

A New GA-based Algorithm for Color Detection for Object Recognition – with application to mobile robot

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Abstract

Similar to human eye, color perception can be a very important and useful feature for object recognition and mobile robot navigation. Hence, up to today, many researchers have paid a great deal of attention to this aspect of perception in machine vision literatures. In this paper, a new GA-based method for color detection is presented. The method consists of two stages of feature extraction and image inspection. In the feature extraction stage, genetic algorithms are used to design a proper filter to reveal and strengthen predefined colors. Then, at inspection stage, the designed filter is applied to a visual image. The image is inspected for color region and passed through an algorithmic threshold. In order to increase the reliability of this algorithm, the threshold is selected according to environmental lighting. In particular, this algorithm has been used to design red, yellow and black color filters, and used in a mobile robot. The robot environment includes three different objects with above three colors. The robot hunts for the three objects and drops them in their designated baskets. Experimental results and robot performance at different environmental lighting conditions indicate that, even with extreme variations in lighting conditions, the proposed algorithm is able to detect objects appropriately.