

3D Action Recognition Using EigenJoints

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Problem Statement:

Aim of this project is to recognize human actions using 3D skeleton joints recovered from 3D depth data of RGBD cameras. In our project Action recognition will be based on differences of skeleton joints, i.e., EigenJoints which combine action information including static posture, motion property, and overall dynamics.

Motivation and Related Work:

Automatic human action recognition has wide range of applications which includes video surveillance, content-based video search, human-computer interaction, and health-care.

Reduction of complex computations for action classification and the accuracy of the action predictions are very obvious tasks of every researcher in this area. Any improvement in this area will be a great achievement, as machines can be interacted with humans very easily.

Earlier action recognition was done with the help of 2D video sequences captured by RGB cameras. Trajectory based methods were also used for action recognition. Extracting joint information from these 2D video sequences is difficult and requires a lot of effort. But with the development of RGBD cameras we are able to capture the depth in the sequence which even allows us to distinguish between actions that have similar 2D projections.

Datasets:

We have the following datasets available:

1. MSR Action 3D (MSR3D)
<http://research.microsoft.com/en-us/um/people/zliu/actionrecorsrc/>
2. Cornell Human Activity
<http://pr.cs.cornell.edu/humanactivities/data.php>

References:

1. Effective 3D action recognition using EigenJoints - Xiaodong Yang, YingLi Tian
http://www-ee.ccny.cuny.edu/wwwn/yitian/Publications/JVCIR_EigenJoints.pdf
2. In Defense of Nearest-Neighbor Based Image Classification - O. Boiman, E. Shechtman, M. Irani
http://www.wisdom.weizmann.ac.il/~irani/PAPERS/InDefenceOfNN_CVPR08.pdf
3. Grassmannian Sparse Representations and Motion Depth Surfaces for 3D Action Recognition – S. Azary, A. Savakis
http://www.cse.iitk.ac.in/users/cs365/2014/papers/azary-savakis-13cvpr_grassmannian-sparse-representation-3D-actions.pdf