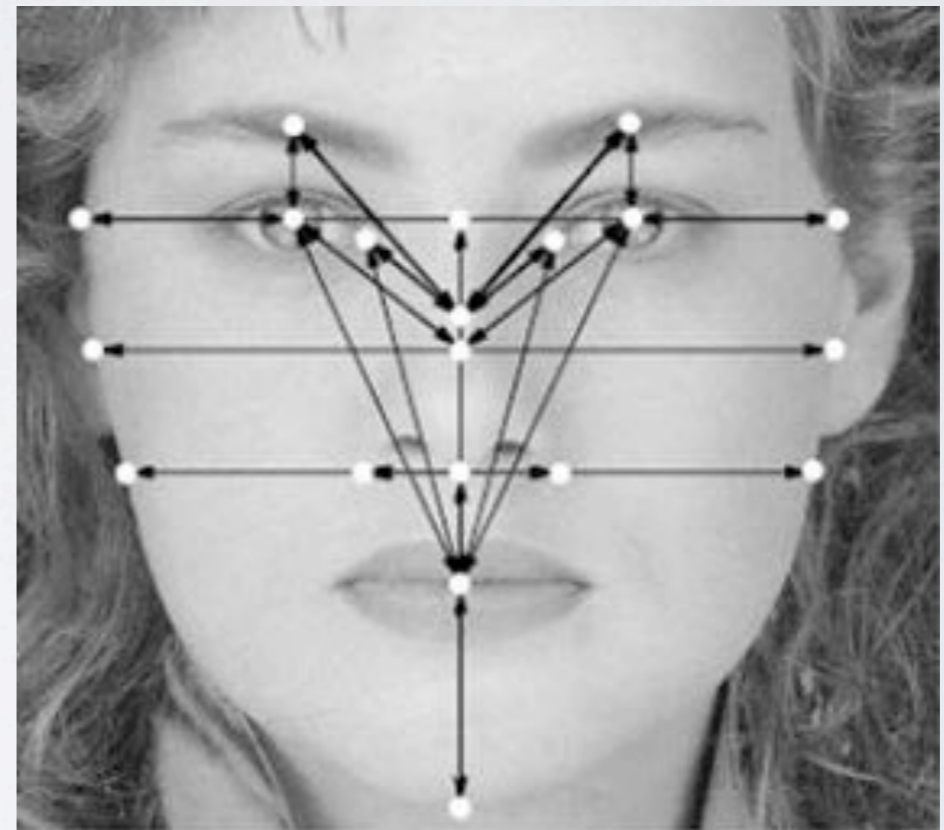# FACIAL FEATURES EXTRACTION USING PHASED BASED VIDEO AMPLIFICATION

Coutino Minguez, Mario Alberto
University of Calgary
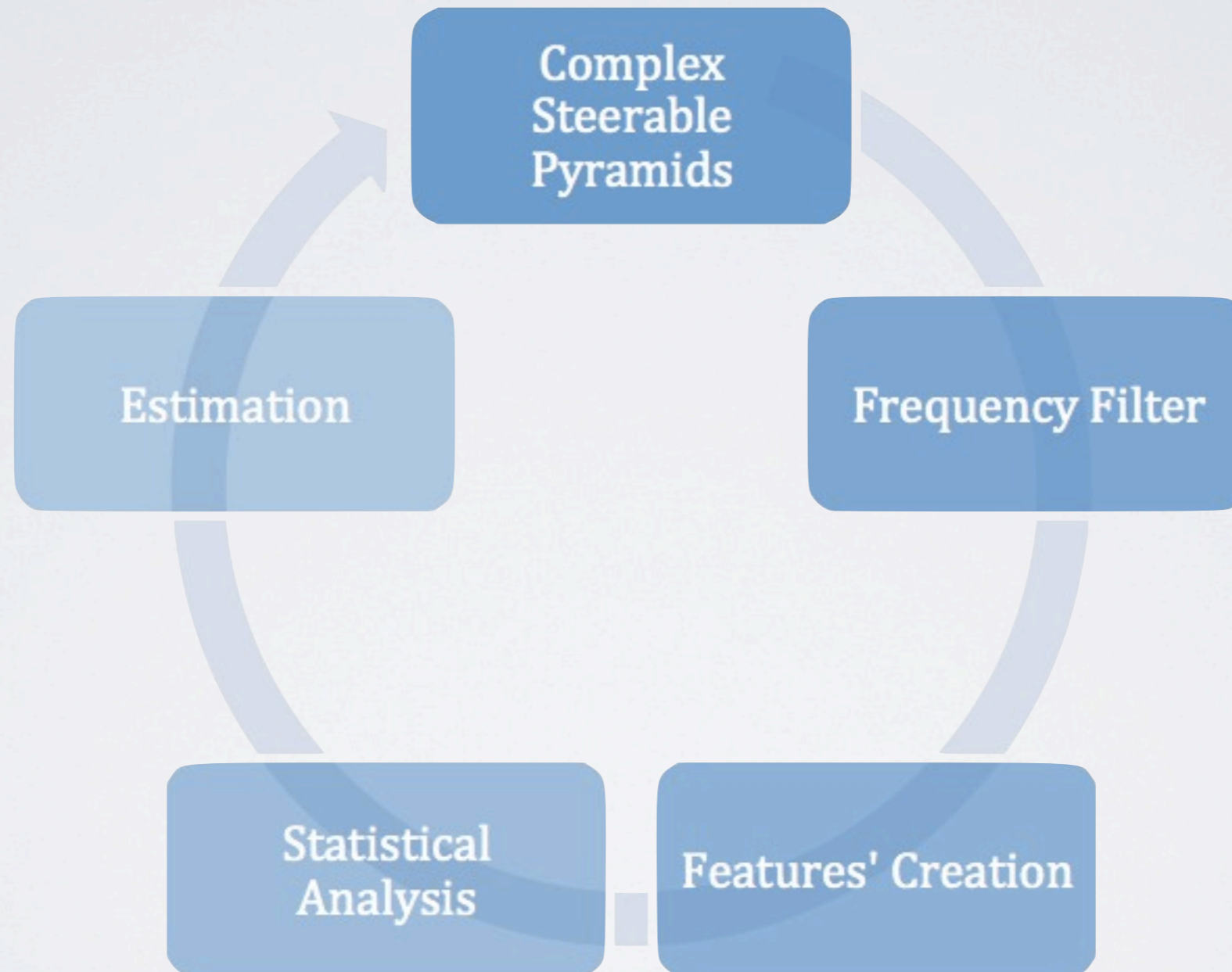Summer 2013

OBJECTIVE

- Detection and tracking of facial features in video sequences in an automatic manner.
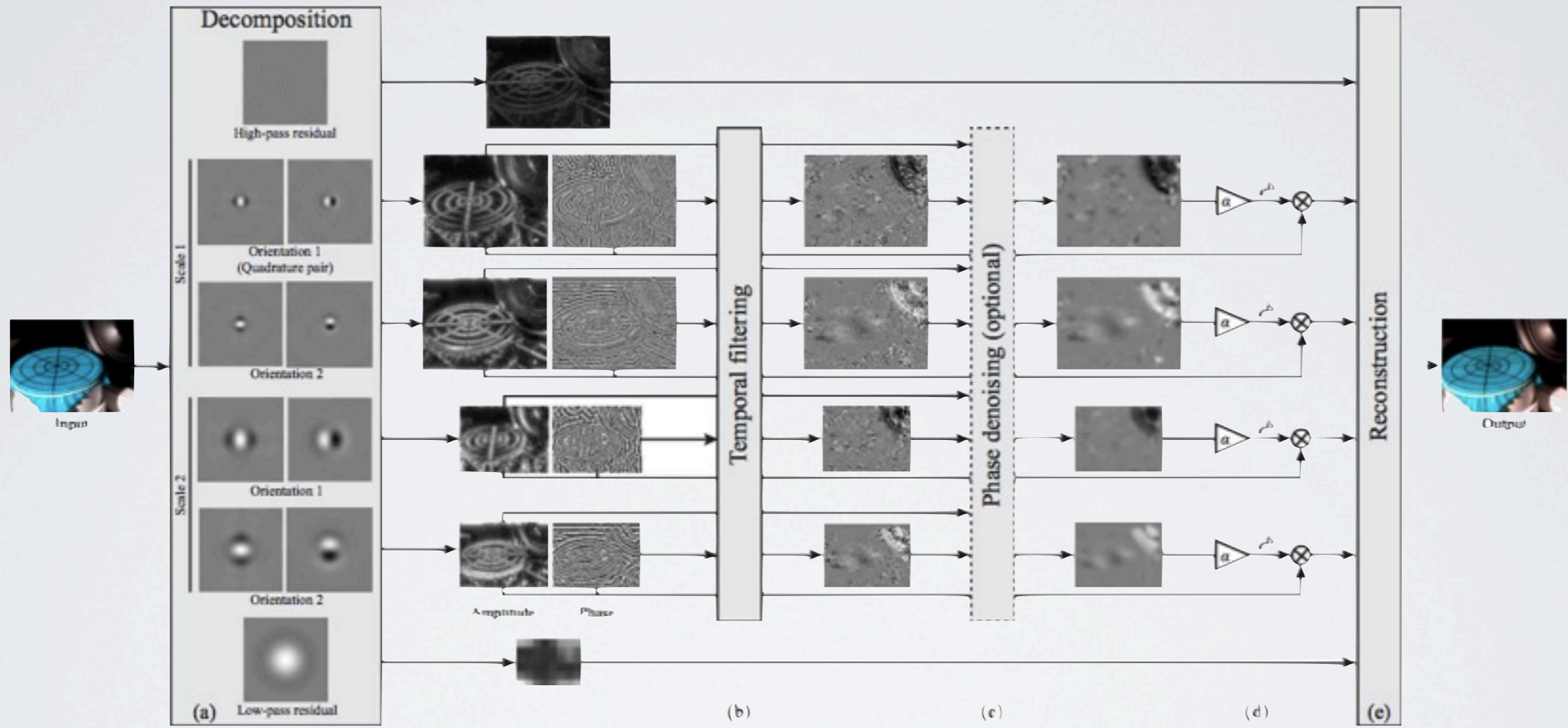
PROPOSAL

- Subtle motion is produced in specific facial features during the normal human's breathing.

- Amplifying the present in the face using the Phase - Based Motion Amplification method [Wadhwa et al. 2013] deliver useful information to estimate the position of nose, eyebrows, eyes and mouth.

- Statistical analysis of the data to improve accuracy over time.
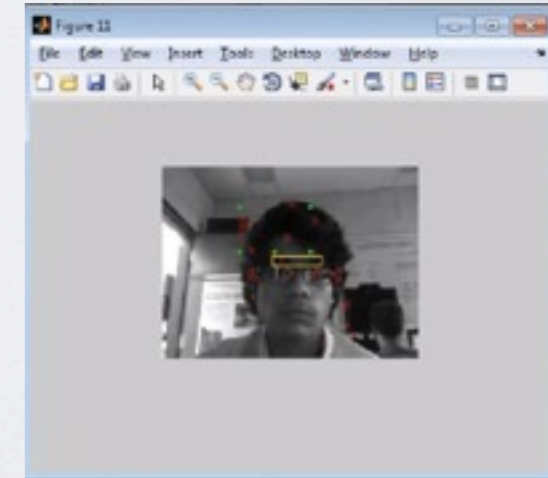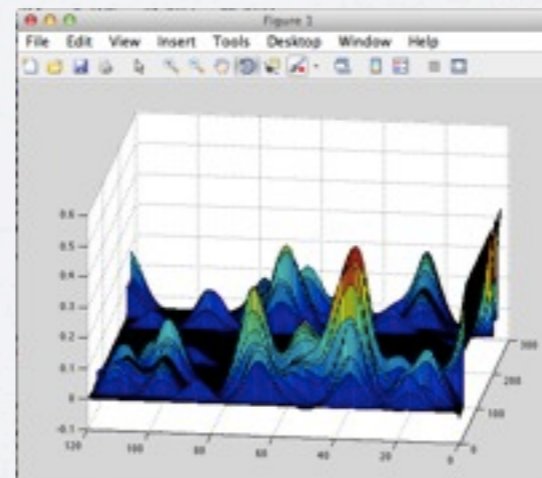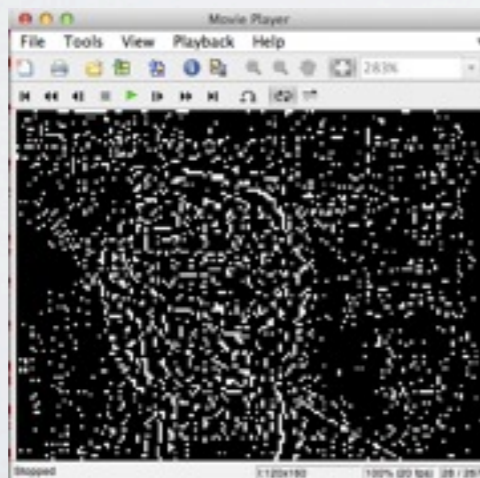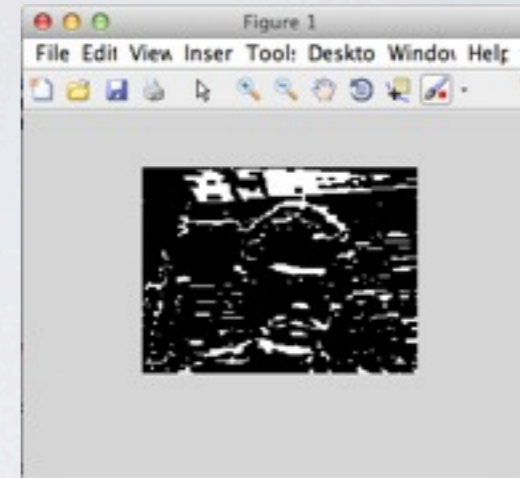
APPROACH

APPROACH

Wadhwa et. al 2013

METHODOLOGY

Cloud Points → Breathing Frequency Filtering → Face Detection → Gaussian Mixture's Peaks → Features Creation → Facial Features' Position Estimation
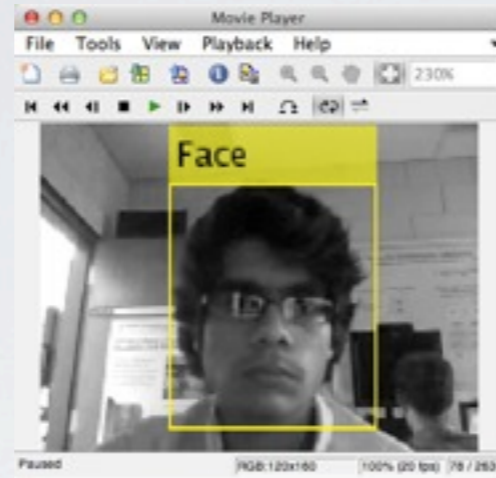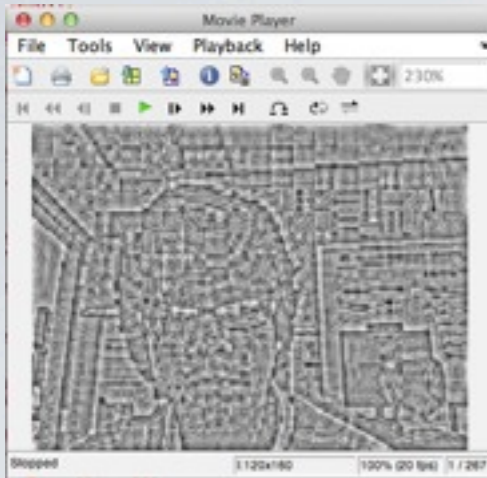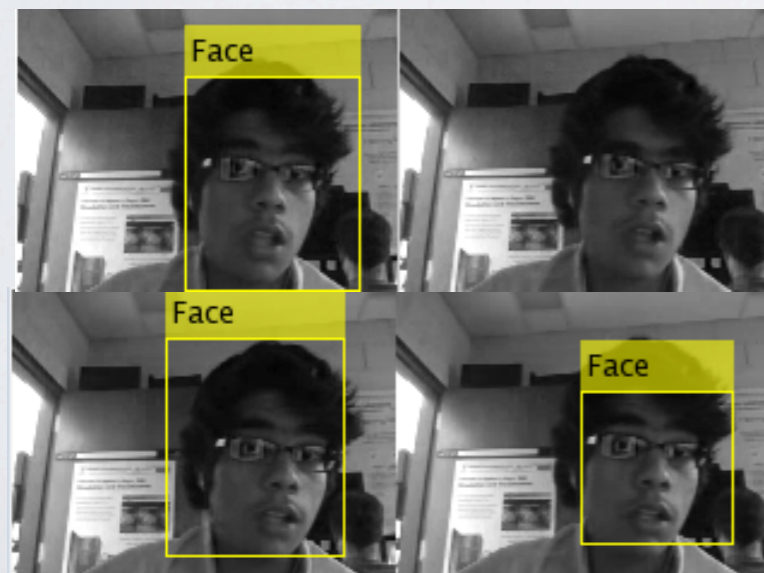
PARTIAL RESULTS

- <u>Face's Tracking Results</u>

- <u>Eyebrows' Detection Results</u>

FACE DETECTOR

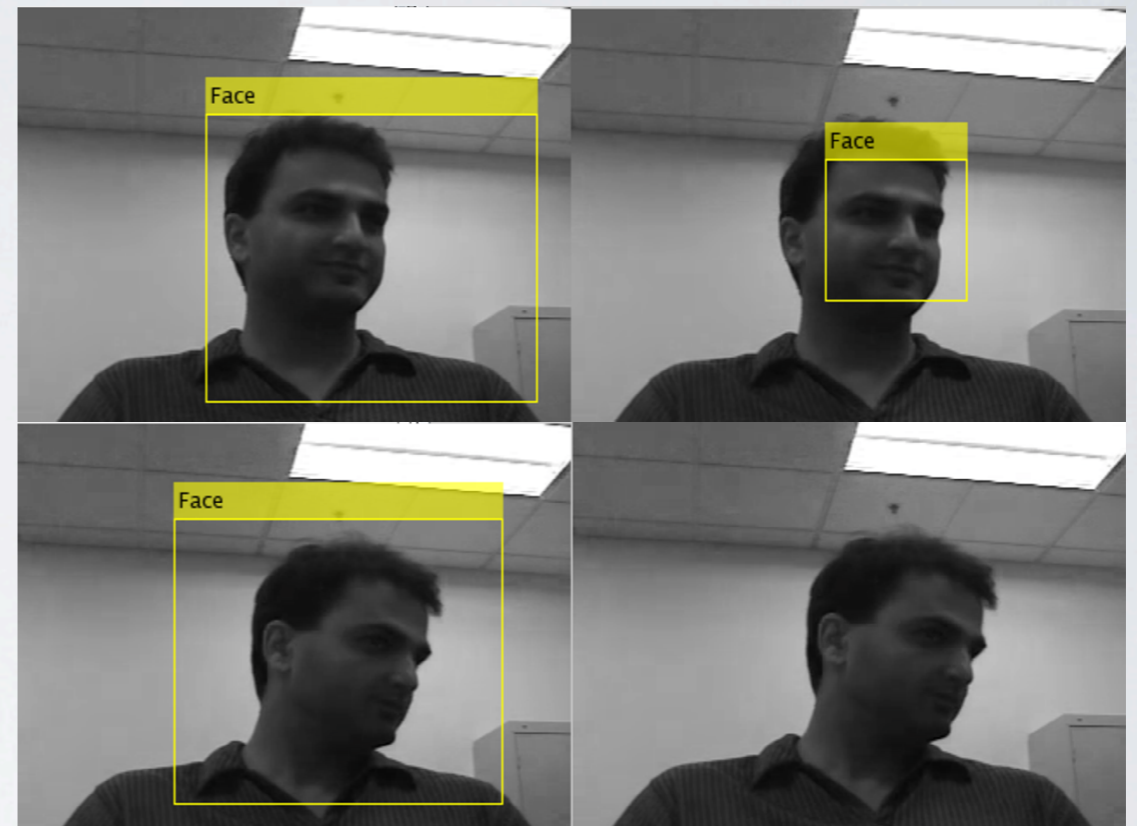Partial faces results using proposed method

Comparison: Proposed method (right) Viola-Jones (right)   Comparison: Viola-Jones (left) Proposed method (right)

FACE DETECTOR

Experiments over Honda/UCSD Video Database [1] [2]
Proposed method (left) Viola-Jones (right)

Method	Accuracy	α
Viola-Jones	71.92%	1
PBMM	64.96%	3.17

| Method	Time(ms)
Viola-Jones	35.3
PBMM	182.3

[1] K.C. Lee J. Ho M.H. Yang and D. Kriegman. Video-based face recognition using probabilistic appearance manifolds. IEEE Conf. On Computer Vision and Pattern Recognition, 1:313–320, 2003.
[2] K.C. Lee J. Ho M.H. Yang and D. Kriegman. Visual tracking and recognition us- ing probabilistic appearance manifolds. Computer Vision and Image Understanding, 2005.

FACE DETECTOR

Results extracted from Choke Point Database [3]
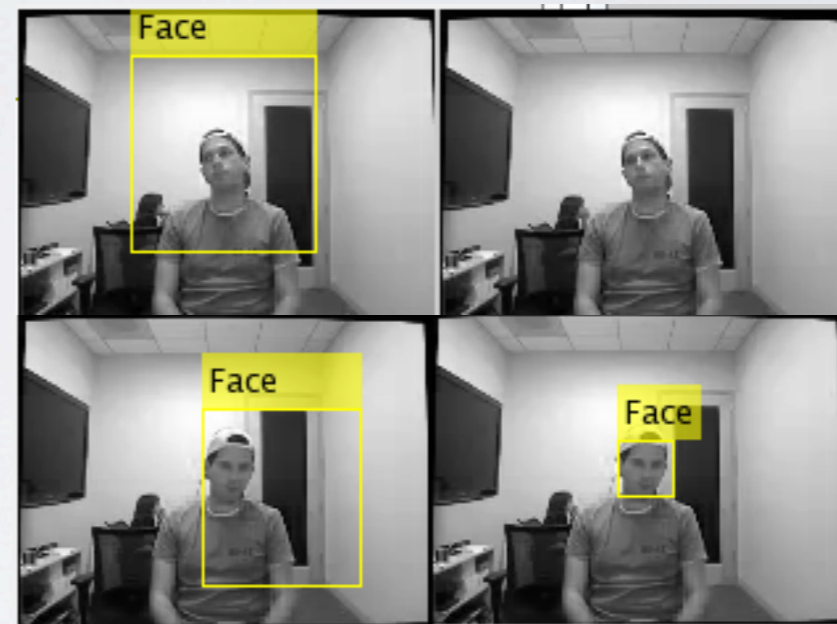
Results extracted from ICT 3D HeadPose Database [4]

[3] Y. Wong, S. Chen, S. Mau, C. Sanderson, B.C. Lovell Patch-based probabilistic image quality assessment for face selection and improved video-based face recognition Computer Vision and Pattern Recognition Workshops (CVPRW), pages 74 - 81, 2011.
[4] T. Baltrušaitis, P. Robinson, and L.P. Morency 3D Constrained Local Model for Rigid and Non-Rigid Facial Tracking in IEEE Conference on Computer Vision and Pattern Recognition, Providence, RI, June 2012

FACIAL FEATURES EXTRACTION

FACIAL FEATURES EXTRACTION

Feature	Accuracy
Eyebrows	67.32%
Mouth	63.54%
Nose	76.29%

CURRENT RESULTS

- <u>Complex Face Tracking</u>

- <u>Facial Features Tracking</u>

DISCUSSION

• Time/Breathing constraint

• Quality of the Breathing information

• [Low / High] Resolution

• Current approach

  • Face: Ellipse fitting

  • Facial Features: Gradient-based

Thanks...