

Abstract

Action recognition method using shape analysis for the needs of vision-based elderly care support systems

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The purpose of this dissertation was to develop a method based on shape analysis to create descriptors of video sequences based on descriptors of static images. This work focuses on feature description algorithms and the possibility of their use in the task of recognizing actions performed by people, with particular emphasis on physical exercises recommended for the elderly to maintain physical fitness and as part of the prevention of many diseases. The proposed method uses shape features calculated for human silhouettes previously extracted from individual frames of video sequences and stored as binary images. In the presented approach, the shape descriptors are combined and transformed into a vector, which is a representation of the action and is used in the classification stage. The described method is in the form of a general data processing structure, therefore it is possible to modify selected stages of the method. This dissertation presents the results of experimental verification of the effectiveness of the proposed approach using popular two-dimensional shape descriptors and multi-class classifiers. The research was aimed at selecting suitable algorithms to be used in action recognition using the proposed method for the classification of exercise types in vision-based elderly care support systems.

Keywords: action recognition, physical exercise classification, shape analysis, shape descriptors, image content analysis, machine vision

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