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RESEARCH ON SKELETON MATCHING CLASSIFICATION

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Abstract. Skeleton matching plays a very important role in image retrieval, which can retrieve the graphics corresponding to the graphics library by the matching degree of object skeleton. Therefore, the key step of shape retrieval is to perform effective bone matching. The skeleton can also be used for surface segmentation, especially when the two deformation models are divided into the same number of surface slices, the difference between the surface slices of the two models needs to be used to build a continuous map, which is the case. In this paper, the skeleton matching methods are summarized, and the advantages and disadvantages of each algorithm are described, which provides theoretical basis for target recognition, shape retrieval, medical image analysis and processing, augmented reality and other fields.

Keywords: skeleton, skeleton matching, target recognition.

Introduction

The rapid development of information technology has made it easier to obtain image resources, and the amount of data has also increased dramatically. Using image analysis and processing methods to process a large number of image data can greatly reduce the workload and improve the efficiency of image data processing. For example, the use of image processing technology can quickly detect image features, this work can be further used in the field of image recognition, greatly improving the work efficiency of industry, medical industry, aerospace industry, and achieve multiplier effect [1].

In computer vision, representing graphics with important information can reduce the workload of recognition [2]. As an important research content of computer graphics representation, skeleton features are simple in structure, so images can be matched effectively and quickly. The skeleton, also known as the central axis, is a simple shape representation, which contains the distance information to the boundary, according to which the boundary of the original shape can be reconstructed, so using the central axis to identify the shape has certain advantages. But the skeleton is greatly affected by the boundary disturbance, so the skeleton matching belongs to a kind of rough matching.

This paper proposes several skeleton matching algorithms, and expounds the theory of each algorithm to achieve skeleton matching from different perspectives. These algorithms have laid a theoretical foundation in areas such as image retrieval, robot navigation, medical image analysis, path planning, and text recognition.

Skeleton graph matching based on path similarity

The main idea is to compare the paths of the endpoints between different skeleton diagrams [3], and do not consider the different stonewall structures between different diagrams, and match the endpoints by passing the path between the comparison endpoints.

The main method is to first extract the skeleton of the calibration type, and then prune and branch to get the skeleton path, and dust the path distance dissimilarity matrix to complete the matching of the end point values.

The biggest advantage of this algorithm is that it avoids the structural changes caused by the instability of the skeleton joints because only the shortest path between the endpoints is considered.

This method only matches endpoints, not intersections. What we want is that both the endpoint and the intersection node participate in the matching, and we hope that more points participate in the matching, not limited to the case where one point corresponds to one point. In the two skeleton diagrams, one point may correspond to multiple points, or multiple points may correspond to multiple points. The matching example is shown in Figure 1.

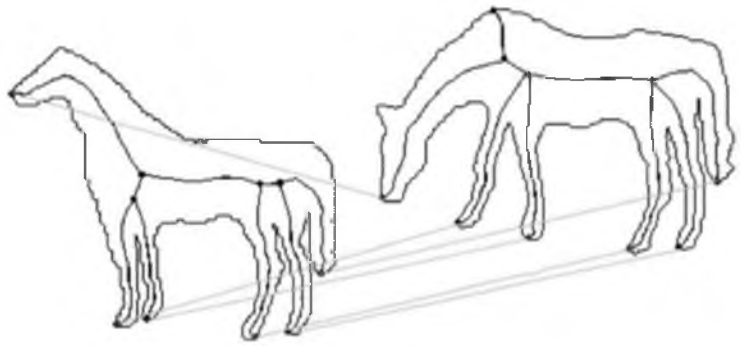

Figure 1. Matching example by using method based on path similarity

Skeleton matching based on clustering

For continuous sampling of moving objects [4], our goal is to divide the skeleton of the object in two adjacent frames into corresponding small parts, and the number of divisions should be the same. The specific method is to extract the key points of the skeleton, and these key points are divided into the intersection and the end of the skeleton, and the matching of the intersection and the end of the skeleton is carried out separately. The end points of the skeleton are first clustered, and the clusters of the end points are matched according to the skeleton paths between the clusters [5], and then a similar method is used to determine the matching relationship of the intersections.

Affine invariant of image feature matching algorithm

The improved method extracts feature points with affine invariance and handle images with repetitive regions well under noise and lighting conditions [6]. We have improved it from the following three angles. First, based on the principle of eight affine simulations, find the most similar affine transformed image to the image to be matched and match the best affine simulated image with the original image to ensure a high matching rate. Secondly, the idea is matched in two directions, and the coincident matching pair of the two-way matching is taken as the stable matching pair. Through bidirectional matching, the stable feature points are guaranteed to be matched first and used as the basis for the matching of other feature points. Then use the stable matching pair to calculate the affine invariant (triangle area ratio invariant) and then improve the accuracy of the remaining point matching. The feature point matching pair has affine invariance.

Conclusion

Shape matching has gone through many years of research. Although there are many mechanisms by which the human brain recognizes shapes is still unclear, the analysis of shapes has become increasingly mature and widely used in many aspects. In this paper, several problems that need to be solved in shape matching are studied, namely, extracting multi-scale skeleton representation that satisfies human visual laws, improving the accuracy and speed of skeleton map matching, improving the similarity measure after shape matching, and using natural images in natural images. Improve the efficiency of learning and modeling in the matching and detection of target shapes. This paper review classification of skeleton matching algorithms skeleton graph matching based on path similarity, skeleton matching based on clustering, affine invariant of image feature matching algorithm, and expounds the theory of each algorithm to achieve skeleton matching from different perspectives. These algorithms have laid a theoretical foundation in areas such as image retrieval, robot navigation, medical image analysis, path planning, and text recognition.

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