

## **Facial Expression Recognition Based on**

# **Neutral Face Shape Estimation**

Sezer Ulukaya<sup>1</sup><sup>2</sup>, Çiğdem Eroğlu Erdem<sup>1</sup>, Electrical and Electronics Engineering Dept., <sup>1</sup> BAHÇEŞEHIR University, <sup>2</sup> BOĞAZIÇI University {cigdem.eroglu, sezer.ulukaya}@bahcesehir.edu.tr



Neutral frame is KNOWN

> Track facial features

Subtract original neutral frame from the peak one

### **Facial Expression Recognition** Neutral frame is UNKNOWN Neutral frame availability **\*** Geometrical features **\***Appearance features Fit a Gaussian 6 discrete emotion classes Mixture Model to Extended Cohn-Kanade the data Database **Neutral frame Motion vectors** Last frame Estimate the best

Classify feature vectors using Support Vector Machines



**Neutral Face Shape Dictionary** 

Tracking Active data based on **Appearance Model (AAM)** 







**Best fit vs. Worst fit** 

\* When the person-specific face shape is not available, it is better to use proposed neutral face shape estimation method.

The proposed method gives higher emotion recognition rates than the baseline method, although we do not use any person-specific neutral shapes and any appearance based features. If we use, recognition rate is 94%.

### 97 95 93 91 89 87 85 83 Method Used 81 79 CBF-ENS CBF-NS Baseline LASSIFT CBF\*SIFT

## **Average Recognition Rate**

It is better to use appearance and geometric features together.

This work has been supported by the Turkish Scientific and Technical Research Council under Project 110E056

Reference: Lucey, P., et al., The Extended Cohn-Kanade Dataset (CK+): A complete dataset for action unit and emotion-specified expression, in Proceedings of IEEE workshop on CVPR4HCBA, 2010.