Journal of Sensors

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Research Article

A Robust and Low-Complexity Gas Recognition Technique for On-Chip Tin-Oxide Gas Sensor Array

Farid Flitti,[1] Aicha Far,[2] Bin Guo,[2] and Amine Bermak[2]

[1]School of Computer Science and Software Engineering, The University of Western Australia, 35 Stirling Highway, CRAWLEY, WA 6009, Australia

[2]Smart Sensory Integrated Systems Lab, ECE Department, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

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Abstract

Gas recognition is a new emerging research area with many civil, military, and industrial applications. The success of any gas recognition system depends on its computational complexity and its robustness. In this work, we propose a new low-complexity recognition method which is tested and successfully validated for tin-oxide gas sensor array chip. The recognition system is based on a vector angle similarity measure between the query gas and the representatives of the different gas classes. The latter are obtained using a clustering algorithm based on the same measure within the training data set. Experimented results on our in-house gas sensors array show more than 98% of correct recognition. The robustness of the proposed method is tested by recognizing gas measurements with simulated drift. Less than 1% of performance degradation is noted at the worst case scenario which represents a significant improvement when compared to the current state-of-the-art.