

Research Seminar 2009

-

# Static Hand Gesture Recognition

Thierry Messer



# Overview

- Introduction
- Recognition Process
  - Techniques
- Applications
- Conclusion
- Questions



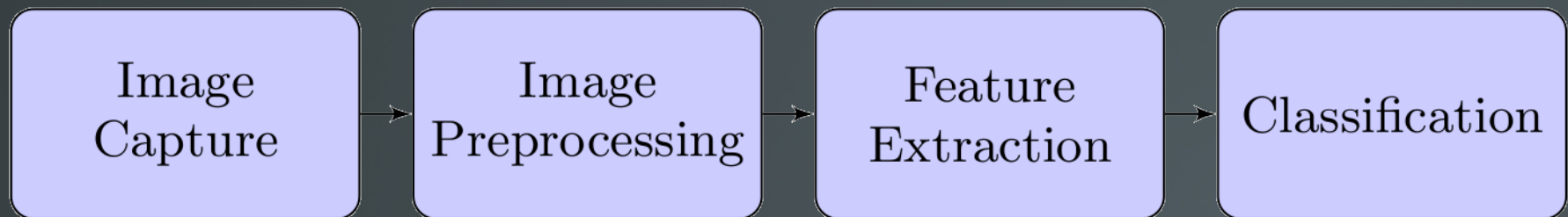
# Introduction

- Static hand gesture
  - Any posture of a hand?
  - Ambiguity?
- Only visual systems were considered in this work



# Recognition Process

- 2 basic approaches:
  - Top-down approach ( $\rightarrow$  model to image)
  - Bottom-up approach ( $\rightarrow$  image to model)
- Schematic view of gesture recognition:



# Recognition Process – Techniques 1

- Image Capture Phase
  - Optimal conditions?
    - next phases less complex
  - 2 or more cameras can be used to gather more informations
- Image Preprocessing Phase
  - Hand detection
  - Segmentation



# Recognition Process – Techniques 2

- Feature Extraction Phase
  - Aim: extract a possible precise feature
  - Features: hand outline, (local) orientation histogram, ...
  - Feature vectors size: up to 200 elements



# Recognition Process – Techniques 3

- Classification Phase
  - Use feature vector to determine appropriate gesture
  - Methods: Hidden Markov Model, Multi-Layer Perceptron, k-Nearest Neighbors, ...
  - Computationally intensive
    - in particular for large feature vectors!



# Applications

- Replacement for remote controls
- Computer Aided Communication (i.e. ASL)
- 3D Navigation





# Conclusions

- ASL recognizer works well (~97%)
  - ”Only” 40 different gestures
  - Adequat recognition requires some 100 ..  
→ Real-Time recognition becomes problematic
  - More descriptive features / faster classification required



Questions?

