Industrial Hazardous Monitoring Robot

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Accidents happening in chemical and process industries can be prevented by a gas monitoring system. Most of the existing systems use a distributive sensing, which is a tedious and complex process in terms of technology as well as cost. To overcome these hindrances in a simple prospective manner, we proposed an idea of a mobile monitoring robot which is cost effective and also an accurate sensing unit. It senses the hazardous gases as well as the fire and smoke by avoiding obstacles in its way, thereby alarming and sending a message to the authorities.

Industrial hazards are negative effects caused by an industry on human beings, environment, flora and fauna. Industrial hazards are of various types of dangerous chemical hazards that are often due to harmful gases like methane, carbon dioxide, carbon monoxide and ammonia. The levels of these gases have to be monitored continuously with a gas monitoring system.

Most of the industries are equipped with a distributive sensing based gas monitoring system that consists of a large number of sensors installed along the length and breadth of the industry and requires a central processing system. Since the data reception is parallel, data acquisition system requires large number of channels. In addition there is a need for advanced microcontrollers to process this data, resulting in a more complex system.

In this paper we discuss a portable gas monitoring system developed using simple gas sensors that overcomes the drawbacks of the existing system. Having only a single set of mobile sensors for the whole plant also makes the system cost effective.

The proposed system is equipped with three gas interfaced with microcontroller via signal conditioning elements. The system is also connected to the outside world by means of Global system for mobile communications (GSM). These gas sensors are mounted on a mobile robot implemented with obstacle avoiding algorithm, enabling it to move freely in the industry. Whenever the gas sensor detects a gas, the robot stops, gives an alarm and sends a message to the concerned operator using the GSM modem. Such mobile gas monitoring system with GSM technology requiring no human intervention at any stage makes it the first of its kind and finds a number of applications in an industry associated with harmful gases.