Abstract

Doors are important landmarks for indoor mobile robot navigation and also assist blind people to independently access unfamiliar buildings. Most existing algorithms of door detection are limited to work for familiar environments because of restricted assumptions about color, texture and shape. In this paper we propose a novel approach which employs feature based classification and uses the Kohonen Self-Organizing Map (SOM) for the purpose of door detection. Generic and stable features are used for the training of SOM that increase the performance significantly: concavity, bottom-edge intensity profile and door edges. To validate the robustness and generalizability of our method, we collected a large dataset of real world door images from a variety of environments and different lighting conditions. The algorithm achieves more than 95% detection which demonstrates that our door detection method is generic and robust with variations of color, texture, occlusions, lighting condition, scales, and viewpoints.

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Index Terms
Computer Science
Pattern Recognition
Keywords
Self-Organizing Map  Door Detection  Canny Edge Detection  Indoor Environment