

Real Time Hand Based Robot Control Using MultiCam

Introduction

We propose an efficient and natural hand based commanding system to control an industrial robot using multimodal 2D/3D images.

Main Functionalities:

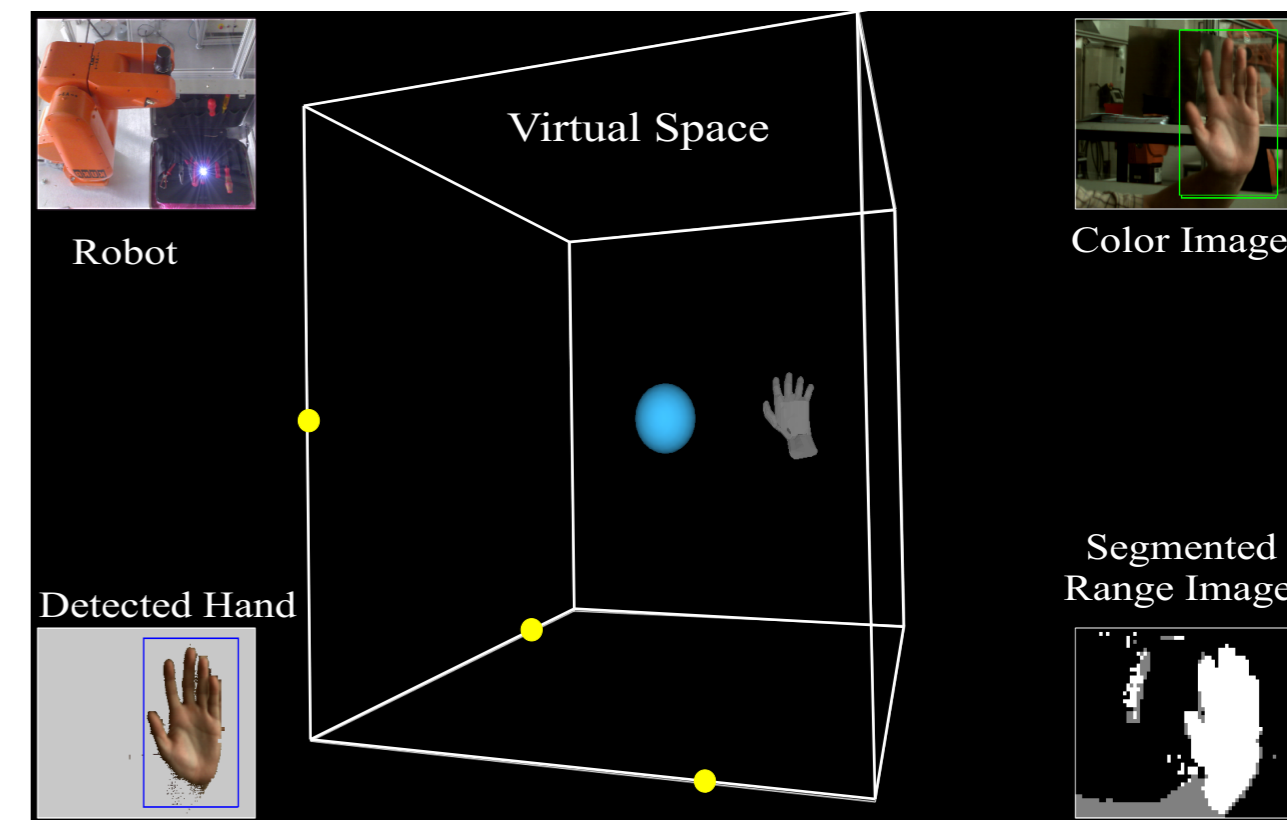
- Move the robot in any direction by moving the hand
- Pick up and put down an object with palm/fist or fist/palm posture

Main Advantages:

- Independent of environment lighting
- Fast, intuitive and natural interface
- Robust against cluttered background
- High accurate

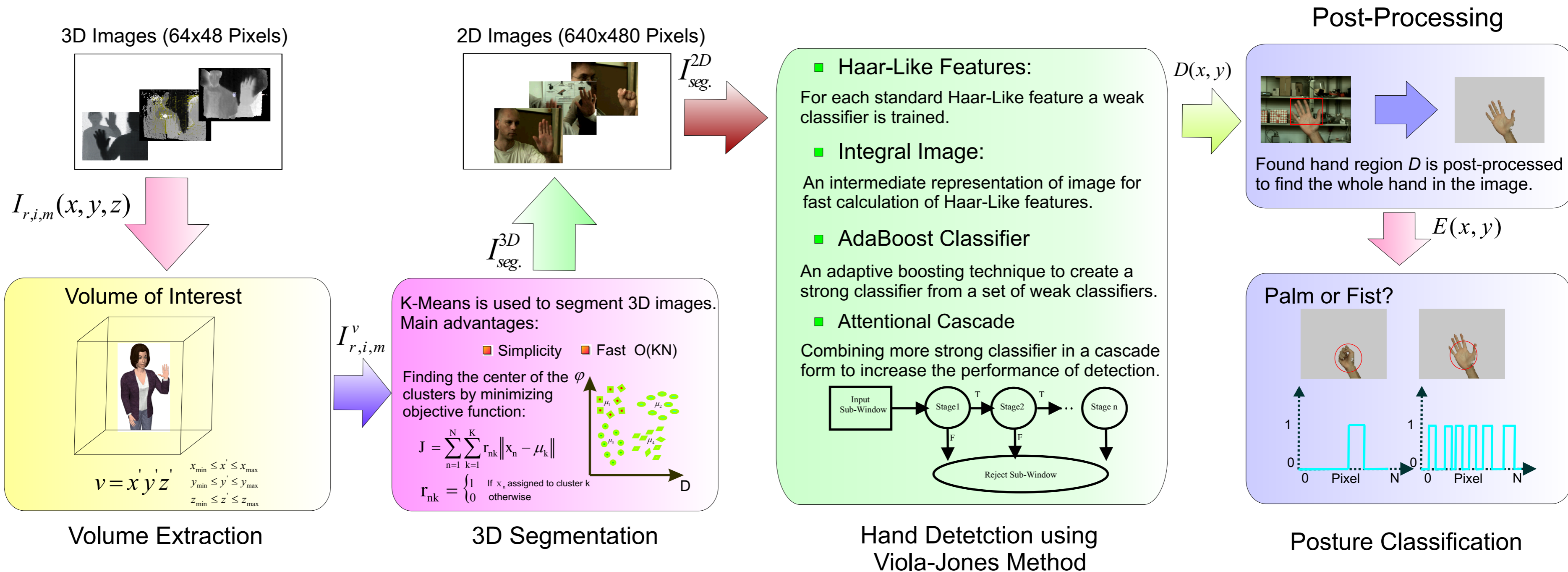


Robot Control



Graphical User Interface

Hand Detection & Posture Classification Techniques



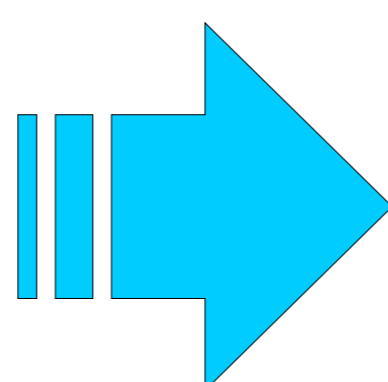
Results

Training:

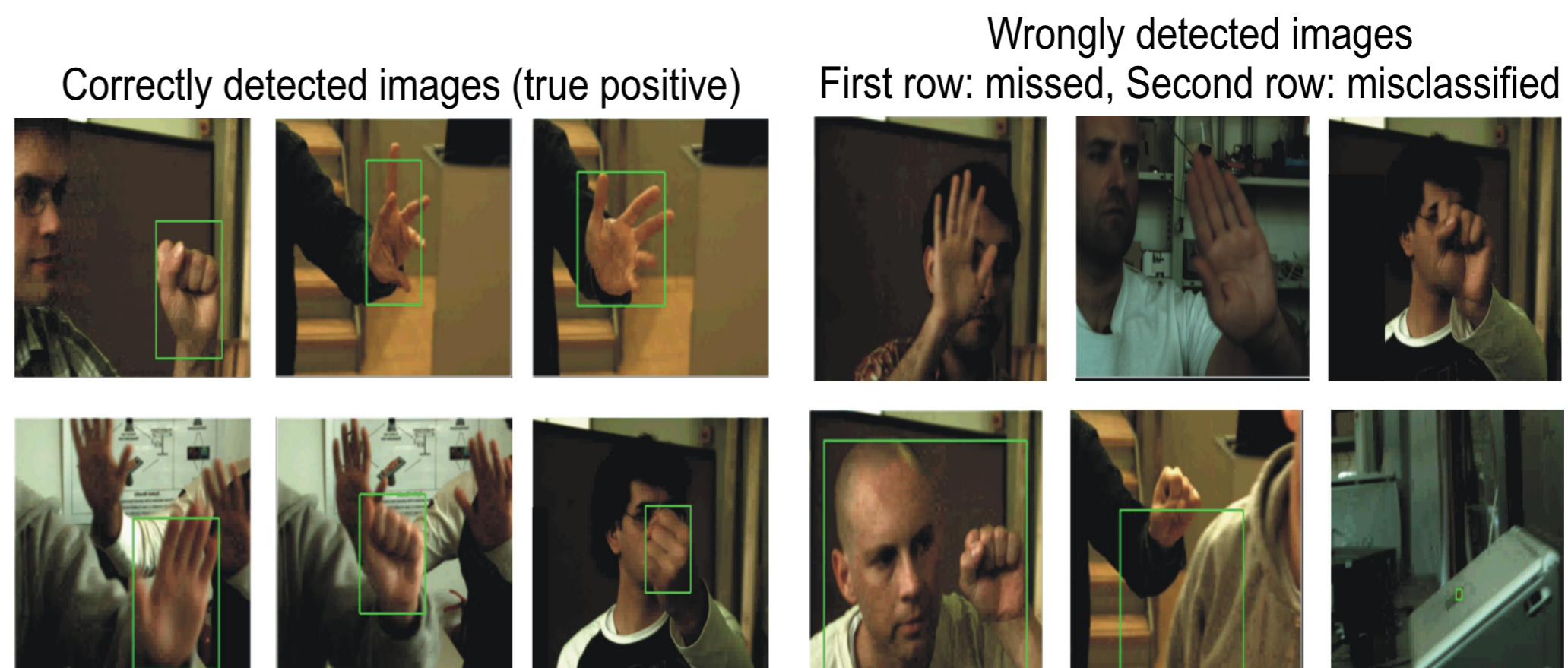
Positive samples: 1037 images
 Negative samples: 1269 images
 Search window size: 32x32 pixels
 Number of cascade stages: 20

Test:

	Actual Class	
	Hand	Non-Hand
Hand	2633	87
Non-Hand	224	2630
Sum	2857	2717



False Positive Rate: 0.032
 Hit Rate: 0.921
 Accuracy: 94.4%
 Detection Speed: video frame rate



Ref: Real Time Hand Based Robot Control Using 2D/3D Images, Seyed Eghbal Ghobadi, Omar Edmond Loepprich, Farid Ahmadov, Jens Bernshausen, Klaus Hartmann and Otmar Loffeld, 4th International Symposium on Visual Computing, ISVC08, Las Vegas 2008