Abstract

Iman Gamal Morsi

Wireless Gas Detector System Using Microcontrollers, PLC and SCADA System for Monitoring Environmental Pollution

Gas identification represents a big challenge for improving detection and pattern recognition of each gas by using inexpensive gas sensor. This paper presents a gas detector system which is built to monitor, and measure gas pollutant emissions in the air and also used to detect different gases. The pollutants are ethane (C2H6) and methane (CH4) which are located beside the fertilizer factories in Alexandria Egypt and some other gases as hydrogen (H2), propane (C3H8) and isobutane (C4H10).The gas sensors TGS-2611, TGS-816, TGS-2620 and TGS-823 from Figaro Engineering Inc. are used to build agas detector system and it is located in the site of measurements. The data of each sensor is transmitted and received wirelessly using XBee module (DigiXBee 802.15.4) and microcontroller PIC 18F4620. The system is controlled and monitored by using programmable logic controllerPLC Step 7-200 from Siemens and Supervisory Control and Data Acquisition SCADA systems respectively. The principal component analysis PCA method is applied for clustering and distinguishing among different gases. The results indicate thatmethane can be detected using TGS-2611 better than other sensors.Isobutane can be detected by using TGS- 2620 and TGS-2611 better than others. Propane can be detected by using TGS-816 and TGS-823 better than others. Hydrogen can be detected using TGS-2620, TGS-816 and TGS-823 better than others.