Comparative Analysis of Dissimilarity Detection between Binary Images Based on Equivalency and Non-Equivalency of Image Inversion

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Abstract : Image matching is a fundamental problem that arises frequently in many aspects of robot and computer vision. It can become a time-consuming process when matching images to a database consisting of hundreds of images, especially if the images are big. One approach to reducing the time complexity of the matching process is to reduce the search space in a pre-matching stage, by simply removing dissimilar images quickly. The Probabilistic Matching Model for Binary Images (PMMBI) showed that dissimilarity detection between binary images can be accomplished quickly by random pixel mapping and is size invariant. The model is based on the gamma binary similarity distance that recognizes an image and its inverse as containing the same scene and hence considers them to be the same image. However, in many applications, an image and its inverse are not treated as being the same but rather dissimilar. In this paper, we present a comparative analysis of dissimilarity detection between PMMBI based on the gamma binary similarity distance and a modified PMMBI model based on a similarity distance that does distinguish between an image and its inverse as being dissimilar.

Keywords : binary image, dissimilarity detection, probabilistic matching model for binary images, image mapping
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