



Skin Segmentation

Project Management and Software Development
for Medical Applications

General Info

Project Title Skin Segmentation

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Project Abstract

The student is tasked to prepare a documented software package which segments skin from either color or gray-scale images.

Background and Motivation

Skin segmentation plays an important role in multi-view reconstruction of human limbs from color or multispectral images. In this approach regions of the input images are segmented in order to produce an initial estimate of the regions where skin is present. These regions will be further processed in later stages to extract a mask of the object of interest.

These masks play an important role in multi-view reconstructions as they offer information about which pixels are relevant for the reconstruction and also provide the silhouette of the object, increasing the accuracy and reliability of the reconstruction.

Students Tasks Description

The project will be divided into multiple work-packages.

Colorimetric Segmentation involves that the student implement a robust detection of fore-

ground and background pixels. This stage will also assume that image pixels geometrically outside the background be excluded from the segmentation.

Random Walk Segmentation will require reliable seed pixels on both foreground and background. The algorithm will then effectively separate the two regions from each other. The student will be tasked with integrating a C++ implementation of this algorithm.

Technical Prerequisites

The student should have basic knowledge about image processing and basic programming skills in C++.

Administrative Info

Working Time upto 10 hours per week

Project Location Garching

Required Equipment computer with discrete graphics card and at least 2 GB of RAM.

Timeline and Milestones

- **Familiarize with the state-of-the art:**
duration: 2 weeks
- **Colorimetric Segmentation:**
duration: 6 weeks
- **Random Walk Segmentation:**
duration: 4 weeks
- **Documentation and Report:**
duration: 2 weeks weeks

pixel classification: analysis and comparison. *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, 27(1):148–154, 2005.

References

- [1] F. Gasparini and R. Schettini. Skin segmentation using multiple thresholding. In *Proceedings of SPIE*, volume 6061, pages 128–135, 2006.
- [2] S. L. Phung, A. Bouzerdoum Sr, and D. Chai Sr. Skin segmentation using color
- [3] S. L. Phung, D. Chai, and A. Bouzerdoum. Adaptive skin segmentation in color images. In *Multimedia and Expo, 2003. ICME'03. Proceedings. 2003 International Conference on*, volume 3, pages III–173, 2003.

