RGB-D Presentation @ EURON – Koen Buys
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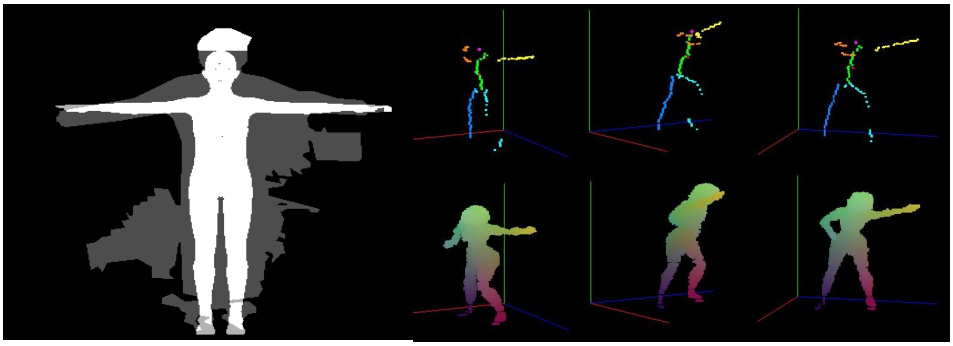
Interaction between pointclouds and camera images for human motion capture segmentation.

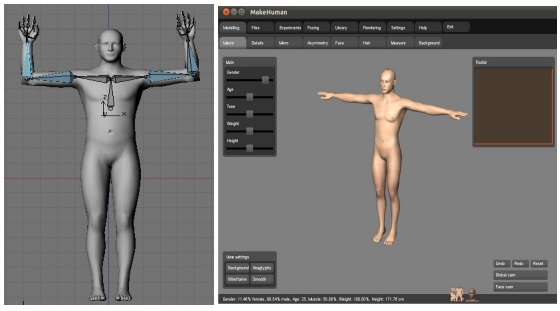
Abstract

This presentation will present two main research fields in which I currently use combination of RGB and Depth information. The goal of the presentation is to discuss approaches and ideas of possible collaborations and feature descriptors.

The first part handles about marker-less human motion capture where RGBD data is not only used to influence segmentation in 2D but also do PF model validation. The goal is the estimate body poses of people lying in bed sleeping.
First an automatic avatar creation algorithm was implemented which uses combined 3D and 2D segmentation.



A segmentation on the depth image helps to avoid shadows, removes background and ground influences, this is a combination of a pass through filter and a plane estimation and subtraction. The remaining pointcloud is an aid in verifying correct postures. This pointcloud is backprojected into the camera image and serves as an input to the GrabCut algorithm which segments out the human.
This segmented image serves to estimate the body poses and to adapt a MakeHuman avatar to the subject.



For calibration purposes 5 known poses were asked to the subjects. Once a customized avatar is created, the sleeping process of the human will be monitored. This is done by an active mattress which adapts to the human body pose and

generates a 170 point pointcloud of the current pose. In an OpenGL environment a PF simulates the physics of a human sleeping and generates a corresponding pointcloud. These pointclouds are compared to do particle evaluation.

In the second part I will discuss a number of combinations of pointcloud and RGB data segmentation that were discussed for the object and person detection and recognition in the Robocup@home contest.