

Abstract

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A Microcontroller Based on Multi Sensors DataFusion and Artificial Intelligent Technique foGas Identification

A microcontroller based gas sensing system is presented in this paper. The analysis presented here depends on thin film metal oxide gas sensors, TGS 822, TGS 813, TGS 2600, TGS 3870 and TGS 4160. The differences in the steady state performance among their sensors are used for improving their ivity and sensitivity, while the combination of gas sensors permits success in gas classification problems. In the approach the gas sensors are embedded into a chamber with a heating system. Different types of gases are used, such as, Methane, Carbon dioxide, Hydrogen, Propane and Butane to pass through this chamber with different concentrations and different operating temperatures. Sets of experimental measurements are done to detect the gas sensitivity for each sensor depending on the output volt of microcontroller, in relation to temperatures, concentration of gases, and variable resistances for each sensor. In this paper, a novel approach for the gas identification is based on the fuzzy technique. The identification rules are directly extracted from the data driven from the microcontroller in the form of (IF-Then rules), where membership functions are employed in the fuzzy classifier. The results of the fuzzy logic are shown to provide gas identification according to variation in different parameters, such as gas concentrations variation in sensor's resistance and output volt of microcontroller at different temperatures and to indicate that the ion of different gases is possible, based on microcontroller, which improves sensitivity and ivity with high accuracy and reliability