODUCTION

Industrial equipment and working areas need regular monitoring to maintain safe and reliable operation. Manual inspection may not identify a hazard immediately, especially when equipment is located in a large or restricted area. High temperature, gas or smoke, fire, and unexpected human movement can create safety risks. The Internet of Things (IoT) technology allows sensor data to be collected and shared for remote monitoring. This project combines sensors with an Arduino Uno controller and a SIM800L GSM/GPRS module. The sensors measure selected environmental conditions, while the controller processes their readings and initiates a response when a set limit is exceeded. A display provides local information, and remote communication supports alerts and online data viewing.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

The main objective is to develop a simple and cost-effective system for automatic monitoring of selected industrial safety parameters. The system is designed to detect abnormal temperature, gas or smoke, fire, and motion conditions, provide local alarm or actuator responses, and send notifications for remote awareness. Previous IoT-based

monitoring approaches demonstrate the value of connected sensors and communication modules in improving industrial safety. The proposed prototype brings these functions together using an Arduino-based controller.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

The proposed system is arranged in three layers:

1. Sensing layer: LM35 measures temperature; MQ-2 detects smoke or combustible gas; the fire sensor detects flame; the LDR senses light intensity; and the PIR sensor detects motion.
2. Processing and communication layer: Arduino Uno reads sensor inputs and compares the values with predefined limits. The SIM800L GSM/GPRS module supports SMS alerts and data communication.
3. Application layer: An online server or IoT platform can display sensor readings for remote monitoring. A 16×2 LCD provides local readings, while a relay module controls outputs such as a fan, alarm, and indicator LEDs.

IV. SYSTEM IMPLEMENTATION

At startup, the Arduino initializes the sensors and display, then continuously reads the sensor values. If readings remain within their normal ranges, monitoring continues. If a threshold is crossed or a hazard is detected, the controller activates the relevant output and sends an alert when communication is available. Example responses include switching on a fan for high temperature and activating an alarm for detected smoke or fire. The response must be configured and verified during testing.

Hardware requirements: Arduino Uno R3, LM35 temperature sensor, MQ-2 gas/smoke sensor, fire sensor, LDR, PIR sensor, SIM800L GSM/GPRS module, 16×2 LCD, four-channel relay module, DC fan, alarm, LED indicators, and a suitable power supply.

Software requirements: Arduino IDE and Embedded C for programming. PHP, MySQL, HTML, and an IoT

platform such as ThingSpeak may be used for server-side storage and online monitoring, if implemented.

V. REVIEW AND POSSIBLE IMPROVEMENTS

The prototype should be tested separately for each sensor and then as an integrated system. Testing can check whether the LCD displays readings, the alarm and relay respond correctly, and SMS alerts are received. Actual results should be recorded before making performance claims. Future improvements may include adding voltage and current monitoring, storing historical data, improving dashboard visualization, and using data analysis for early fault warnings.

CONCLUSION

The proposed Automatic Industrial Fault Detection and IoT-based Remote Monitoring System combines sensors, Arduino processing, and GSM/GPRS communication to monitor selected industrial safety conditions. By providing local responses and remote alerts, it can help users recognize hazards more quickly and support safer industrial operation. The final performance depends on sensor calibration, threshold values, network availability, and practical testing.

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REFERENCES

- [1] L. D. Xu, W. He, and S. Li, "Internet of Things in Industries: A Survey," IEEE Transactions on Industrial Informatics, vol. 10, no. 4, 2014.
- [2] K. U. Bhosale and A. B. Galande, "Progress of IoT in Industrial Automation," 2017.
- [3] P. K. Sase et al., "Arduino Based Single Phase Fault Detection System Using IoT," IRJET, vol. 7, no. 3, 2020.