Human Motion Segmentation using Active Shape Models

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Abstract Human motion analysis in images is thoroughly related with the development of computational techniques capable of automatically identify, track and analyze relevant structures of the body. In fact, in any system designed for human motion analysis from image sequences, the first processing step concerns the identification of the structures to be analyzed in each of the sequence images, being this step commonly referred as image segmentation. Here, a widely used database, the CASIA Gait Database, is used to build Point Distribution Models (PDMs) of the human silhouette, including specific joints. The training image dataset used includes 14 subjects walking in four different directions, and each shape of the training set was represented by a set of labeled landmark points. The contours of the silhouettes were obtained with the purpose of automatically extract 100 silhouette points together with additional 13 anatomic joint points, such as elbows, knees and feet, to be used as landmarks. In order to obtain the mean shape of the silhouette as well as its admissible shape variations PDMs for each direction were built. The PDMs built were finally used in the construction of Active Shape Models (ASMs), which combine the shape model with grey level profiles, with the purpose of further segment the modeled silhouettes in new images. The referred technique is an iterative optimization scheme for PDMs allowing initial estimates of pose, scale and shape of an object to be refined in a new image. The experiments conducted using this segmentation technique has revealed very encouraging results.

Keywords Image segmentation; Deformable models; Point Distribution Models.

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