3D Medical Imaging

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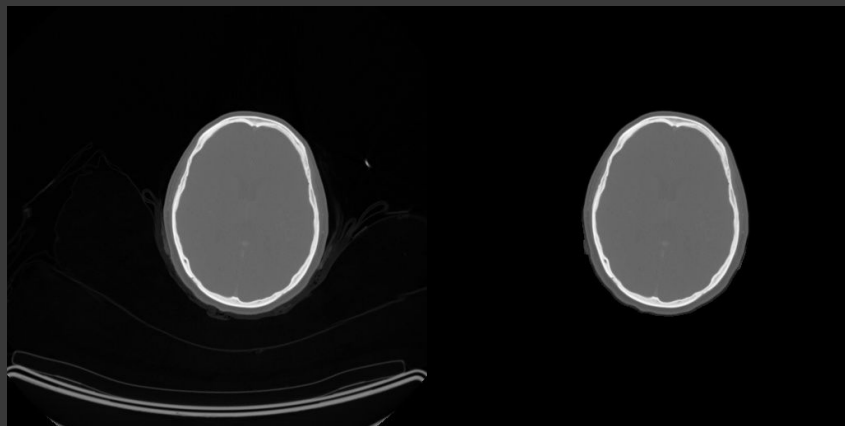
Data

- Axial CT scans of head and neck
- 4 sets for each patient
- DICOM (.dcm)

0522c0001
2819497684894126 - 0522c0001
Neck HeadNeckPETCT - 8/23/99 / 7:30 PM
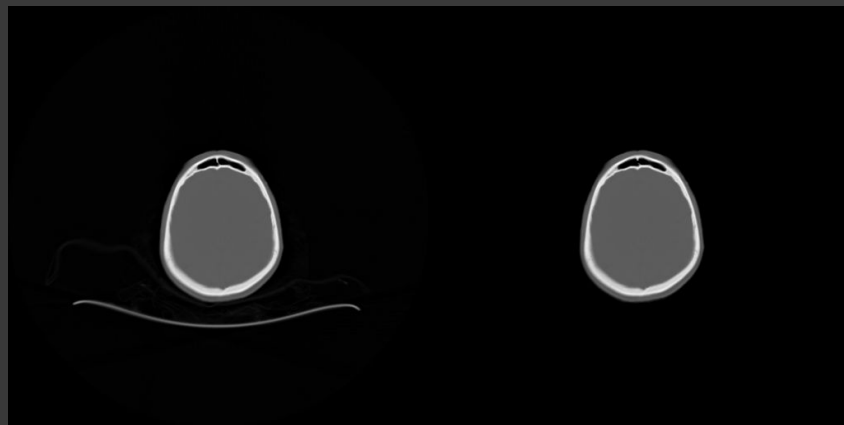Displayed by OsiriX Engine 6.0®

Data Processing

1. Threshold
2. Label connected components
3. Find and isolate the label of the head
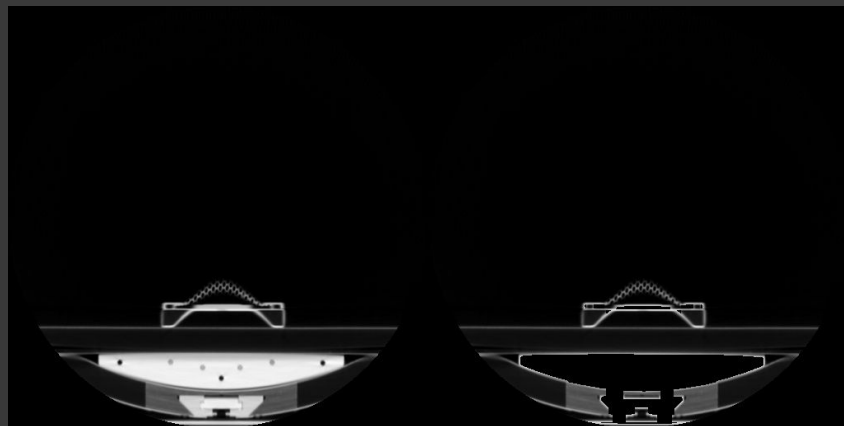4. Open and Dilate
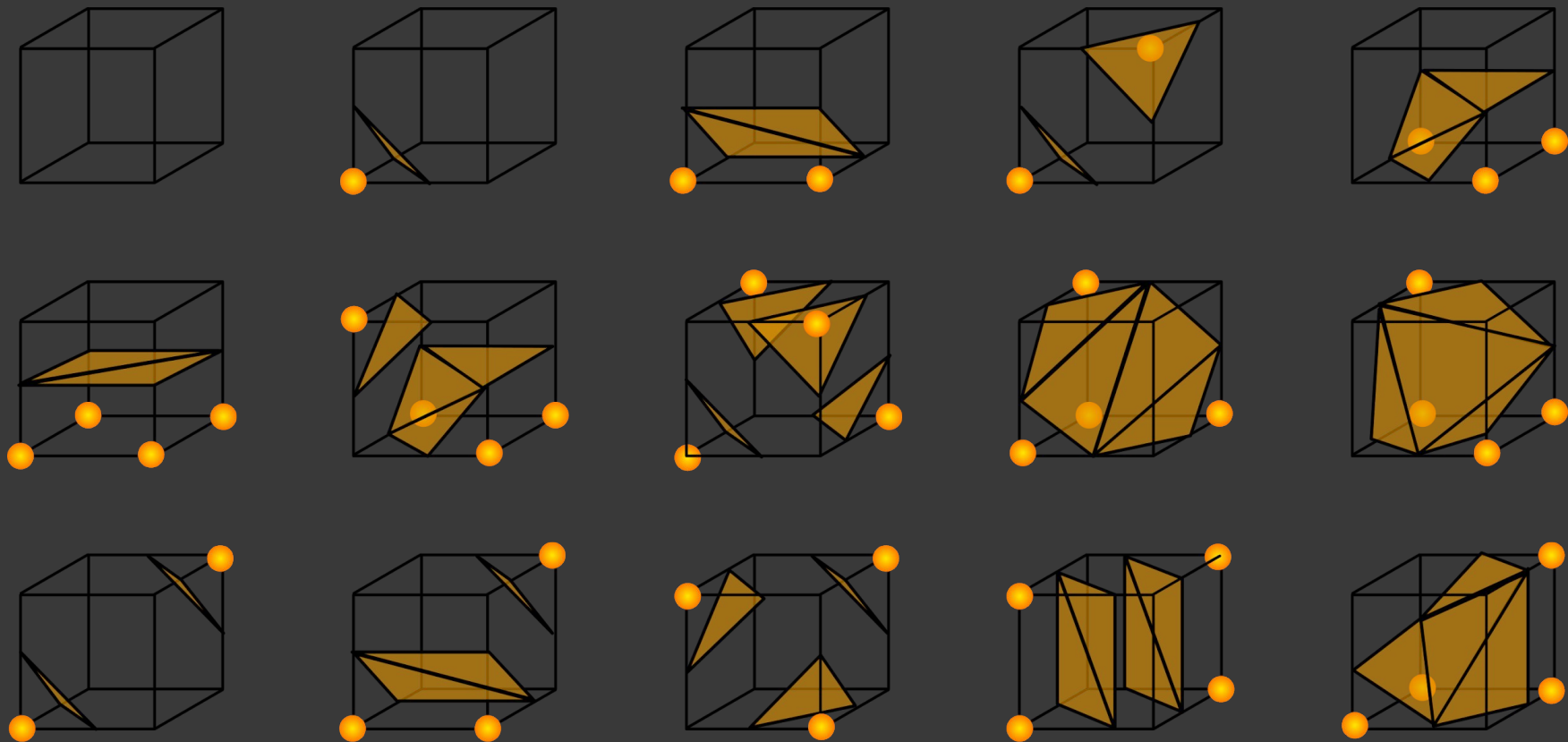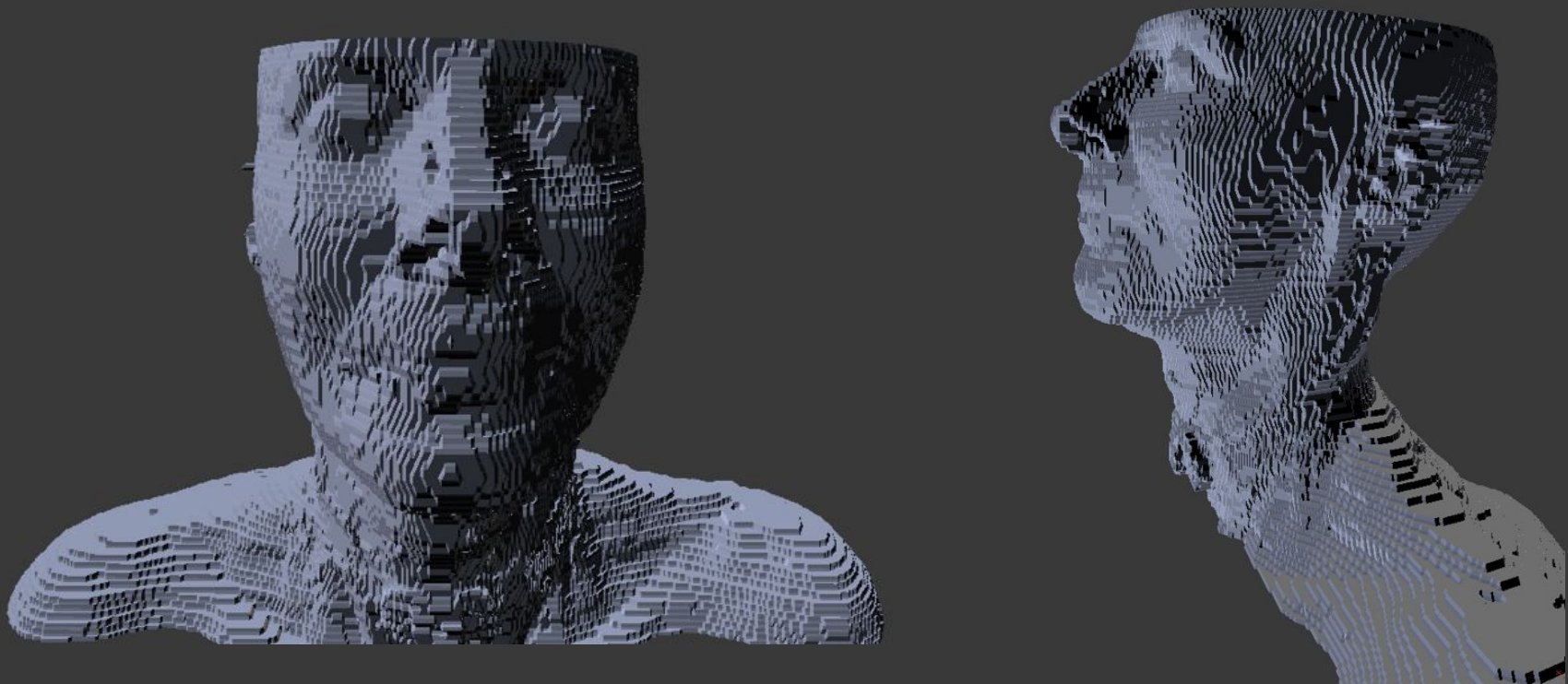
Before   After

Before   After

Before   After

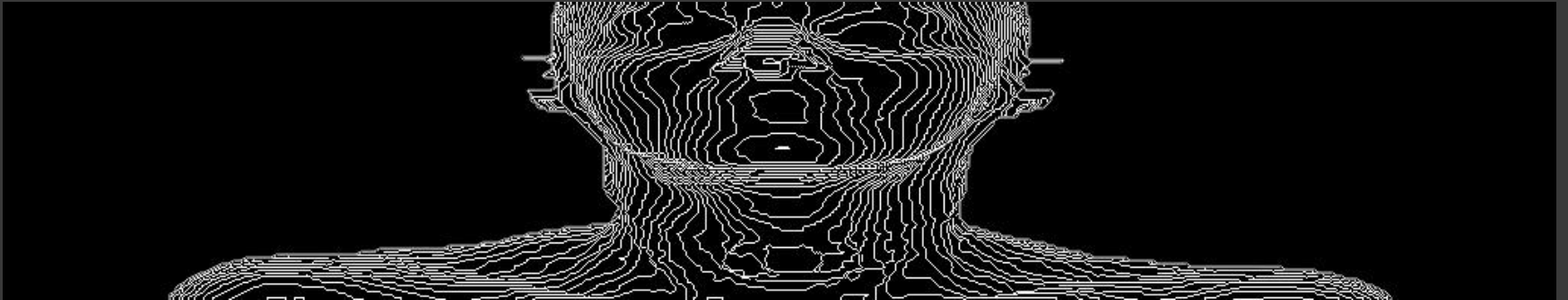Marching Cubes Algorithm

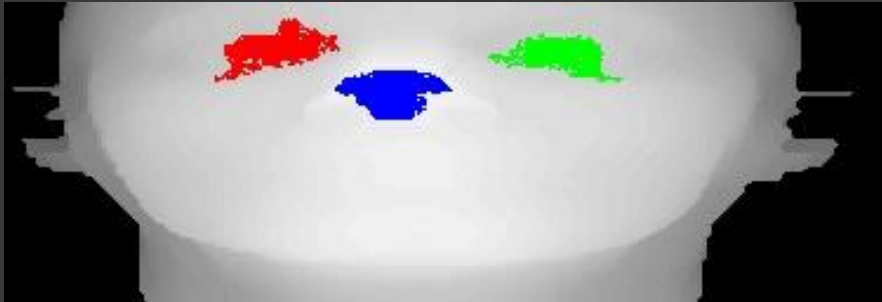# 3D Mesh Generation

2D Face Projection

Above: 2D Projection after scaling and morphological closing
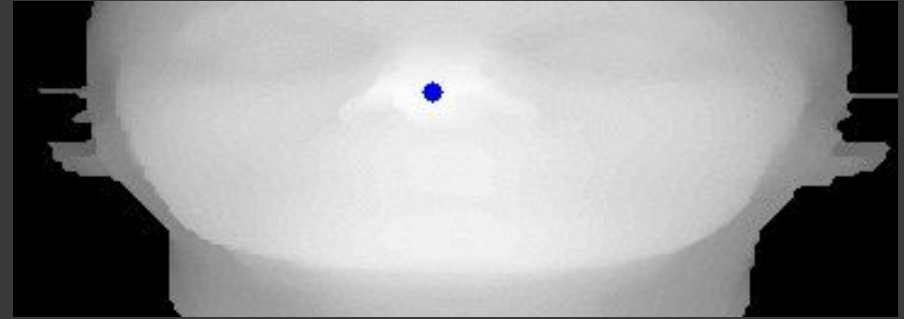Below: Laplacian detailing the contour map of the face.
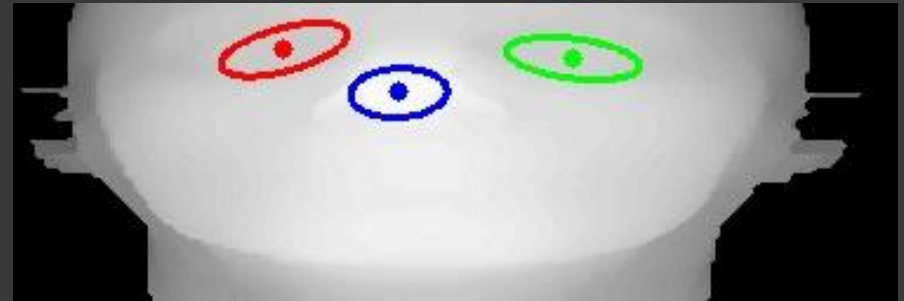
Minimum Descent and Facial Features

Path of our minimum descent algorithm.

Using the previous results, flood fill the general area.
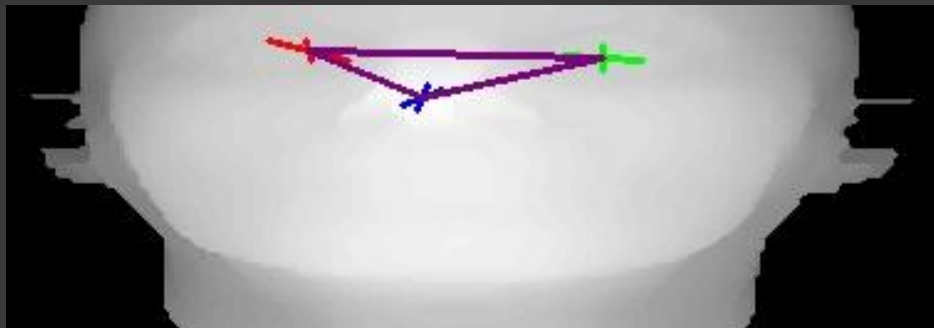
Find a contour and approximate an ellipse.

Feature Vector

Fast Fourier Transform

Ratios among eyes, nose, and width of head

Find nearest neighbor to predict

Next Step: Test the accuracy between models using each of these features

References

Data:

Bosch, Walter R., Straube, William L., Matthews, John W., & Purdy, James A. (2015). Data From Head-Neck_Cetuximab. The Cancer Imaging Archive. http://doi.org/10.7937/K9/TCIA.2015.7AKGJUPZ

Clark K, Vendt B, Smith K, Freymann J, Kirby J, Koppel P, Moore S, Phillips S, Maffitt D, Pringle M, Tarbox L, Prior F. The Cancer Imaging Archive (TCIA): Maintaining and Operating a Public Information Repository, Journal of Digital Imaging, Volume 26, Number 6, December, 2013, pp 1045-1057. (paper)

Marching Cubes:

Chernyaev, Evgeni V. Marching Cubes 33: Construction of Topologically Correct Isosurfaces. Institute for High Energy Physics, 142284, Protvino, Moscow Region, Russia. 1995.