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An Interactive Software Tool for Gas Identification

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Abstract

This paper presents the design of an interactive graphical user interface (GUI) to monitor and quantify a developed electronic nose (EN) platform for gas identification. To this end, an EN system has been implemented using a multi-sensing embedded platform comprised of a data acquisition unit, an RFID module and a signal processing unit. The gas data are collected using two different types of gas sensors, namely, seven commercial Figaro sensors and in-house fabricated 4×4 tin-oxide gas array sensor. The collected gas data are processed for identification by means of dimensionality reduction algorithms and classification techniques where the software implementation and the quantification of these algorithms have been carried out. Subsequently, the GUI was designed to enable several operations. The GUI allows the user to visualize the sensors responses for any selected gas at any point of the acquisition process as well as visualizing the data distribution. Beside, it provides an easy approach to evaluate the EN system performance in terms of data identification and execution time by computing the classification accuracy using a 10-fold cross validation technique. Furthermore, the GUI, which is freely distributed, grants the users the privilege to upload other types of data to enable different pattern recognition applications.

Keywords: Graphical user interface (GUI), Electronic nose (EN), Gas identification, Gas sensor, Pattern recognition

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