Sizes of Superpixels and their Effect on Interactive Segmentation

ABSTRACT

Semi-automated segmentation, also known as interactive image segmentation, is an algorithm that extracts a region of interest (ROI) from an image based on user input. The said algorithm will be fed the user input information repeatedly until the required region of interest is successfully segmented. Pre-processing steps can be used to speed up the segmentation process while improving the end result. The use of superpixels is one example of such pre-processing step. A superpixel is a group of pixels that share similar characteristics such as texture and colour. Despite the fact that it is used as a pre-processing step in many interactive segmentation algorithms, less studies had been conducted to assess the effects of the size of superpixels required by interactive segmentation algorithms to achieve an optimal result. Therefore, the purpose of this research is to address this issue in order to bridge this research gap. This study will be performed using the Maximum Similarity based region merging (MSRM) with input strokes on selected images from the Berkeleys and Grabcut image data sets, generated by superpixels extractions via energy-driven samples (SEEDS We infer from this research that an image with a minimum of 500 superpixels will aid the interactive segmentation algorithm in producing a decent segmentation result with pixel accuracy of 0.963, F-score of 0.844, and Jaccard index of 0.756. When the superpixels for an image are raised to 10,000, the segmentation results degrade. In conclusion, the size of the superpixels would have an impact on the final segmentation results.