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Abstract

Construction of a 3-Dimensionally Segmented Dataset of Indoor Scenes Using the Microsoft Kinect

Image segmentation has become a focus for computer vision research to enable computers to obtain information from their surroundings. Many algorithms have been produced to segment features of an image; these algorithms are constantly being altered to increase the efficiency and accuracy of the segmentation process. The algorithm constructed during this project utilizes a combination of recognized methods, including the watershed algorithm applied to Pb boundaries and an iterative segmentation framework, along with novel methods of inferring support relations between features of the image and classifying features into structural classes. To segment an image, an initial set of regions was first created by using the watershed algorithm applied to Pb boundaries to produce an oversegmentation of the image. Regions with minimum boundary strength were merged over an iterative process by the decision of a classifier that implemented similar RGB and position features to Hoiem et al. and novel geometric features. The geometric features included support relations, which were inferred based on depth information and geometric interpretation, and the classification of objects into structural classes. The segmented images of indoor scenes were uploaded into a public dataset intended for access by researchers of the computer vision field. The dataset created will be used as a comparison to similar studies to further the progress of image segmentation, which is currently essential in areas such as medical imaging segmentation and baggage security.