

## **Indigenous food recognition model based on various convolutional neural network architectures for gastronomic tourism business analytics**

### **ABSTRACT**

In gastronomic tourism, food is viewed as the central tourist attraction. Specifically, indigenous food is known to represent the expression of local culture and identity. To promote gastronomic tourism, it is critical to have a model for the food business analytics system. This research undertakes an empirical evaluation of recent transfer learning models for deep learning feature extraction for a food recognition model. The VIREO-Food172 Dataset and a newly established Sabah Food Dataset are used to evaluate the food recognition model. Afterwards, the model is implemented into a web application system as an attempt to automate food recognition. In this model, a fully connected layer with 11 and 10 Softmax neurons is used as the classifier for food categories in both datasets. Six pre-trained Convolutional Neural Network (CNN) models are evaluated as the feature extractors to extract essential features from food images. From the evaluation, the research found that the EfficientNet feature extractor-based and CNN classifier achieved the highest classification accuracy of 94.01% on the Sabah Food Dataset and 86.57% on VIREO-Food172 Dataset. EFFNet as a feature representation outperformed Xception in terms of overall performance. However, Xception can be considered despite some accuracy performance drawback if computational speed and memory space usage are more important than performance.