

Project Proposal

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Introduction

Over the last decade, the computer vision community has shown an increasing interest for 3D data. This has been possible due to the democratisation of depth sensors such as Kinect. For this reason, in the scope of this project, we will study how deformation, such as facial expression, can be transferred across 3D meshes.

Goals

In this project we will apply Graph-based tools to 3D geometry and meshes. In this case the graph topology is explicitly defined by the tessalation. The goal is to learn the deformation between a source and target mesh. In our case the source will be a neutral face and the target mesh will be the different facial expressions (*i.e. Mouth open, raised eyebrows, ...*).

The second aspect taken into consideration will be whether or not we can defined cluster of nodes that categorise facial expressions as well as ethnicity.

Dataset

In the scope of the project we will build upon two datasets, one being publicly available called *FaceWarehouse* and one collected here at EPFL. Both datasets are composed of meshes of people showing different facial expressions. They have the following properties:

- FaceWarehouse: 150 peoples, 47 expressions, mainly asian people
- EPFL: ~100 people, 30 expressions, mainly caucasian people.

Both datasets share the same topology since there are registered (*i.e. densely aligned*).

Evaluation

The quality of the transfered expressions will be estimated using two metrics:

- Vertex to vertex error
- Normal of surface similarity

Reference

[1] Cao *et al*, FaceWarehouse: a 3D Facial Expression Database for Visual Computing