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Enhancing the Autonomous Robotic Person Detection and Following Using Modified Hough Transform

Abstract

The thesis develops and implements new image processing algorithms for the detection of the person in a vision-based robotic person following. The image processing approach presented in this thesis locates the position of the person by detecting the circle that corresponds to the person's head. Hough transform is first used to detect circular shapes in the image. Then a region under each detected circle is considered for color (hue-saturation histogram) match. A combination of Hough accumulator count for the circle and the best matching region under it determines which of the detected circles corresponds to the person's head. The proposed technique also covers autonomous radius prediction for circle detection in successive images. Determining the search area which is optimal for circle detection is incorporated to make the computation faster and more reliable. The image processing algorithm is able to detect and distinguish the person in a changing environment and also in presence of other persons in the scene.

Thesis Committee

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