Distances Correlation for Re-Ranking in Content-Based Image Retrieval

Daniel Carlos Guimarães Pedronette and Ricardo da S. Torres
RECOD Lab - Institute of Computing (IC) - University of Campinas (UNICAMP)
dcarlos@ic.unicamp.br, rtorres@ic.unicamp.br

- Distance Optimization Algorithm: re-ranking for CBIR based on clustering and distances updating.

- Concept of Distances Correlation applied for distances updating:
Distances Correlation for Re-Ranking in Content-Based Image Retrieval

- Experimental evaluation considering several CBIR tasks: color, texture, and shape descriptors.

- Bullseye score on MPEG-7 database: 93.62%

- First row: retrieval results for the CFD shape descriptor (first image as a query).
- Second row: retrieval results for the same shape descriptor after distance optimization.
The Local Spherical Hash Collision Detection Algorithm

Pre Processing Step

1º) Centralize
2º) Define local axis particles
3º) Map to spherical coordinates
4º) Map to Hash[θ, φ]

The local axis will deform with the mesh!
The Local Spherical Hash Collision Detection Algorithm

Collision Detection

1°) Test against the Bounding Sphere

2°) Map particles from one mesh to the other’s LSH

3°) Test only against the particles in the mapped solid angle
This paper presents a methodology to accurately detect meaningful feature points in eyes and eyebrows of people in frontal pose, in images captured by webcams:

- Face Detection
- Computation of ROIs
- Color Channel Selection
- Exponential Transform
- Image Binarization
- Blobs Detection
- Blobs Selection
- Points Localization
Eyes and Eyebrow Detection for Performance Driven Animation

- The paper also discusses the mapping of the movement of the eyes of a real person to an avatar, in order to provide Performance Driven Animation (PDA).
GENERATING FACIAL GROUND TRUTH WITH SYNTHETIC FACES

Rossana B. Queiroz, Adriana Braun, Juliano L. Moreira, Julio Jaques Jr, Marcelo Cohen and Soraia Musse
Generating Facial Ground Truth with Synthetic Faces

- This work presents a methodology for generation of facial ground truth with synthetic faces.

- We developed a prototype in which we can generate facial animation videos with 3D MPEG-4 parameterized face models, controlling face actions, illumination and camera position.

- Our model provides the ground truth of a set of facial feature points at each frame.

- As result, we are able to build a video database of synthetic human faces with ground truth, that can be used for the evaluation of several algorithms of feature tracking and/or detection.
Feature Space Exploration

Colorful Texture Analysis

- Moment Invariants: PCC = 78%
- SIFT: PCC = 95%
- RGBHistogram: PCC = 92%
- PCA: PCC = 99%

Brandoli et al, Visual Data Exploration to Feature Space Definition
Feature Space Exploration

Outdoor Scenes

Global Features
RGB Histogram
PCC = 77%

Local Features
SIFT Color
PCC = 94%

Brandoli et al, Visual Data Exploration to Feature Space Definition