

# GENERATING GROUND TRUTH DATA FOR SKULL-FACE OVERLAY

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## Abstract

Craniofacial superimposition (CFS) is a technique to identify a missing person from skeletal remains. It involves the superimposition of a skull (or a skull model) with a number of ante mortem images of an individual, creating a **skull-face overlay** (SFO), followed by the analysis of their morphological correspondence.

The assessment of SFO methods is hindered by the lack of ground truth superimpositions, preventing the forensic community to study the reliability of the process in an objective, quantitative way. In this work, we created the first such dataset using photos and Cone Beam Computed Tomography (CBCT) scans of 19 subjects.

## Overall procedure

The main idea:

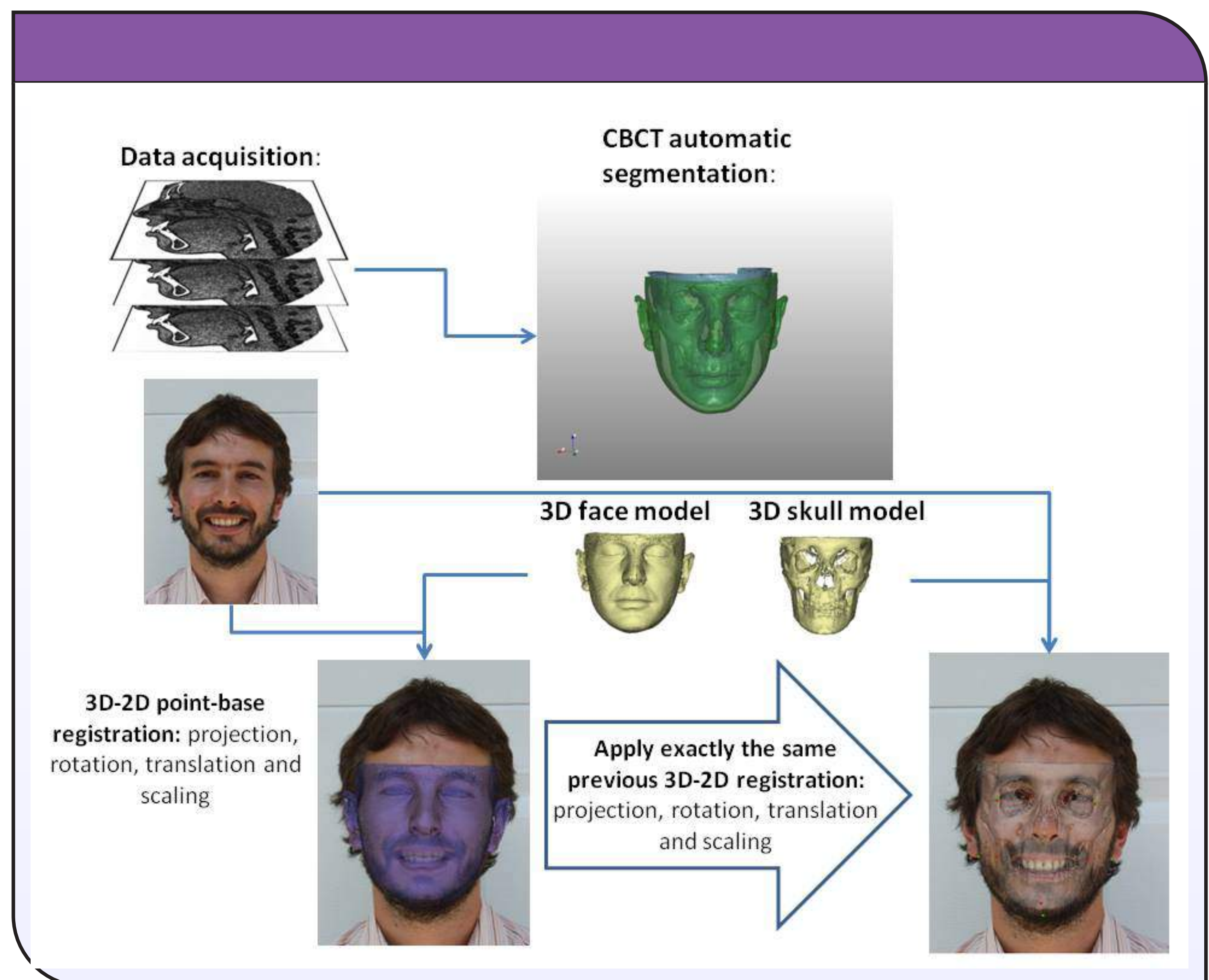
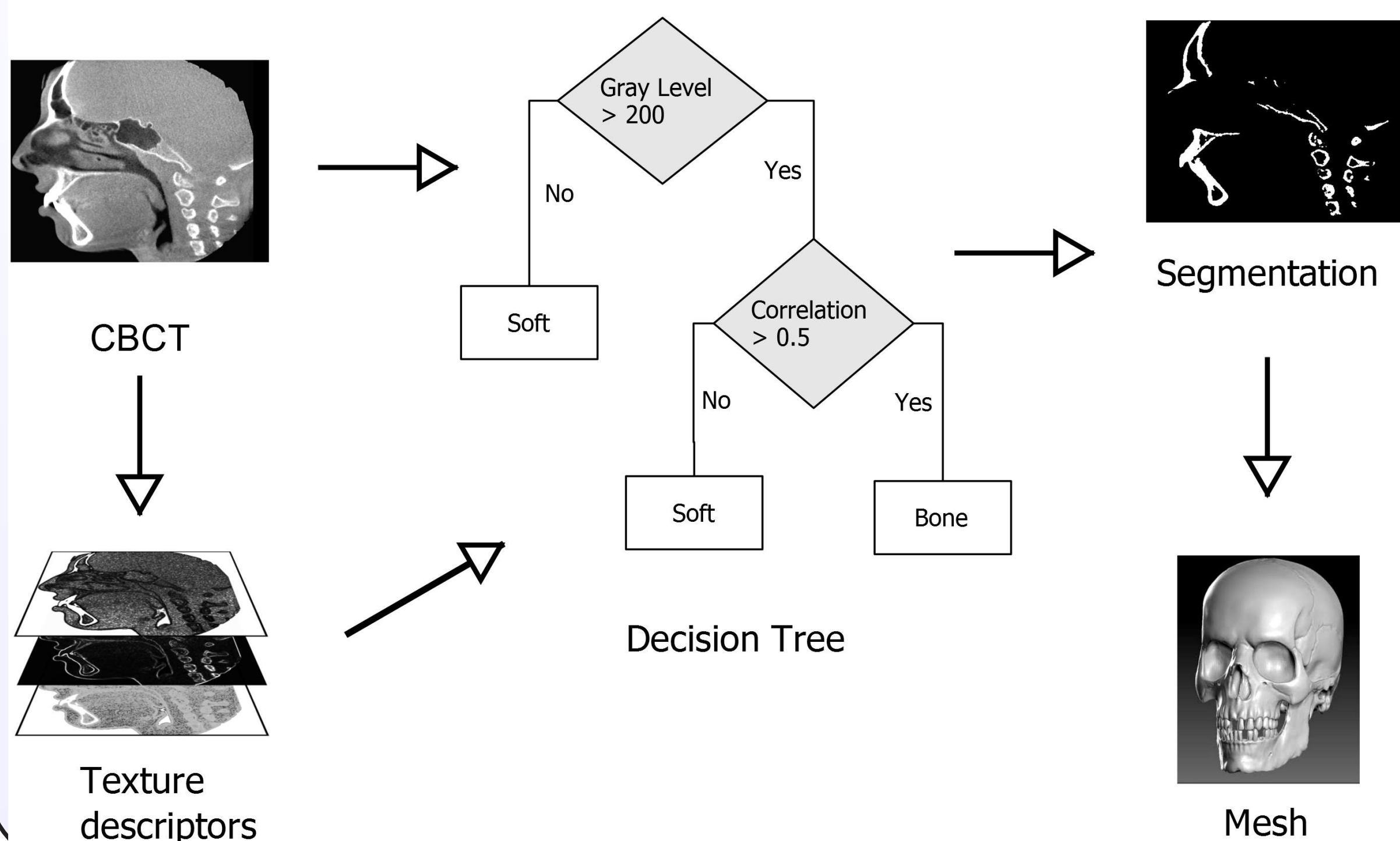
- Use the CBCT scan to create a pair of 3D models of the face and skull already superimposed
- Register the face model with the photo using facial landmarks
- Use the obtained transformation to align the skull model with the photo

## Segmentation of CBCT

In CBCT scans the relation between grey level and radiodensity is inaccurate, so that regions having the same density appear with different grey values depending on their position relative to the organ being scanned. While air and soft tissue have significantly different radiodensities, the values for soft and bony tissue overlap.

**Face** Simple thresholding

**Skull** Classification approach using Haralick's texture features and decision trees



## Results



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