

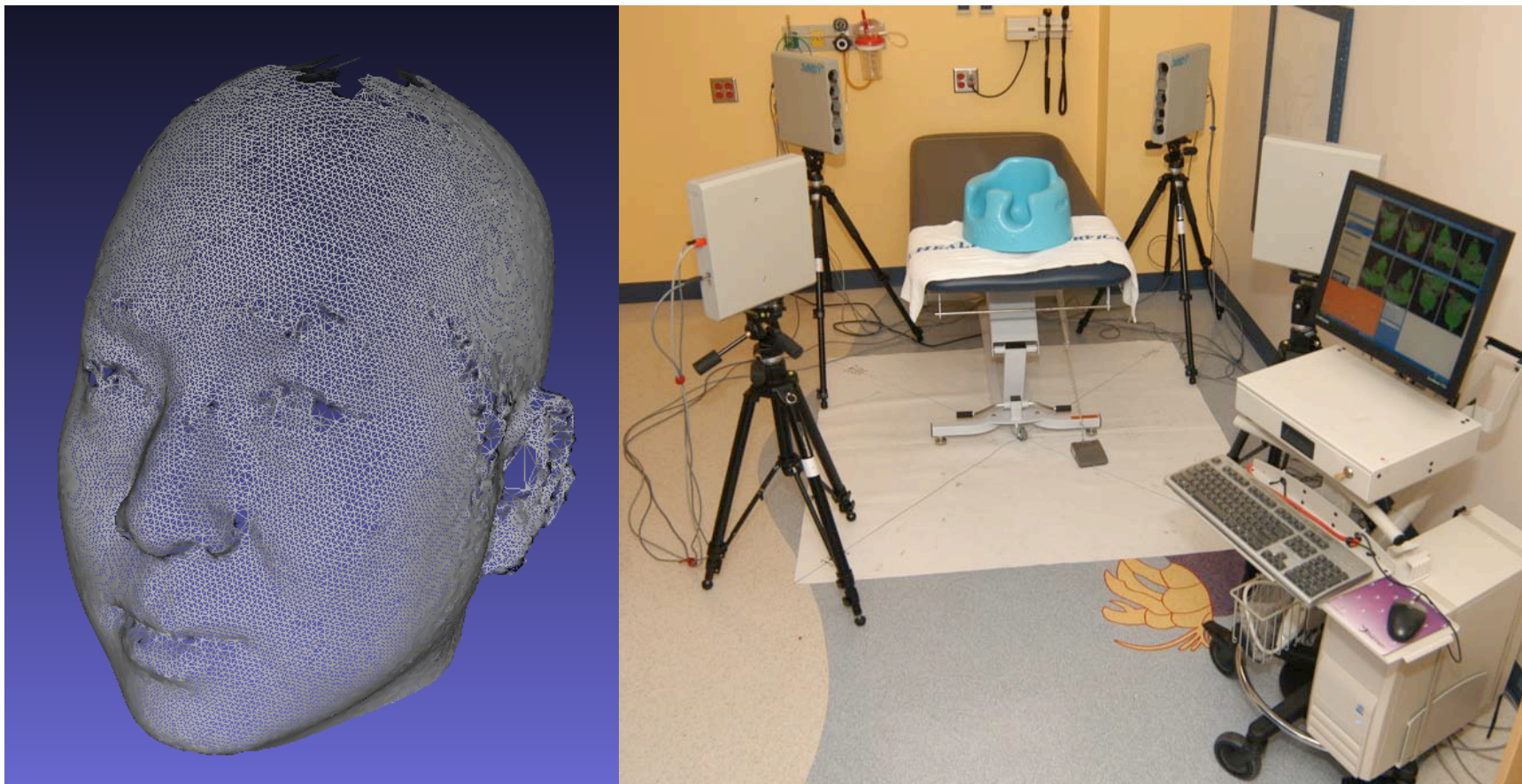
Content Based Retrieval on 3D Face Data

Ezgi Mercan

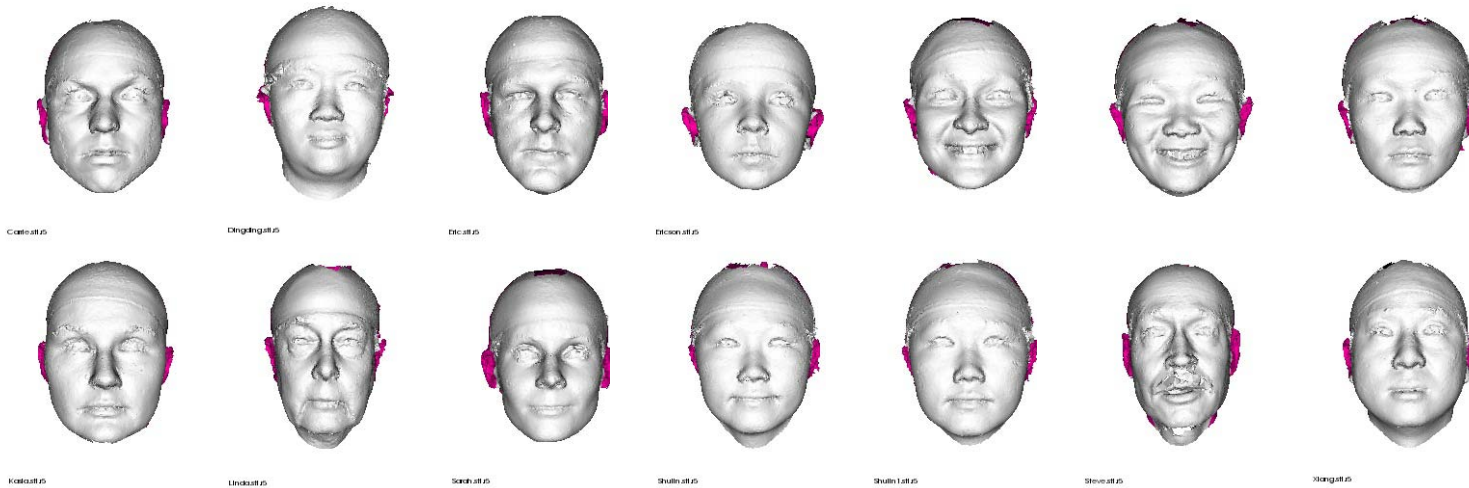
Motivation

- Indriyati Atmosukarto's Thesis:
 - Global 2D azimuth-elevation angles histograms are successfully used in 3D shape quantification for deformational plagiocephaly and classification of 22q11.2DS.
 - Can we use azimuth-elevation angles histograms for retrieval?

Image Acquisition: 3dMD



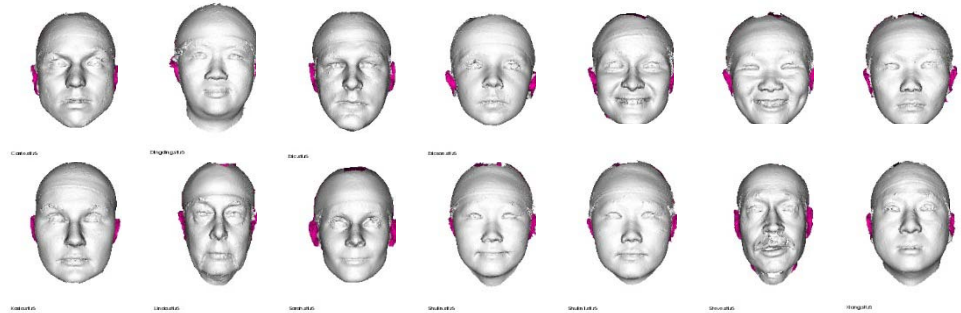
About the Data



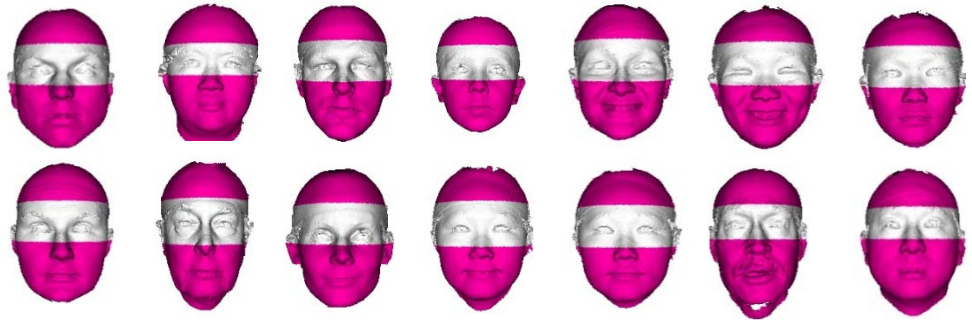
- ‘us’ database: 14 head meshes of 12 people.
- Data is limited
 - Hard to find similarity
 - No ground truth: survey.

Methodology

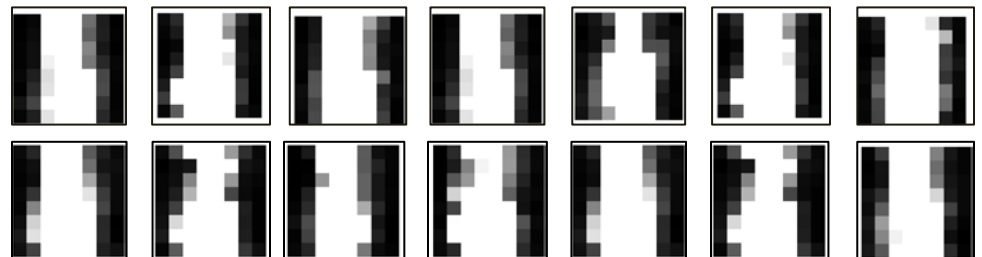
Pose Normalized
Heads



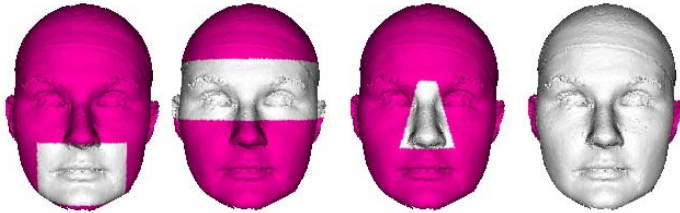
Masking



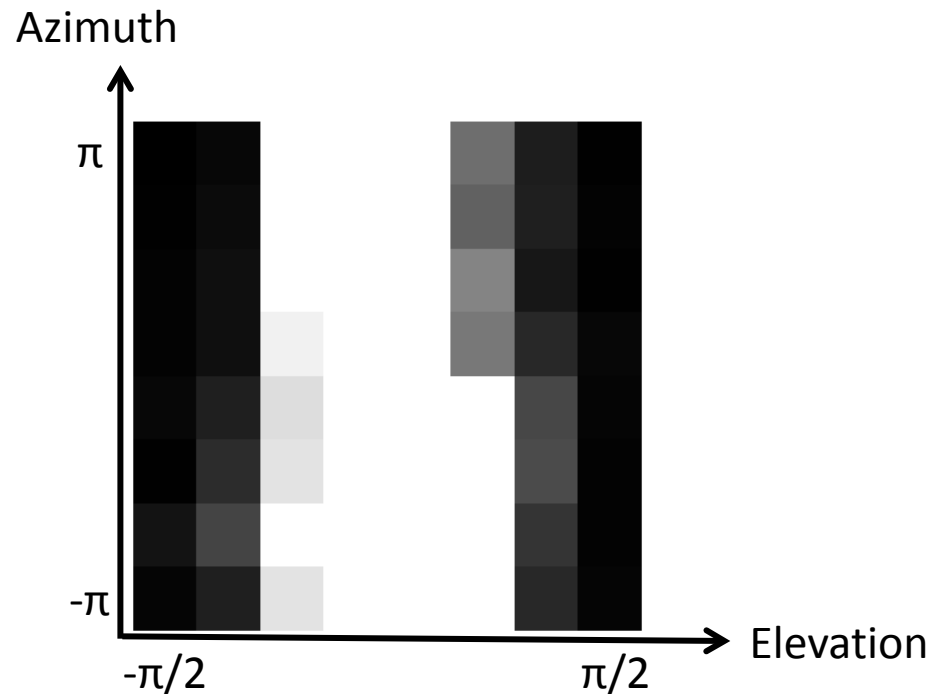
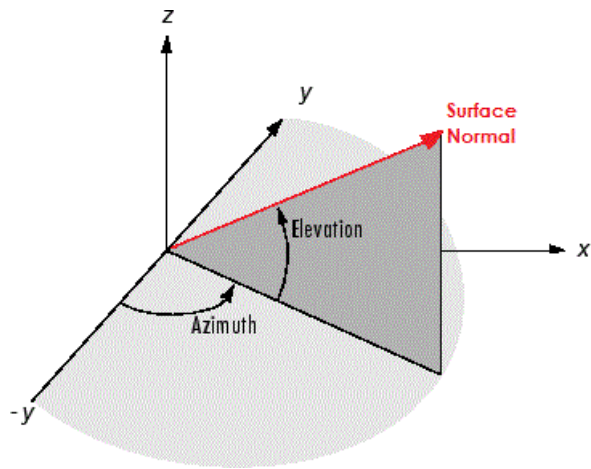
Histograms



Feature Extraction



- Compute the azimuth and elevation angles of the surface normal vectors of each point on the mesh.
- Construct 2D histograms of angles.

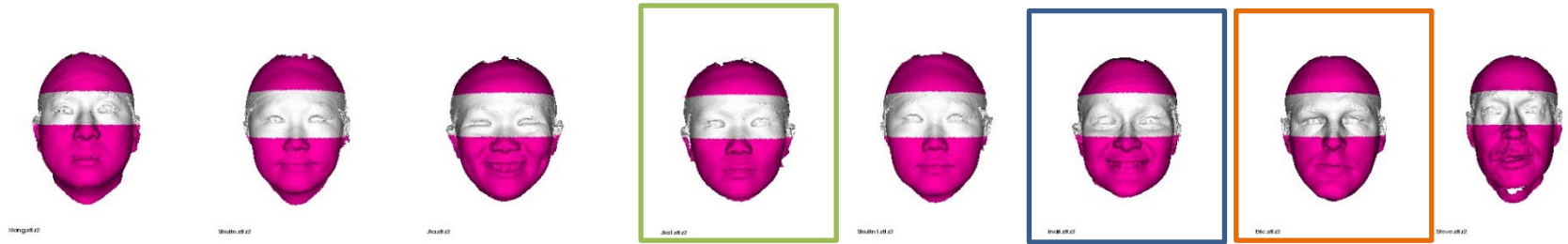




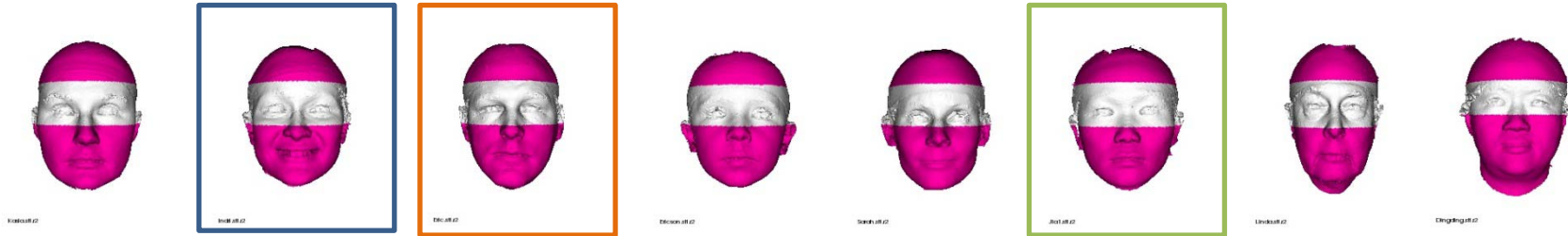
Query for Carrie - eyes

Carrie_01_02

Retrieval Results:



Ground Truth:





Query for Jia - mouth

Jia.all.1



Indri.all.1

Indri



Jia2.all.1

Jia 2



Lynn2.all.1

Lynn 2



Lynn.all.1

Lynn



Carrie.all.1

Carrie



Eric.all.1

Eric



Ericson.all.1

Eric's son



Sarah.all.1

Sarah



Steve.all.1

Steve



Xiang.all.1

Xiang



Kasia.all.1

Kasia



Dingding.all.1

Dingding



Linda.all.1

Linda

Discussion

- Ground truth: people's perception of similarity.
- Azimuth & Elevation angles may not correspond to human's perception of similarity.
- Database is too small to derive a statistically significant result.

Future Work

- Alternative features: Gaussian Curvature, Lynn's method of distance matrices.
- Larger databases: FaceBase collaborator Seth Weinberg's data repository of 3500 healthy Caucasian individuals.
- User friendly GUI.