GSOC: Identification of facial dysmorphisms using images

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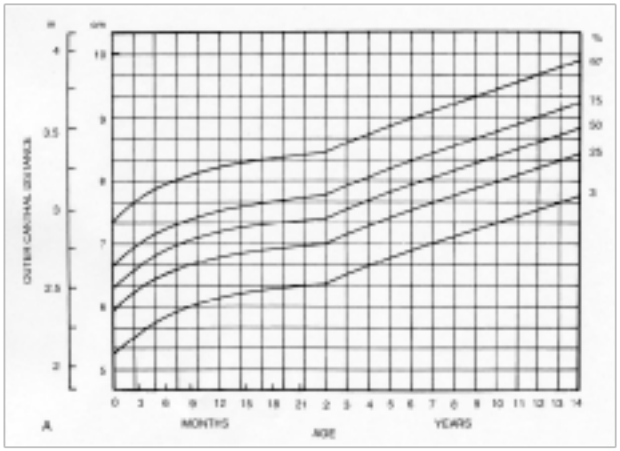
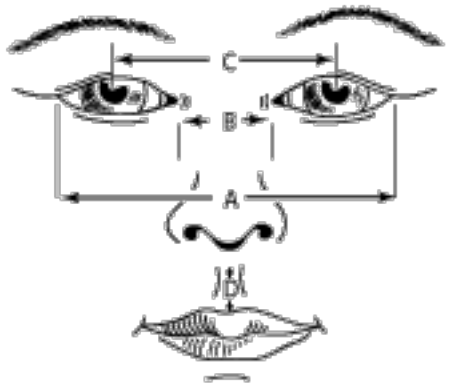
Week 1

Measurements in Growth Charts





Adapted from Smith's Recognizable Patterns of Human Malformation, 5 th Ed., ed. Jones, KL

- 1. Head circ. (cm):
- 2. Philtrum length (cm): (D)
- 3. Left ear length (cm):
- 4. Right ear length (cm):
- 5. Outer canthal distance (cm): (A)
- 6. Inner canthal distance (cm): (B)
- 6. Palpebral fissure length (cm):
- 8. Interpupilary distance (cm): (C)

Measurements in FaceTracer

- http://www.cs.columbia.edu/CAVE/databases/facetracer/
- The face id
- The width of the face in pixels
- The height of the face in pixels
- The x-location of the top-left corner of the face
- The y-location of the top-left corner of the face
- The pose angles (in degrees) of the face:
  - The yaw angle (out-of-plane left-right) of the face
  - The pitch angle (up-down) of the face
  - The roll angle (in-plane left-right) of the face
- The fiducial points of the face (all relative to the top-left of the face rectangle):
  - The x-location of the left corner of the left eye
  - The y-location of the left corner of the left eye
  - The x-location of the right corner of the left eye
  - The y-location of the right corner of the left eye
  - The x-location of the left corner of the right eye
  - The y-location of the left corner of the right eye
  - The x-location of the right corner of the right eye
  - The y-location of the right corner of the right eye
  - The x-location of the left corner of the mouth
  - The y-location of the left corner of the mouth
  - The x-location of the right corner of the mouth
  - The y-location of the right corner of the mouth

What can be measured using the FT metadata?

- 1. Head circ: NO
- 2. Philtrum length: NO
- 3. Left ear length: NO
- 4. Right ear length: NO
- 5. Outer canthal distance (cm): YES
- 6. Inner canthal distance (cm): YES
- 7. Palpebral fissure length (cm): YES
- 8. Interpupilary distance (cm): NO

Average values from FT (15k) raw

	Mean	Standard Deviation
Outer Canthal Dist	66.76	67.39
Inner Canthal Dist	27.12	27.52
Palpebral fissure (Right)	20.04	20.29
Palpebral fissure (Left)	19.84	20.03

This is without any normalization. Once normalized by the head width (since all these were horizontal distances), the SD reduced.

Average values from FT (15k) normalized

	Mean	Standard Deviation
Outer Canthal Dist	0.32	0.04
Inner Canthal Dist	0.13	0.02
Palpebral fissure (Right)	0.10	0.01
Palpebral fissure (Left)	0.10	0.01

Age-wise averages (200 per class)

Mean	OuterCD	InnerCD	Right P fissure	Left P fissure
Baby	0.32	0.13	0.10	0.10
Child	0.32	0.13	0.10	0.10
Youth	0.31	0.12	0.10	0.10
Middle aged	0.31	0.13	0.09	0.09
Senior	0.30	0.12	0.09	0.09

Race-wise averages (200 per class)

Mean	OuterCD	InnerCD	Right P fissure	Left P fissure
Asian	0.31	0.13	0.09	0.09
White	0.31	0.12	0.09	0.09
Black	0.32	0.13	0.10	0.10

Comparison with Growth Charts

- No common element to normalize and compare
- Perhaps head circumference should be used?
- Need to obtain the head circumference of the FT images by using a detector then?

Number of valid URLs from FT

- I obtained the HTTP response codes for the 15k URLs of the images.
- Only around 10,500 are still active
- In case of any image based training, the effective number of training images is ~10,500