Probabilistic neural network based olfactory classification for household burning in early fire detection application

Abstract

Determination of burning smell is important because it can help in early fire detection and prevention. In this paper, a household burning smell classification system for early fire detection application has been proposed using Probabilistic Neural Network (PNN) and PCA analysis. The experiments were performed on recorded smell samples from combustion of ten different commonly available household, including candle, joss sticks, air freshener, mosquito coil, newspaper, card board, plastic materials, Styrofoam and wood. All the experiments were done in a test chamber with humidity and temperature sensors. Portable Electronic Nose (PEN3) from Airsense Analytics is used as the measurement device. The smell source is placed 0.3m from the PEN3 and the time-series signal is measured for two minutes. The odour metrics is modelled using Probabilistic Neural Network. It is found that the average classification accuracy for the model is 99.62%.

Keywords;

Olfactory; Fire detection; Time series signal; Classification; Neural network