

Abstract

Odor emitted from agricultural production creates a potential nuisance and in some cases can make people feel uncomfortable, anxious and fretful. Using instruments instead of human panels to assess odors can save money and make the collection process more efficient. Cow operations were chosen as odor sources for this research. Odor samples from animal operations were collected. Two instruments, the eNose and zNose, were applied to collect measurements from odor sources separately. Feature extraction methods, PCA and fuzzy inference, were used to reduce the noise of the measurements. Three neural network approaches were used to predict human response to odor pleasantness on a generic hedonic scale that ranges from -11 (extremely unpleasant) to +11 (extremely pleasant). To increase the accuracy of the experimental results, sensor fusion technology was applied to combine the multiple inputs separately obtained by eNose and zNose to get one output. The results of sensor fusion were compared with the optimal results obtained by separate eNose and zNose assessments.