Odour based human identification and classification using neural networks

ABSTRACT

Biometrics permits an individual to be authenticated and identified by computer systems following on a set of verifiable and identifiable data that are precise and unique in nature. This mechanism constitutes a cutting-edge method of identifying an individual since it precisely establishes more explicit and direct connection with humans than mere passwords since biometrics tend to use measurable behavioral and physiological characteristics of human. In this paper, a framework for human identification is proposed distinctively based on specific human odour features. 15 samples of female and male human odour are collected from different age groups, only 15 effective Volatile Organic Compounds (VOCs) are chosen. In this paper, several diverse functions of neural network activation are tested such as Levenberg-Marquardt backpropagation, Gradient descent backpropagation, and Resilient backpropagation. Besides, numerous neural network topologies are tested by means of variety hidden layers and different number of neurons and. Different energy functions were tested TAN- Sigmoid transfer, Linear transfer, and LOG- Sigmoid transfer. Considering the obtained results, employing two hidden layers with more neurons in the hidden layers- to be specific: 15 neurons in every layer- has yielded better accuracy in performance with an accuracy rate of 100%. The unsurpassed framework for algorithm learning to be used for human identification can be backpropagation learning algorithm named the Levenberg-Marquardt. The best function for activation established in this paper is the function of TANSigmoid transfer. The performance accuracy consistency in recognizing human can be enhanced using a big number of study samples.