

**E-Nose: spoiled food detection embedded device using machine learning for food safety application**

**Abstract**

This research aims to employ machine learning (ML) to classify the degree of contamination in leftover cooked foods based on their smell. This study evaluates the odour characteristics of typical leftover cooked lunch or dinner meals that are consumed locally in Malaysia. An easy-to-use e-nose application was attached to the food containers, consisting of four different types of sensors sensitive to various gases, to collect the data. RStudio is used to analyze samples in order to identify the odour classification of leftover Malaysian food. The accuracy ranged from 90% to 100% when using the oversampling and under sampling techniques. The results of this re-search showed satisfactory performances by Support Vector Machines (SVM) is superior compared to that of k-Nearest Neighbours (k-NN) in classifying the samples' contamination degree. As a result, the findings showed that the electronic nose used in this study was a promising method for classifying the degree of contamination in leftover cooked foods and predicting whether food is still edible or not.

**Keywords:**