Extremal region selection for MSER detection in food recognition

ABSTRACT

The visual analysis of foods on social media by using food recognition algorithm provides valuable insight from the health, cultural and marketing. Food recognition offers a means to automatically recognise foods as well the useful information such as calories and nutritional estimation by using image processing and machine learning technique. The interest points in food image can be detected effectively by using Maximally Stable Extremal Region (MSER). As MSER used global segmentation and many food images have a complex background, there are numerous irrelevant interest points are detected. These interest points are considered as noises that lead to computation burden in the overall recognition process. Therefore, this research proposes an Extremal Region Selection (ERS) algorithm to improve MSER detection by reducing the number of irrelevant extremal regions by using unsupervised learning based on the k-means algorithm. The performance of ERS algorithm is evaluated based on the classification performance metrics by using classification rate (CR), error rate (ERT), precision (Prec.) and recall (rec.) as well as the number of extremal regions produced by ERS. UECFOOD-100 and UNICT-FD1200 are the two food datasets used to benchmark the proposed algorithm. The results of this research have found that the ERS algorithm by using optimum parameters and thresholds, be able to reduce the number of extremal regions with sustained classification performance.