

Recognition of food with monotonous appearance using speeded-up robust feature (SURF)

ABSTRACT

Food has become one of the most photographed objects since the inceptions of smart phones and social media services. Recently, the analysis of food images using object recognition techniques have been investigated to recognize food categories. It is a part of a framework to accomplish the tasks of estimating food nutrition and calories for health-care purposes. The initial stage of food recognition pipeline is to extract the features in order to capture the food characteristics. A local feature by using SURF is among the efficient image detector and descriptor. It is using fast hessian detector to locate interest points and haar wavelet for descriptions. Despite the fast computation of SURF extraction, the detector seems ineffective as it obviously detects quite a small volume of interest points on the food objects with monotonous appearance. It occurs due to 1) food has texture-less surface 2) image has small pixel dimensions, and 3) image has low contrast and brightness. As a result, the characteristics of these images that were captured are clueless and lead to low classification performance. This problem has been manifested through low production of interest points. In this paper, we propose a technique to detect denser interest points on monotonous food by increasing the density of blobs in fast hessian detector in SURF. We measured the effect of this technique by performing a comparison on SURF interest points detection by using different density of blobs detection. SURF is encoded by using Bag of Features (BoF) model and Support Vector Machine (SVM) with linear kernel adopted for classification. The findings has shown the density of interest point detection has prominent effect on the interest points detection and classification performance on the respective food categories with 86% classification accuracy on UEC100-Food dataset.

Keyword: Bag of features; Food recognition; Local features; Object recognition; SURF