

Efficient foreground extraction using RGB-D imaging

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Abstract Image segmentation is one of the most important topics in the field of computer vision. As a result, many image segmentation approaches have been proposed, and interactive methods based on energy minimization such as GrabCut, have shown successful results. Automating the entire segmentation process is, however, very difficult because virtually all interactive methods require a considerable amount of user interaction. We believe that if additional information is provided to users in order to guide them effectively, the amount of interaction required can be reduced. Consequently, in this paper we propose an efficient foreground extraction algorithm, which utilizes depth information from RGB-D sensors such as Microsoft Kinect and offers users guidance in the foreground extraction process. Our approach can be applied as a pre-processing step for interactive and energy-minimization-based segmentation approaches. Our proposed method is able to segment the foreground from images and give hints that reduce interaction with users. In our method, we make use of the characteristics of depth information captured by RGB-D sensors and describe them using information from the structure tensor. Further, we show experimentally that our proposed method separates foreground from background sufficiently well for real world images.

Keywords Foreground extraction algorithm · Structure tensor · Depth information · Image segmentation · RGB-D sensor

1 Introduction

The extraction of foreground information from images is one of the most important topics in several research fields such as computer vision, image processing, and human-computer interaction (HCI). For example, foreground extraction is one of the most basic and useful tools for image understanding in the field of computer vision. For interaction with external

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