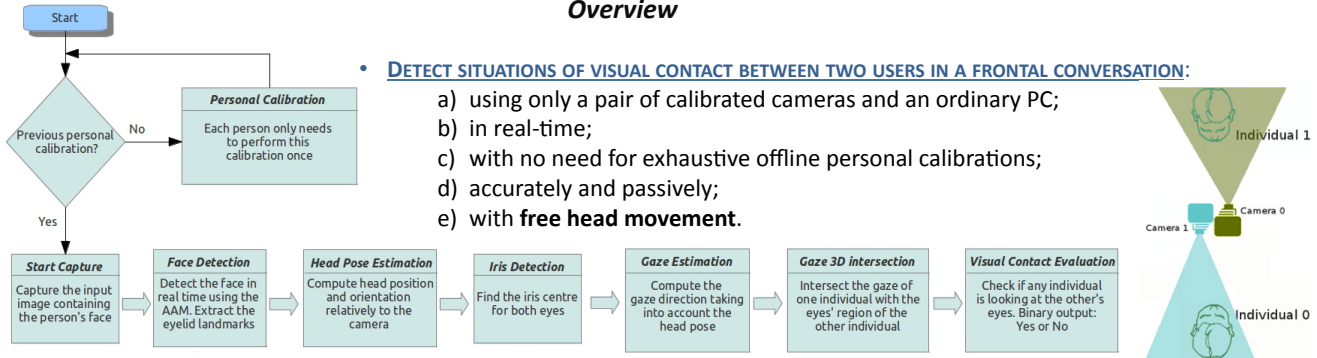


# AN EYE2EYE HUMAN INTERACTION EVALUATION

Cristóvão Cordeiro • Jorge Batista  
Institute of Systems and Robotics

Department of Electrical and Computer Engineering, University of Coimbra, Portugal

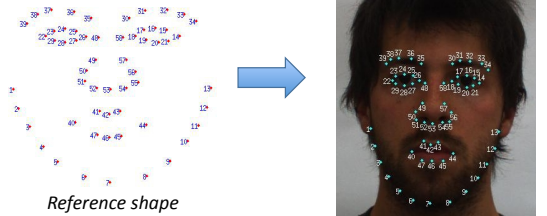
## Overview



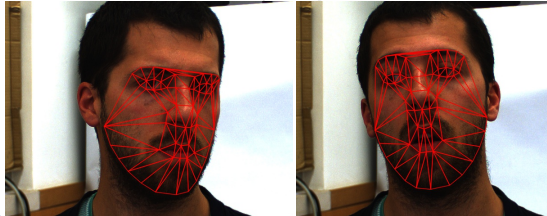
### • DETECT SITUATIONS OF VISUAL CONTACT BETWEEN TWO USERS IN A FRONTAL CONVERSATION:

- a) using only a pair of calibrated cameras and an ordinary PC;
- b) in real-time;
- c) with no need for exhaustive offline personal calibrations;
- d) accurately and passively;
- e) with **free head movement**.

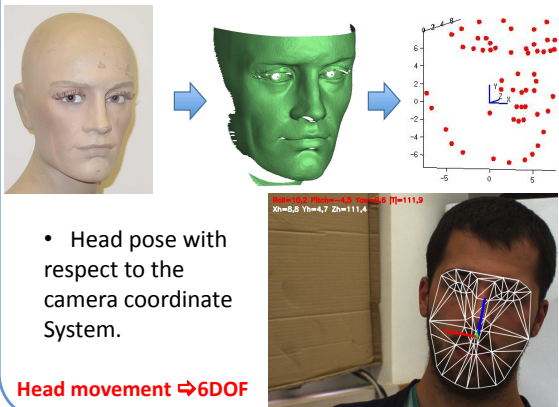
## Face Detection



Model-based approach to track the 58 facial features:  
**Active Appearance Model (AAM)**  
AAM = combination of Shape and Texture models



## Head Pose Estimation



- Head pose with respect to the camera coordinate System.

Head movement  $\Rightarrow$  6DOF

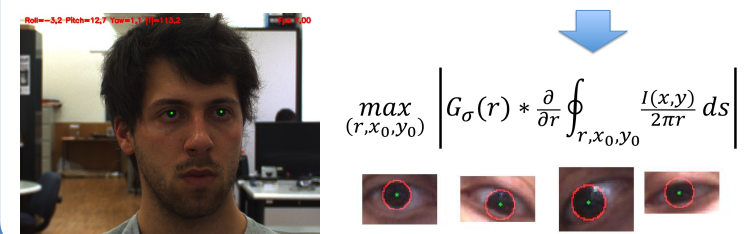
## Conclusion

- $|\bar{e}_{\theta_x}| \approx 1,8^\circ$  ,  $|\bar{e}_{\theta_y}| \approx 2,2^\circ$

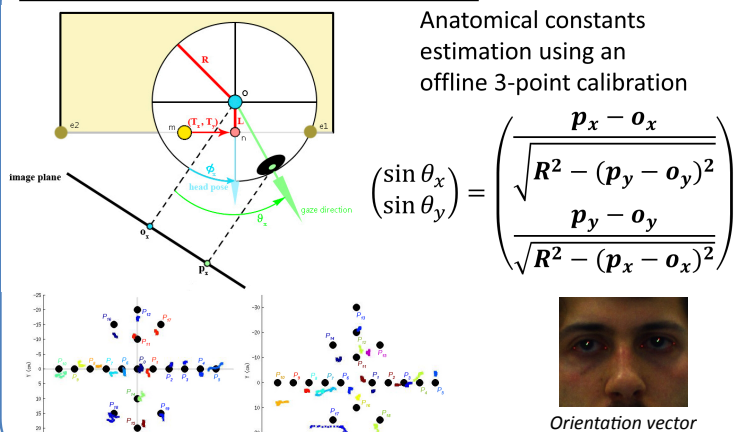
70%  $\leq$  HitRate  $\leq$  87%

## Iris Detection

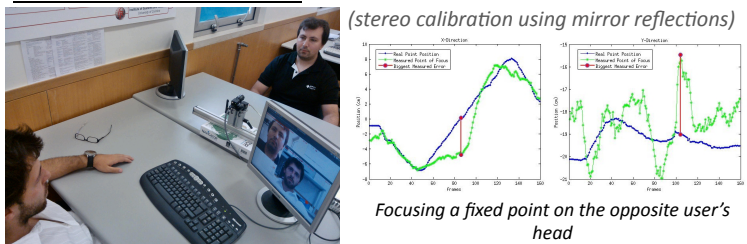
Circular edge detector  $\rightarrow$  John Daugman's Integro-differential Operator



## Gaze Estimation (with free head motion)



## Visual Contact Evaluation



If the point of focus of individual 0, lies inside the eyes region of individual 1 (and vice-versa), then there is visual contact.