Facial expression classification In still images

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Introduction

Face detection

Contour detection

Expression estimation

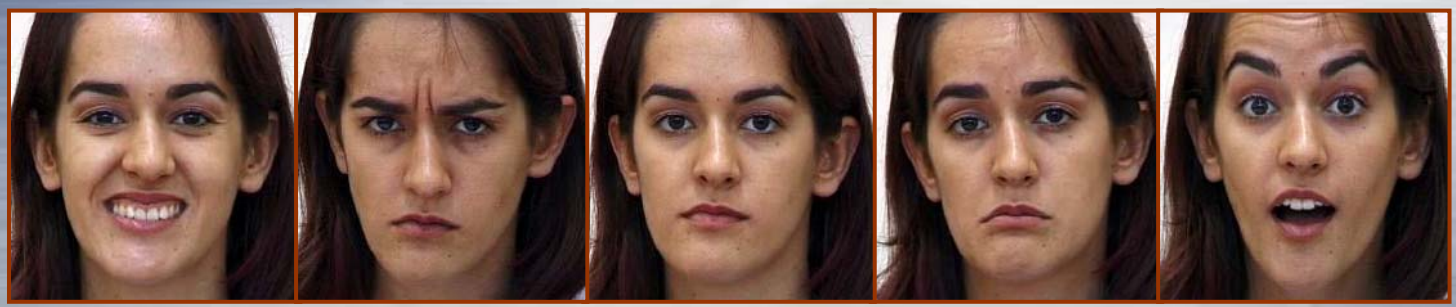
System implementation - DEA

Results

Conclusions

INTRODUCTION

- Basic expressions (Ekman i Friesen – 1971)



Joy **Anger** **Neutral** **Sad** **Surprise**

INTRODUCTION

Objective

- **To develop an automatic system which can recognize a facial expression in a still image.**

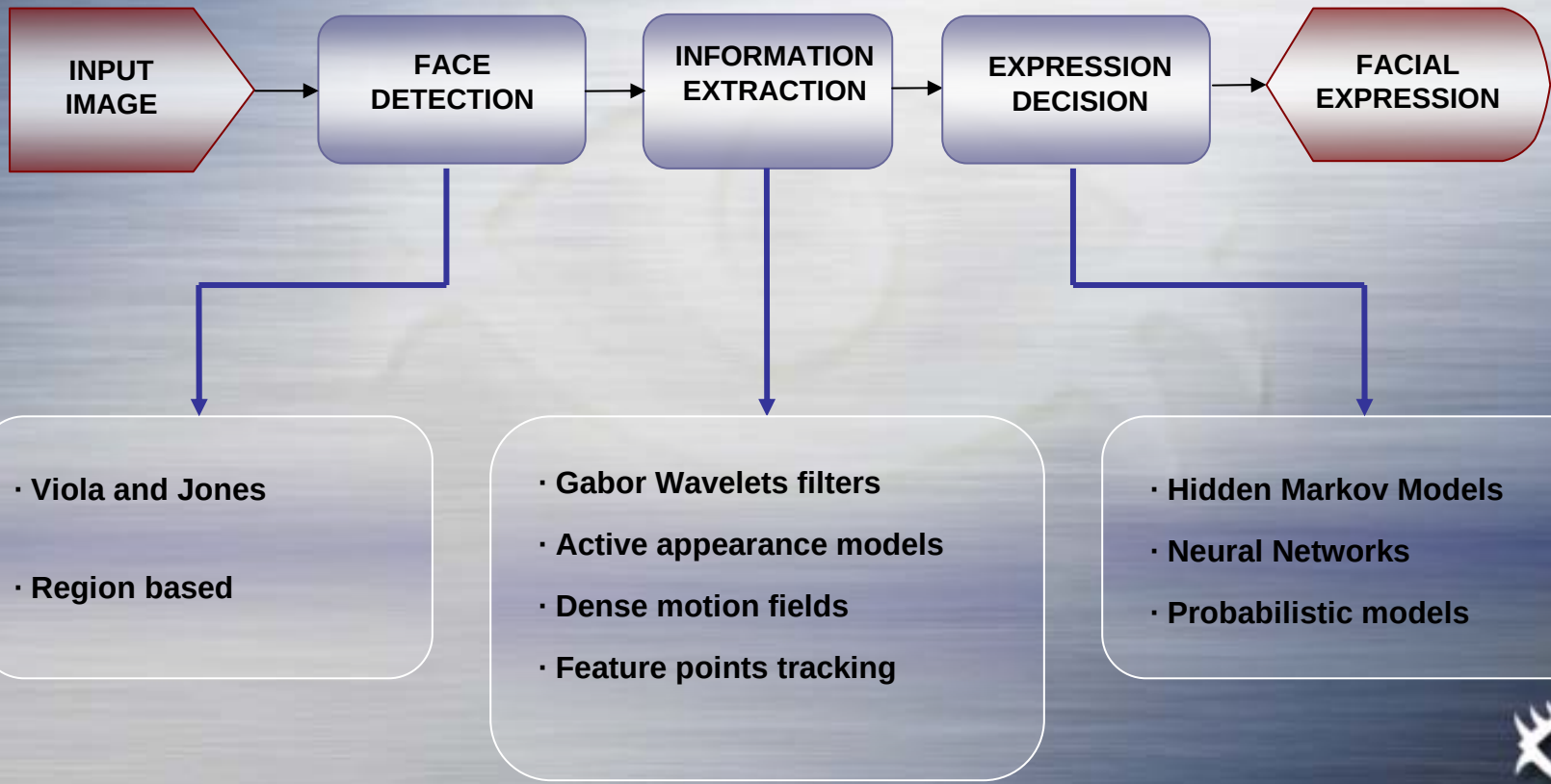
Applications

- **Monitor for drivers**
- **Stress detection**
- **Facial coder**
- **Entertainment/ Games**
- **etc.**

D-E-A

INTRODUCTION

Generic scheme. Methods.




FACE DETECTION
FEATURES DETECTION
EXPRESSION DECISION

FACE DETECTION

Viola and Jones:

- Fast search
- Robust to background

- Uses local texture features
- Trains classifiers for face/non-face classes
- Uses a cascade of classifiers structure (Adaboost)

Region-based:

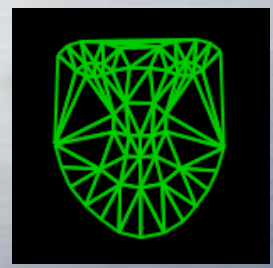
- Refines the face detection to obtain a better initizialization

D·E·A

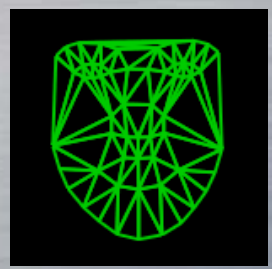
FACIAL FEATURE CONTOUR DETECTION

Model based method

Active Shape Models



Active Appearance Models

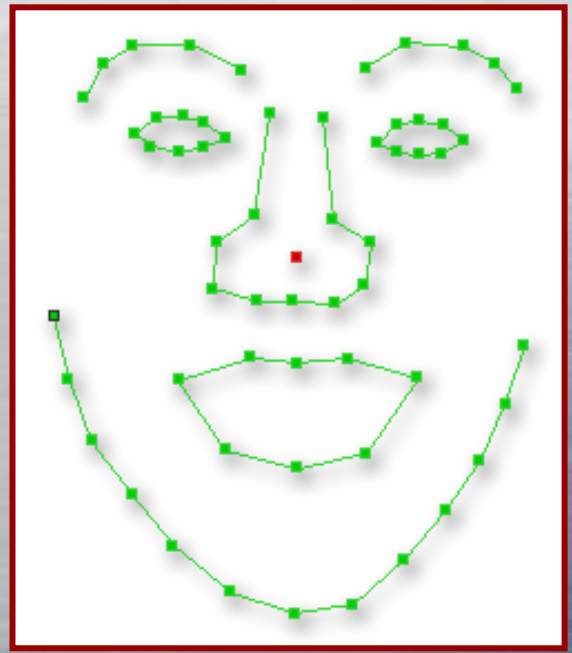


FACIAL FEATURE CONTOUR DETECTION

Based on Active Appearance Model software implemented by Stegmann*

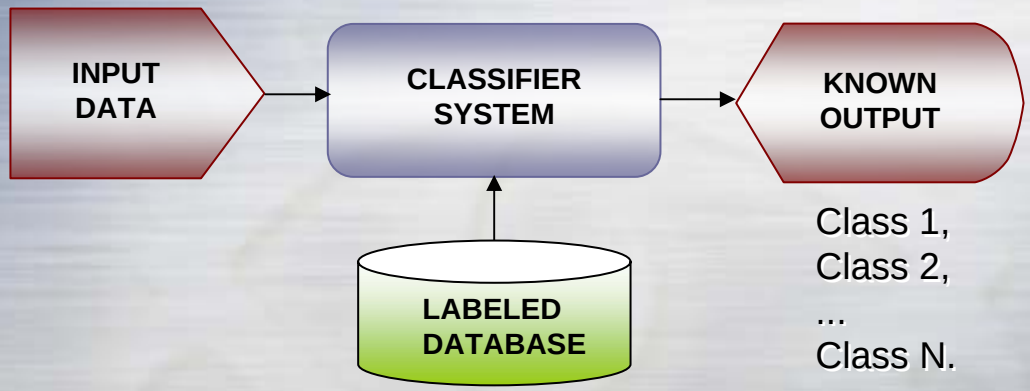
* M. B. Stegmann, B. K. Ersbøll, R. Larsen, FAME - A Flexible Appearance Modelling Environment, IEEE Transactions on Medical Imaging, vol. 22(10), pp. 1319-1331, Institute of Electrical and Electronics Engineers (IEEE), 2003

- Facial feature contours are represented by a 58 points model



D·E·A

FACIAL EXPRESSION



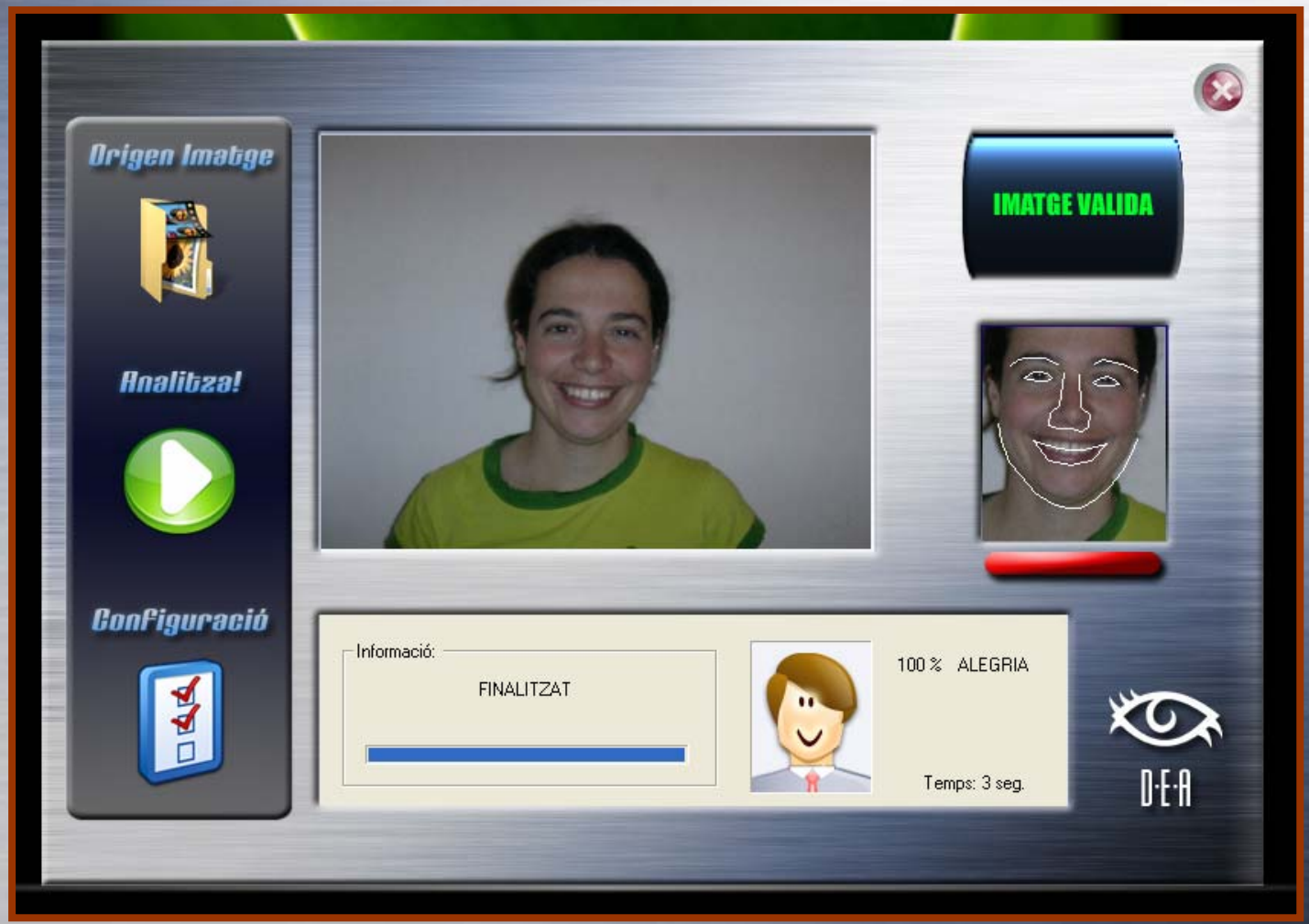
Bayesian framework with probabilistic model: Mixture of multivariate gaussians, trained with EM for each class

RESULTS

Database

- 192 labeled images.

RESULTS


Origen Imatge
Analitza!
Configuració
IMATGE VALIDA
Informació:
FINALITZAT
100 % ALEGRIA
Temps: 3 seg.
D·E·A

D·E·A

RESULTS

TEST 1

95,47%	H	A	N	Su	Sa
H	96%			4%	
A		98%			2%
N			94%	6%	
Su	4%		3%	93%	
Sa			3%		97%

95,47 %

D·E·A

RESULTS

TEST 2

84,66%	H	A	N	Su	Sa
H	96%		2%	2%	
A	6%	79%	4%	4%	8%
N		3%	69%	13%	16%
Su			4%	96%	
Sa		3%	14%		83%

84,66 %

CONCLUSIONS

· Automatic system for facial expression detection in 3 stages:

·Correct classification rate **85 %, with 5 classes**.

· Only frontal faces.
Problems with facial hair and sometimes with glasses