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Rapid identification of tea quality by E-nose and computer vision combining with a synergetic data fusion strategy

Running title: Tea quality identification by E-nose and computer vision

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Abstract: This research demonstrates a rapid detection method of jointly using electronic nose (E-nose) and computer vision system (CVS) to detect tea aroma and tea appearance for tea quality identification. Feature-level and decision-level fusion strategies were introduced for analyzing the fusion signals of E-nose and CVS. K-nearest neighbors (KNN), support vector machine (SVM) and multinomial logistic regression (MLR) were applied for classification modelling. The results showed that the decision making based on fusion strategies synergistically integrated the advantages of E-nose and CVS and obtained better performance than independent decision in tea quality identification. The decision-level fusion combining the SVM results of both E-nose and CVS was the most effective strategy with the classification accuracy rates of 100% for training and testing sets. This study manifests the simultaneous utilization of E-nose and CVS combined with the decision-level fusion strategy could be worked as a rapid detection method to identify tea quality.

Keywords: Tea; quality identification; E-nose; computer vision; data fusion.

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