

# Virtual “Whiteboard”

## Final Presentation

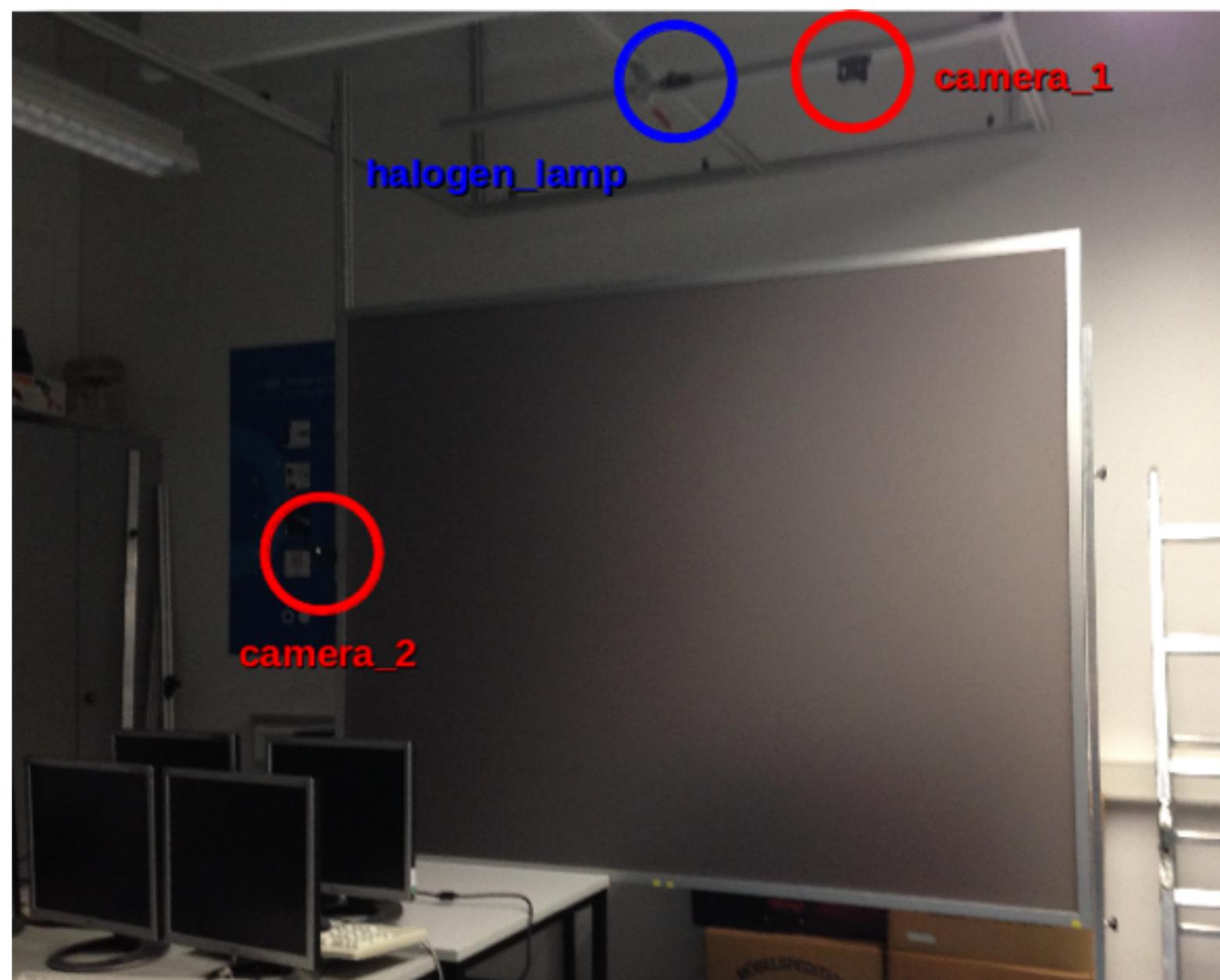
Computer Vision  
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Nicolas Laverde Alfonso  
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# Introduction

Recognize the strokes made with a marker in a flat surface and to transform the strokes into drawings for later projection.

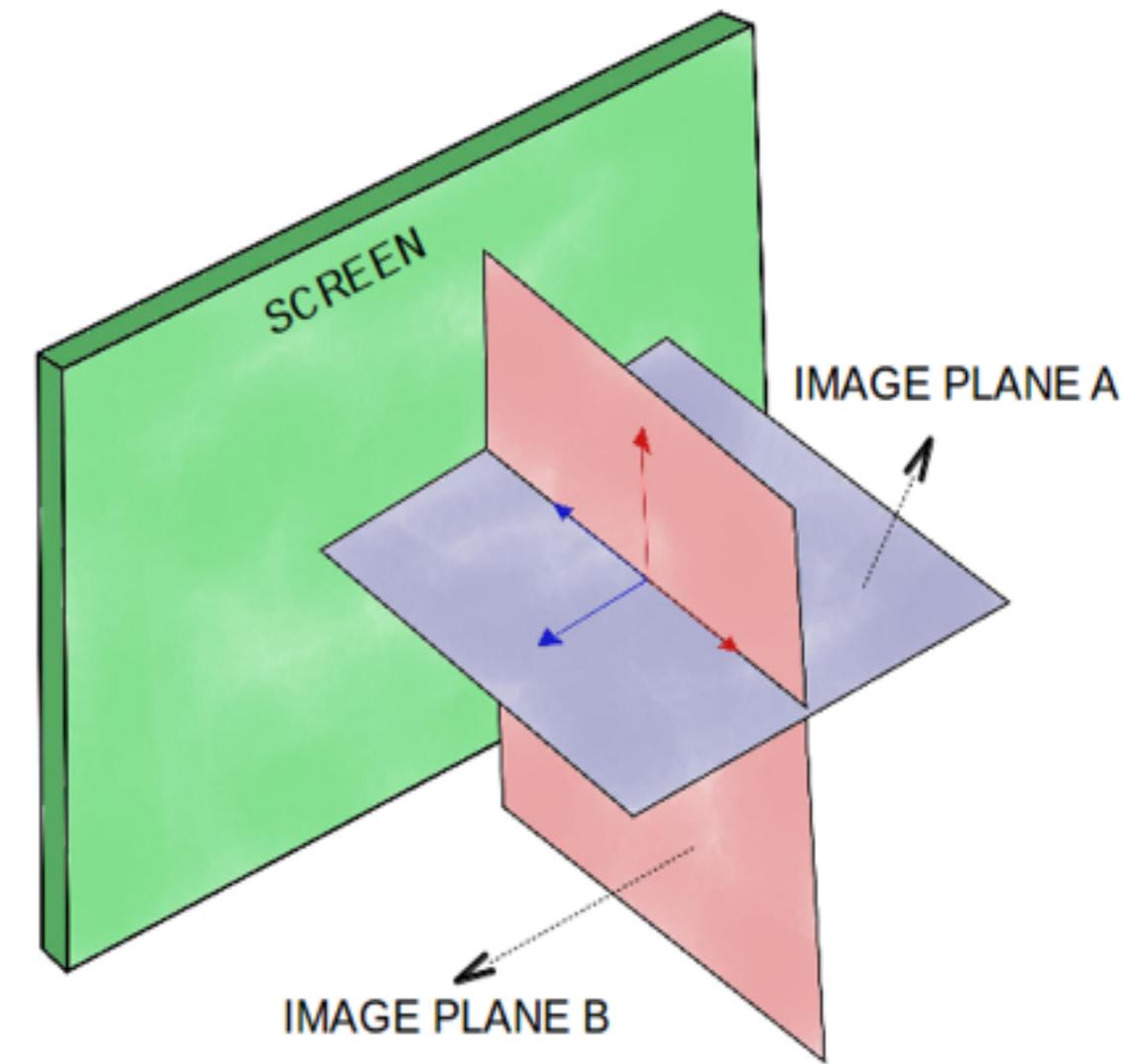
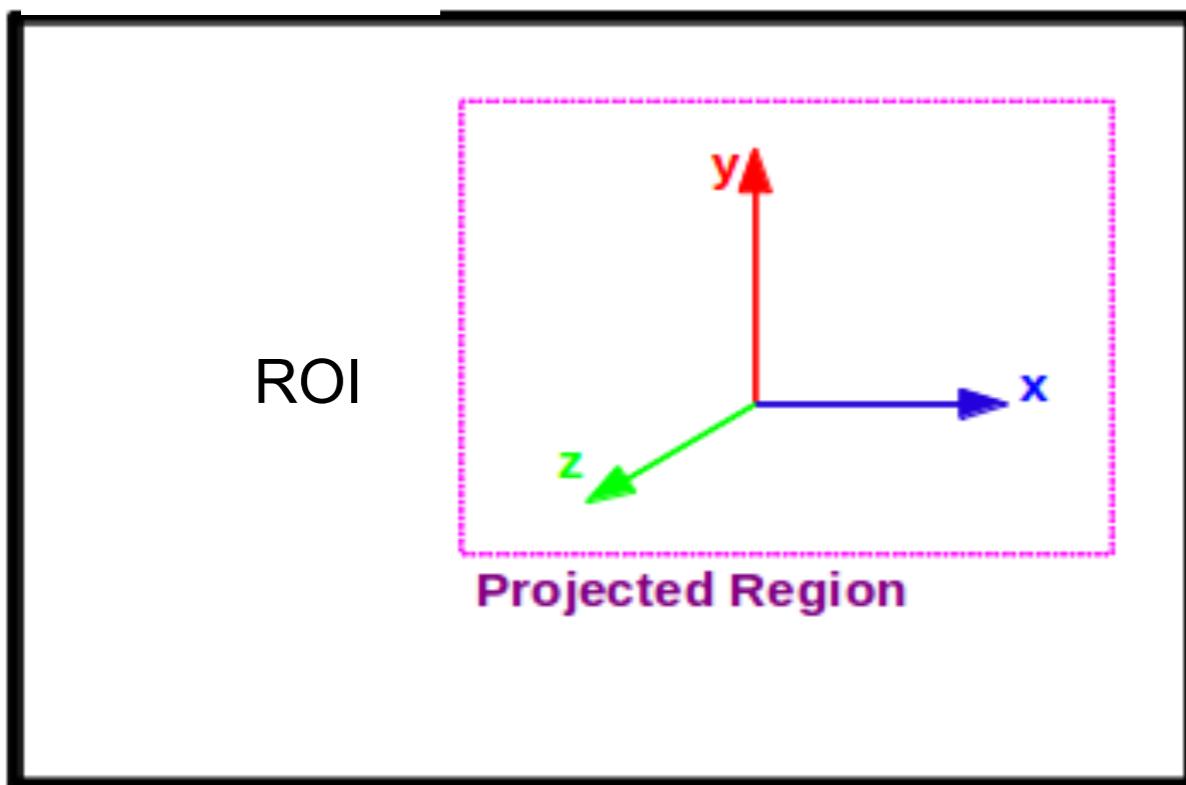
- Two synchronized cameras capture snapshots simultaneously.
- Process two snapshots from different perspectives to detect the position of a pre-defined marker.
- Draw detected strokes and project them into a screen for visualization.

# Description

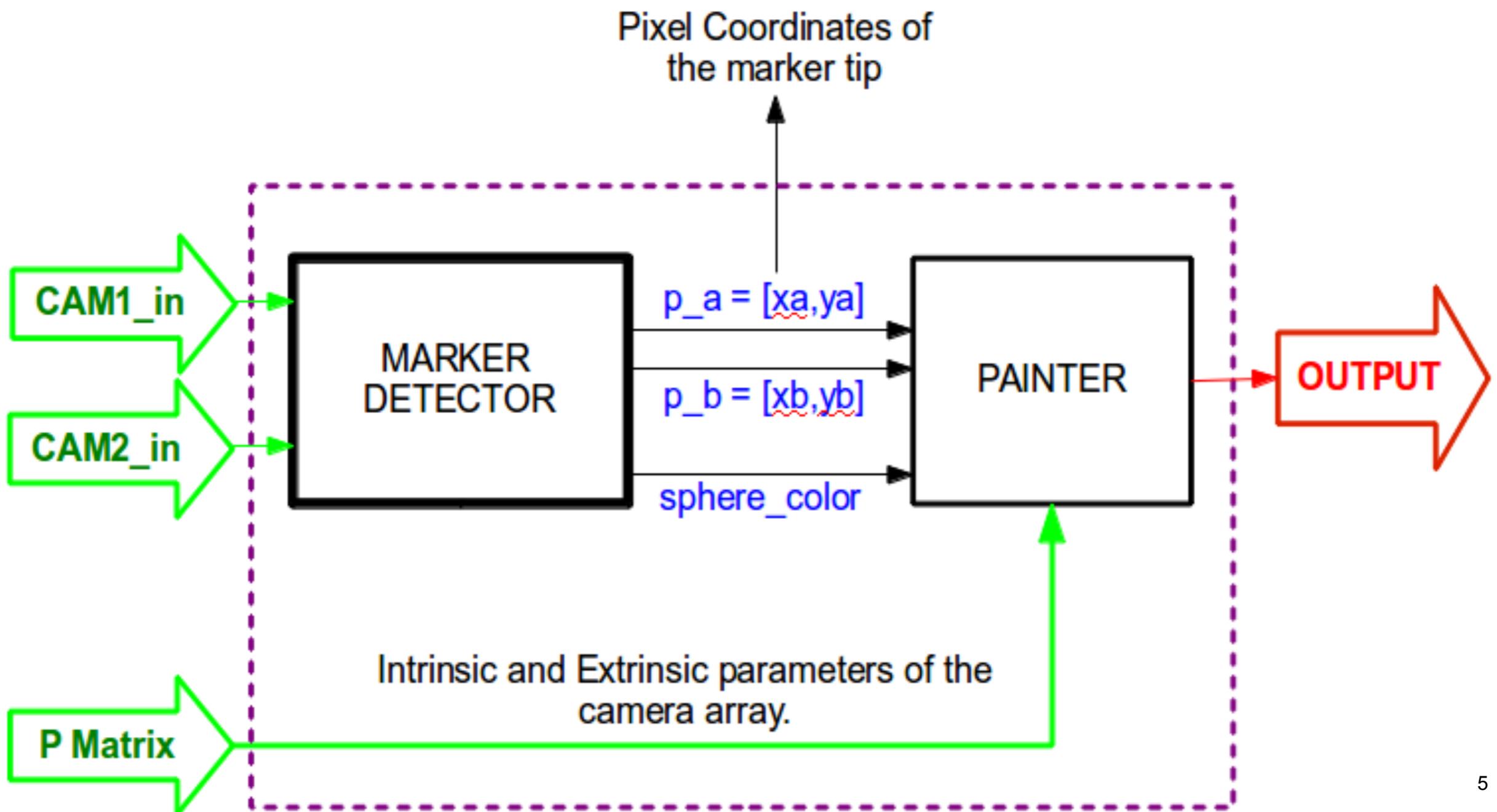


# Description

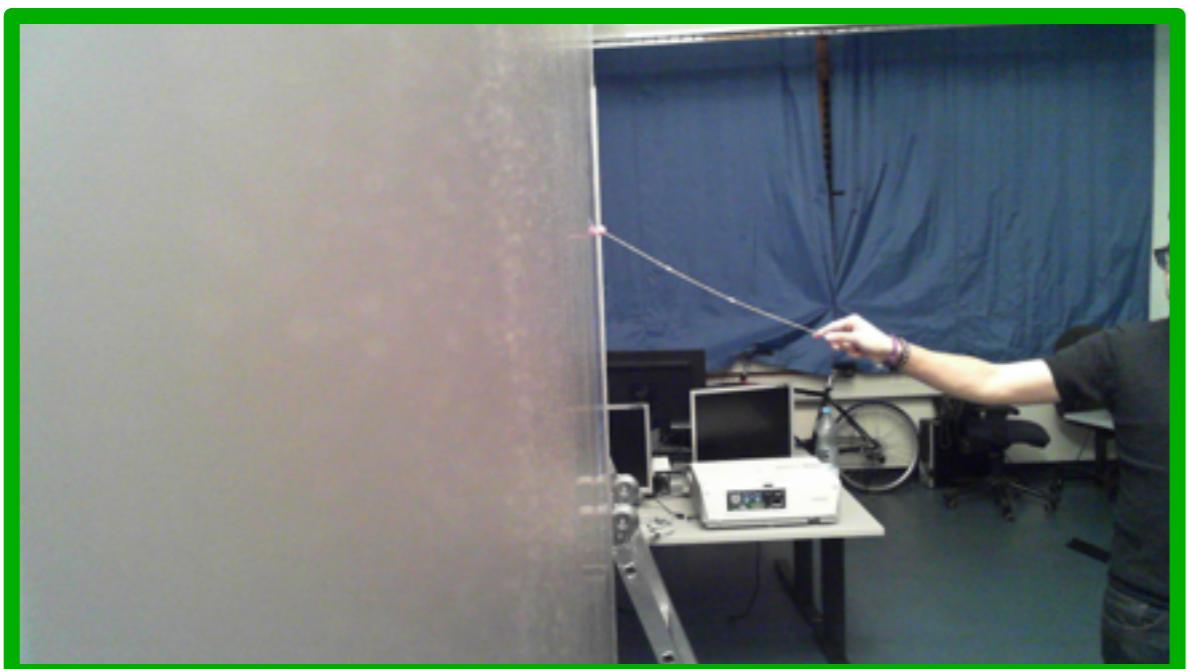
Glass Screen



# System Description

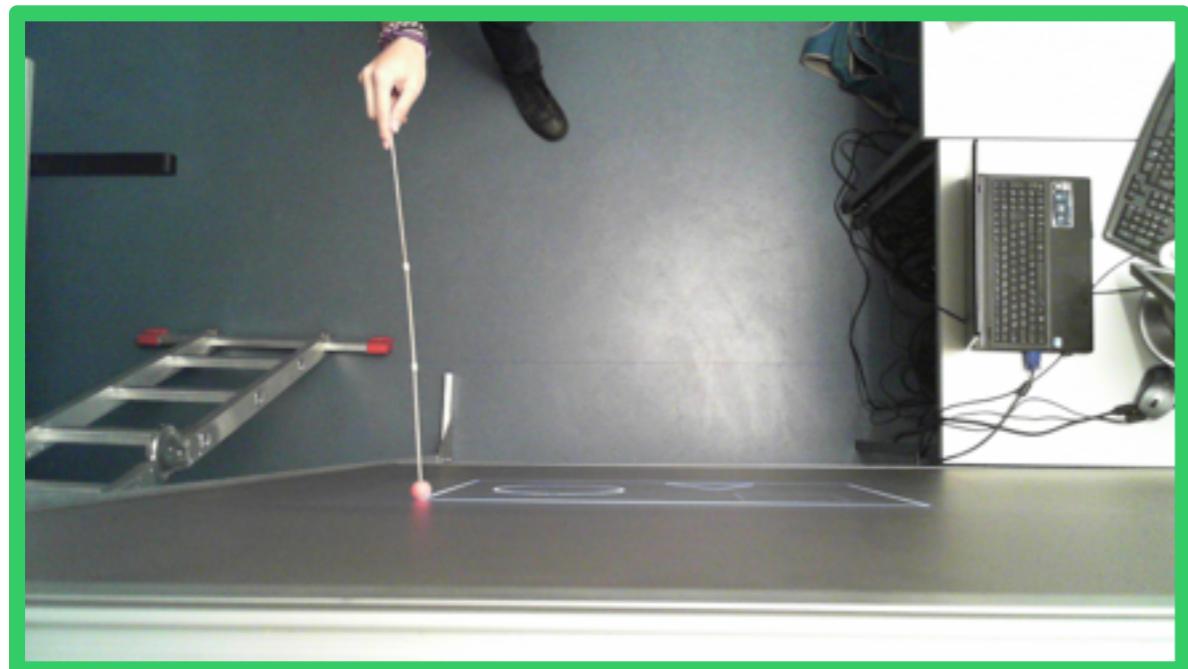


# Input



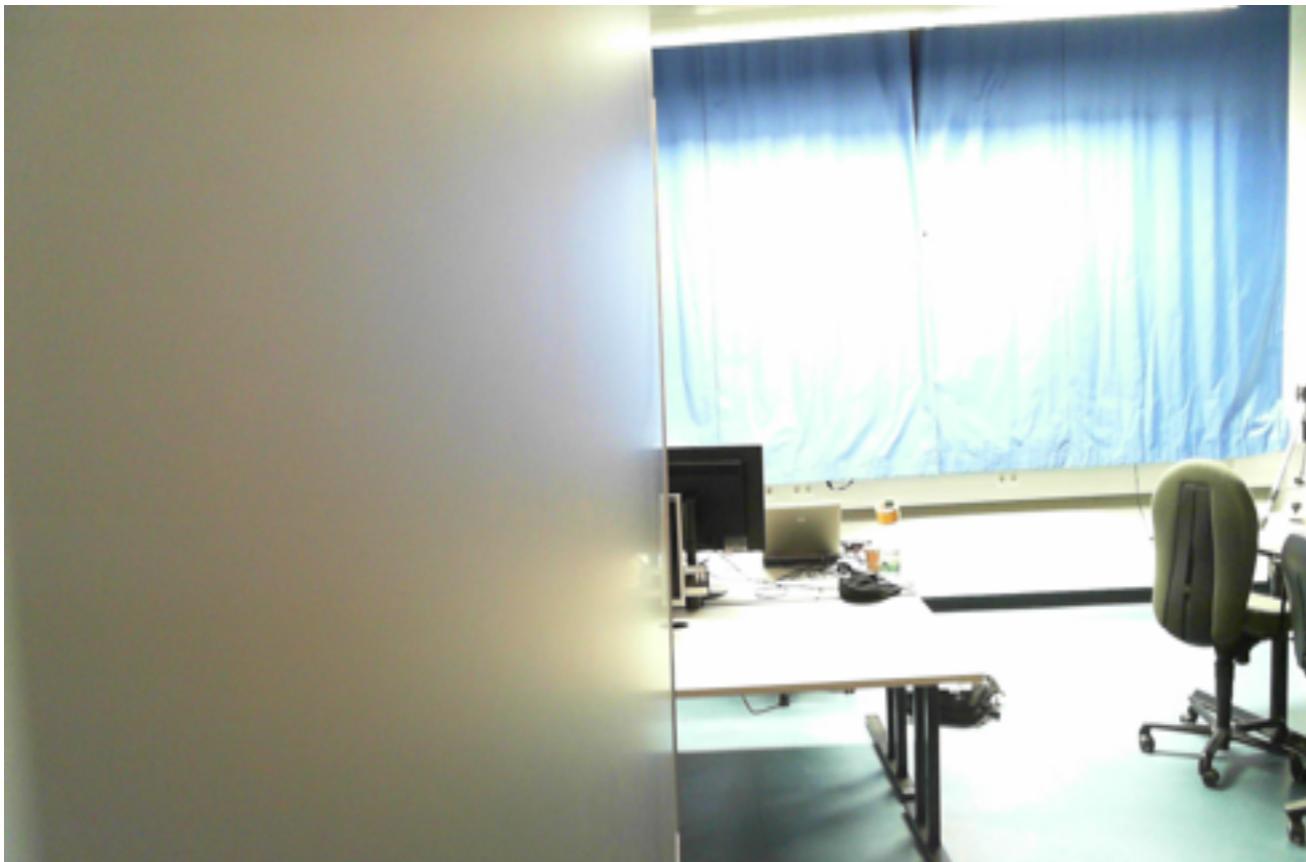
Resolution:  
1920x1080

OFFLINE DESIGN:  
  
50-100 frames  
(images) per view.



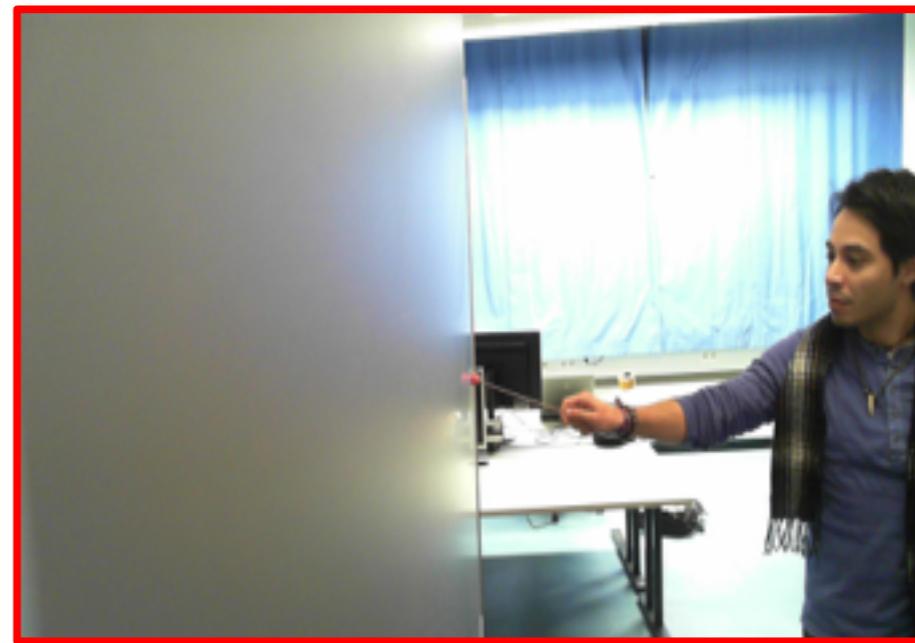
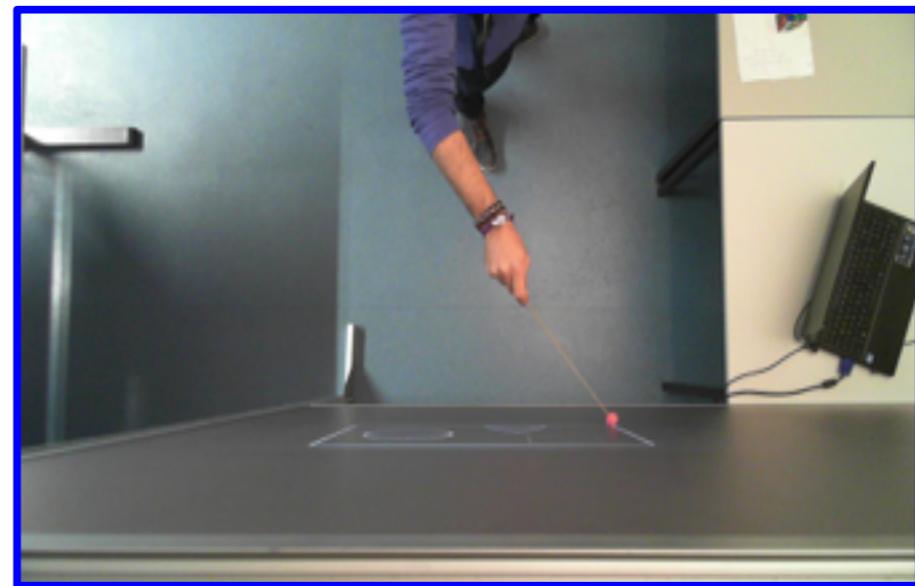
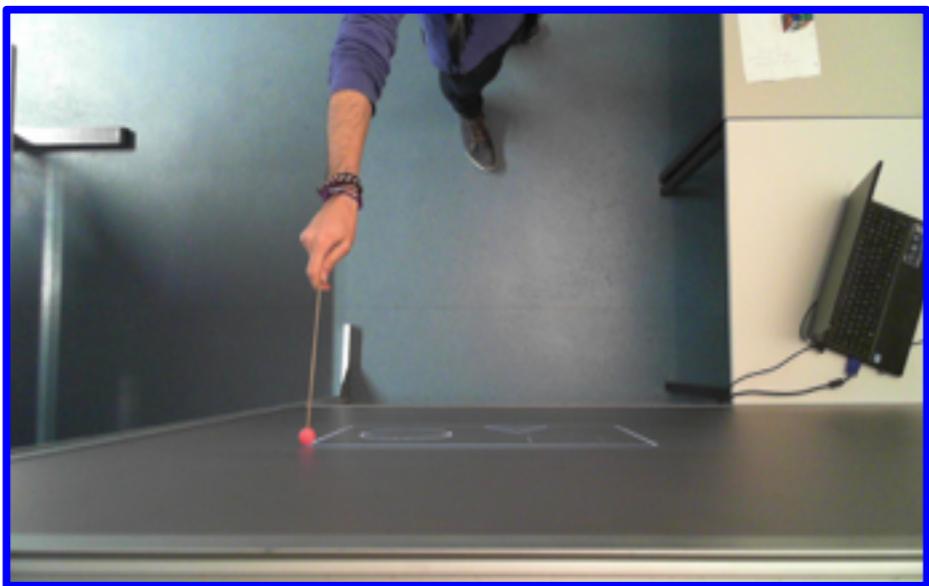
3 sessions  
“recorded”, with three  
different colored  
markers (r,g,b).

# Calibration Background

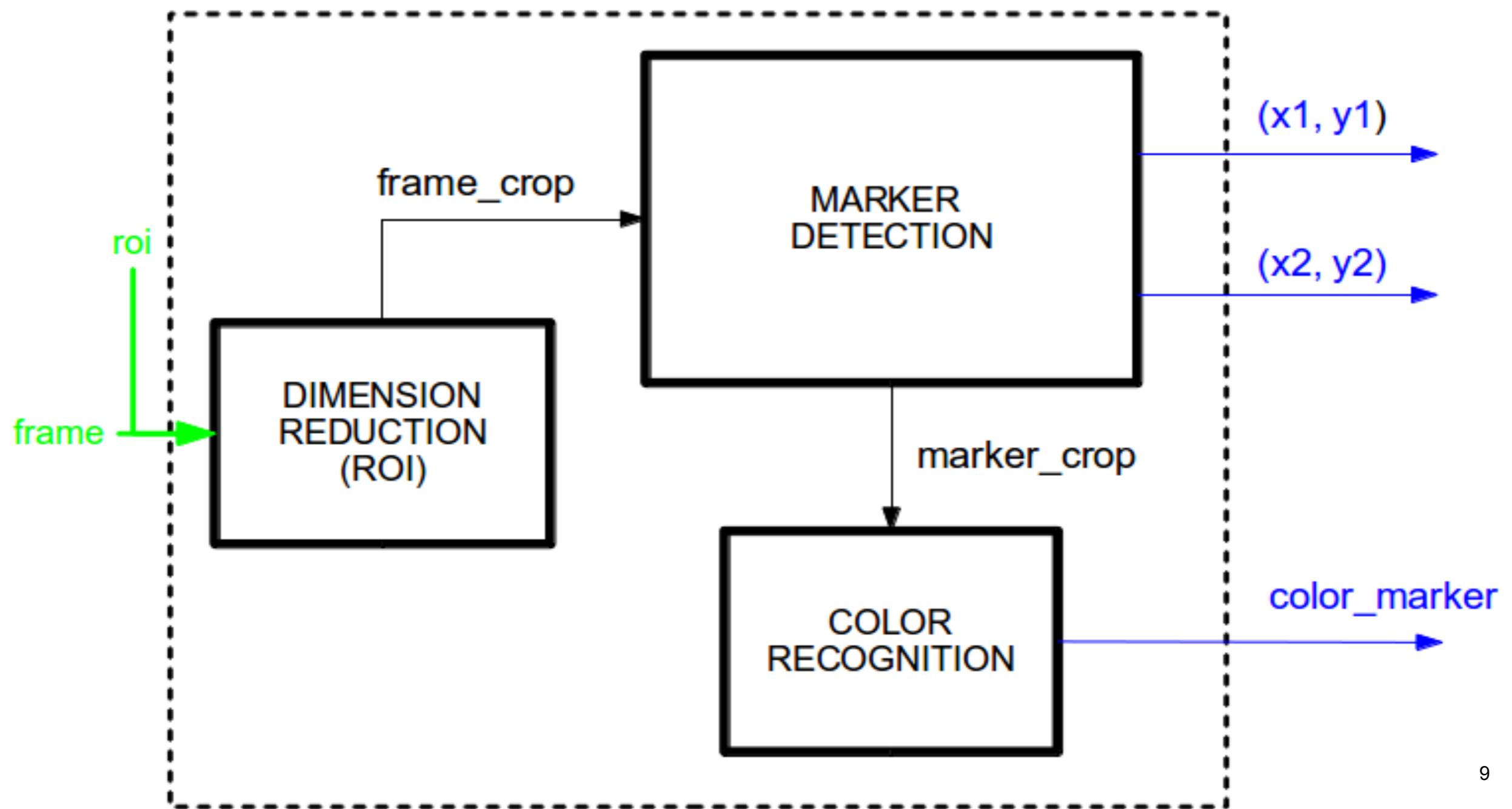


# Calibration

## Corners

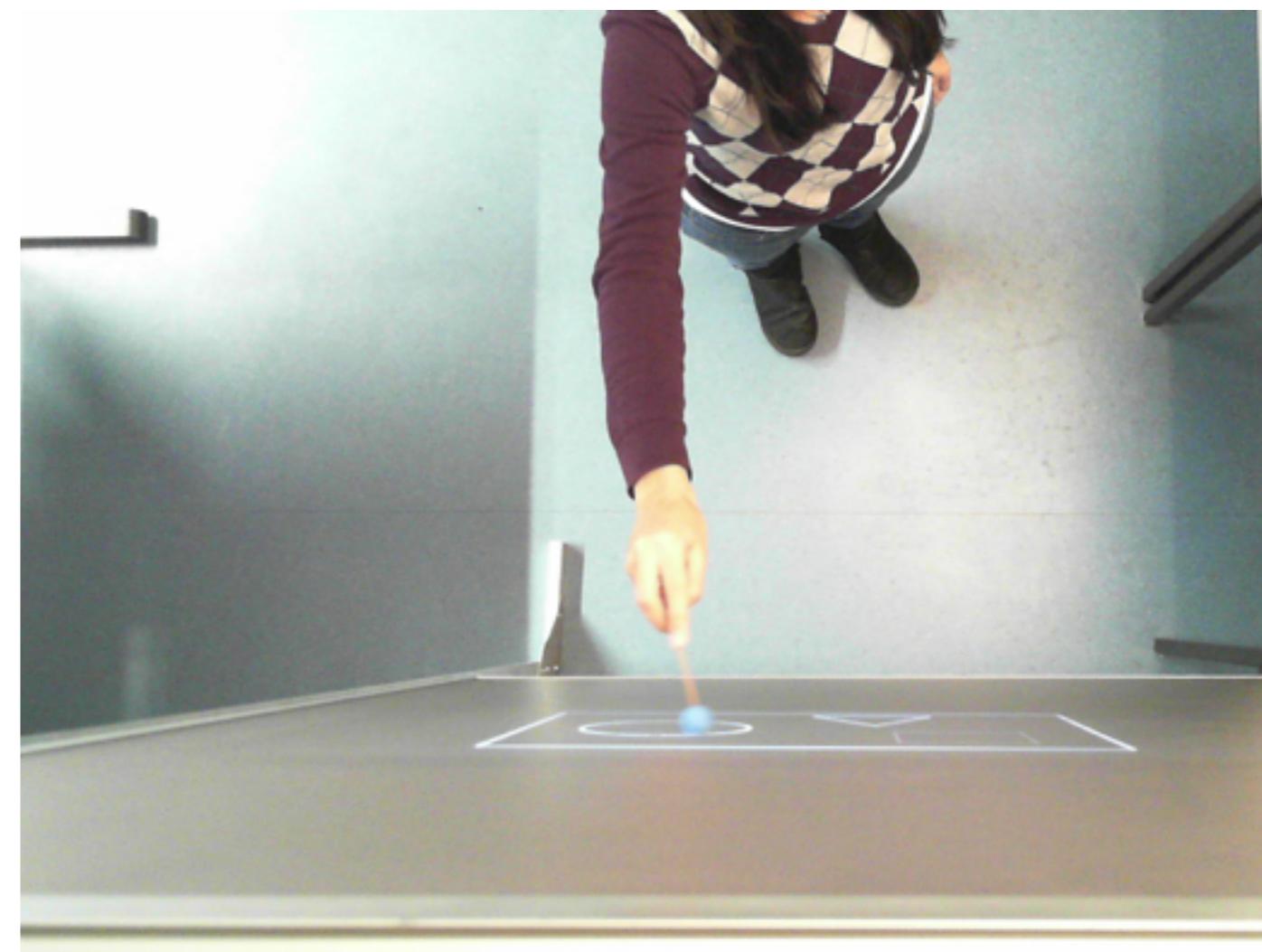


# Marker Detector System



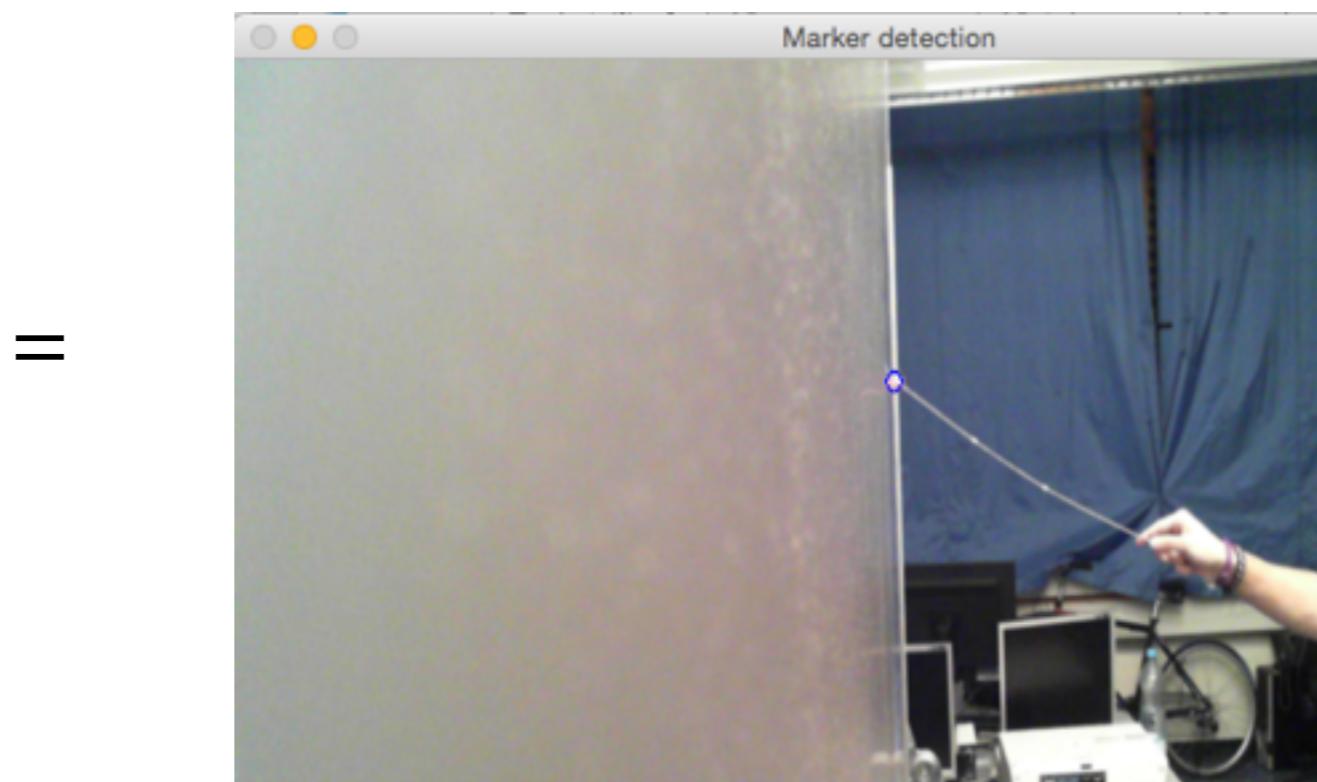
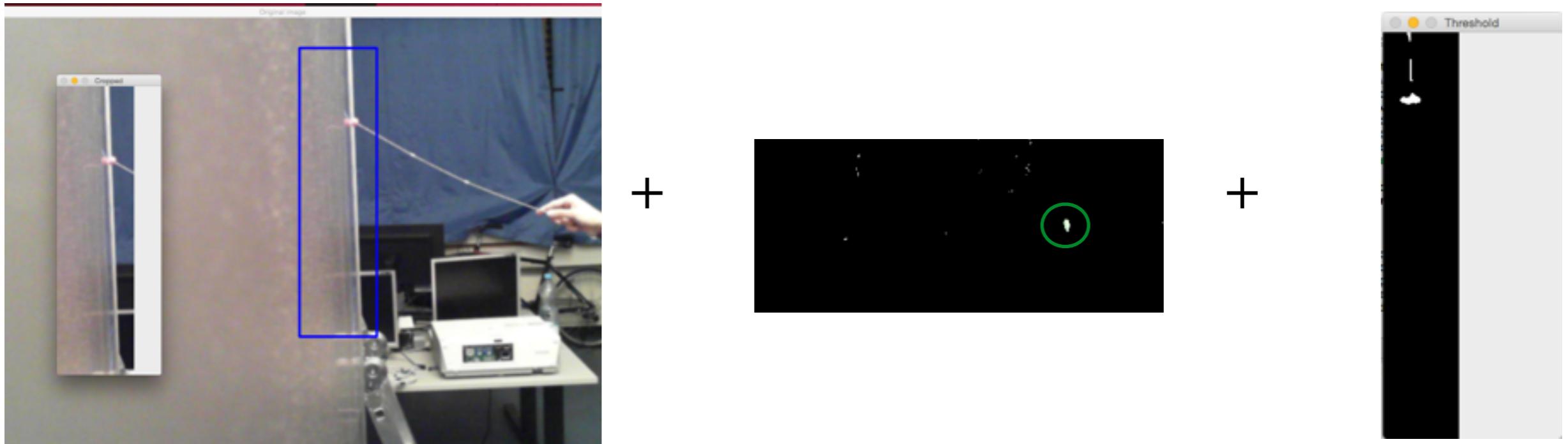
# Results

## Data Synchronization



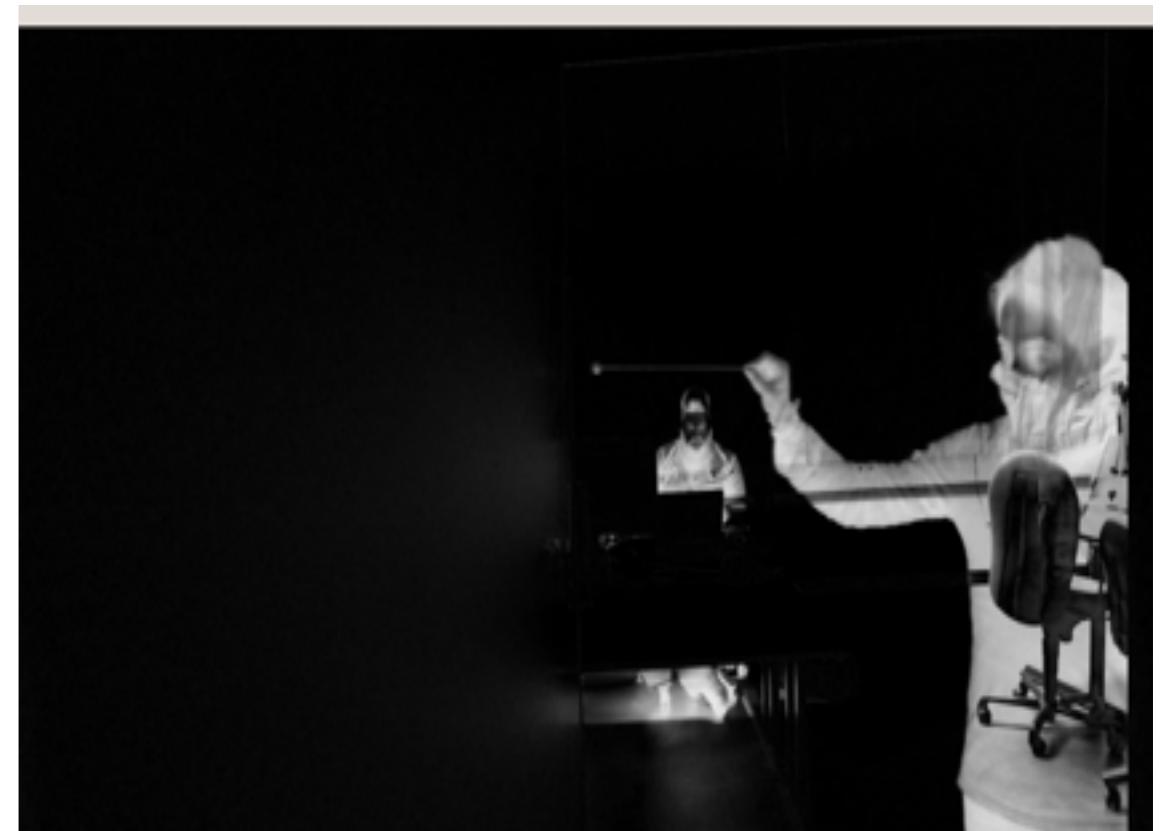
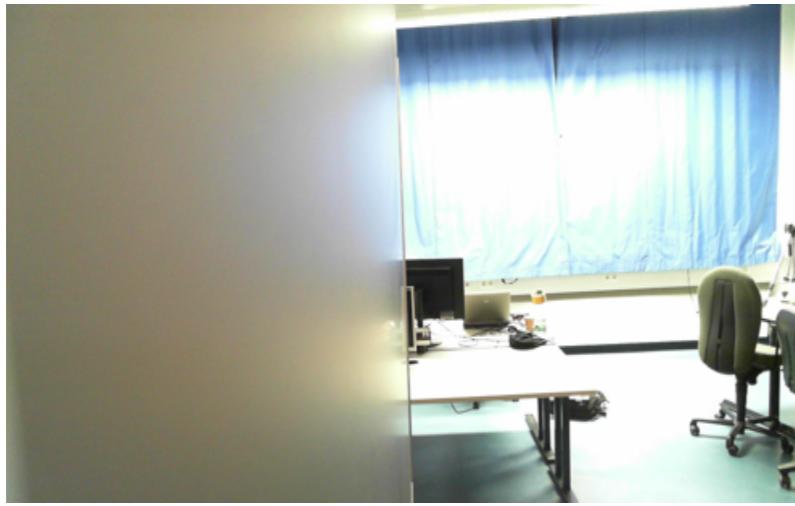
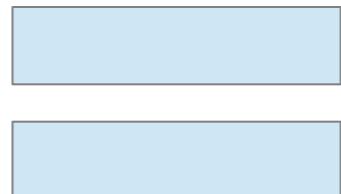
# Marker Detection

## Color Threshold

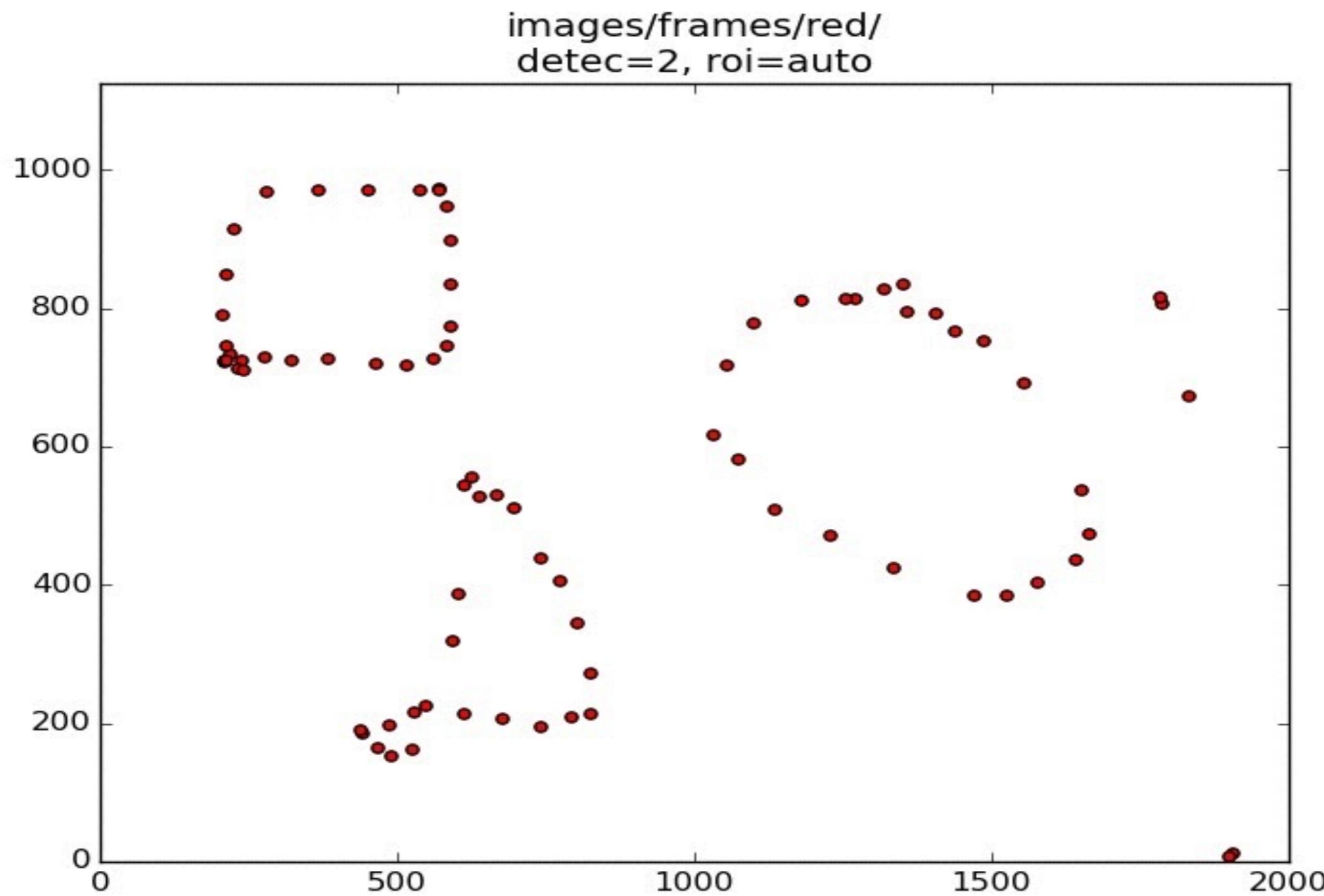


# Marker Detection

## Background Difference



# Results



# Results

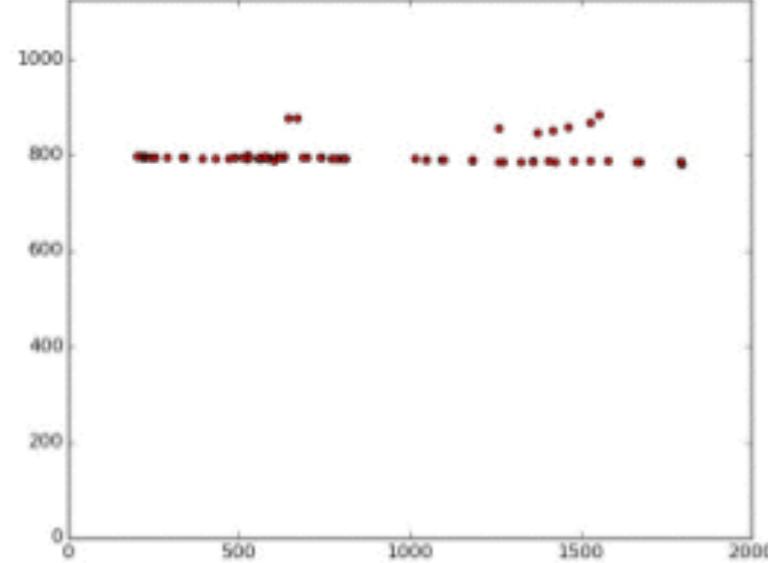
## (Board Output)



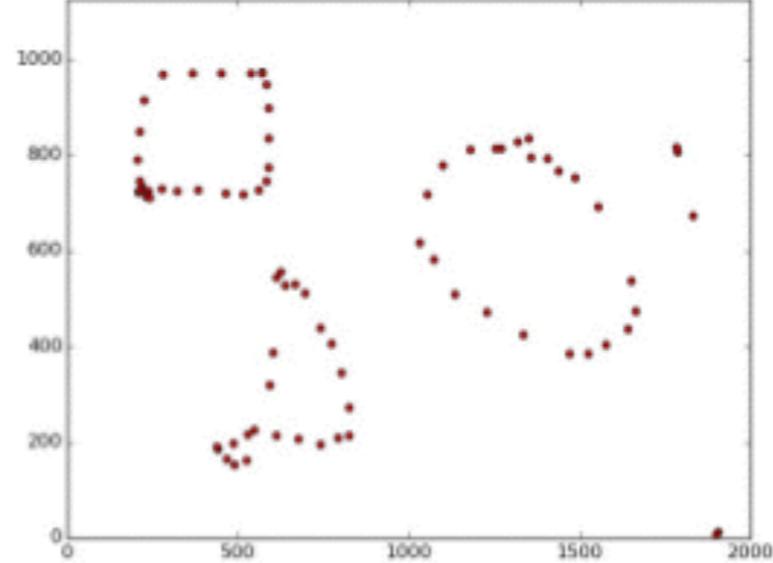
# Results

## (Approach Comparison)

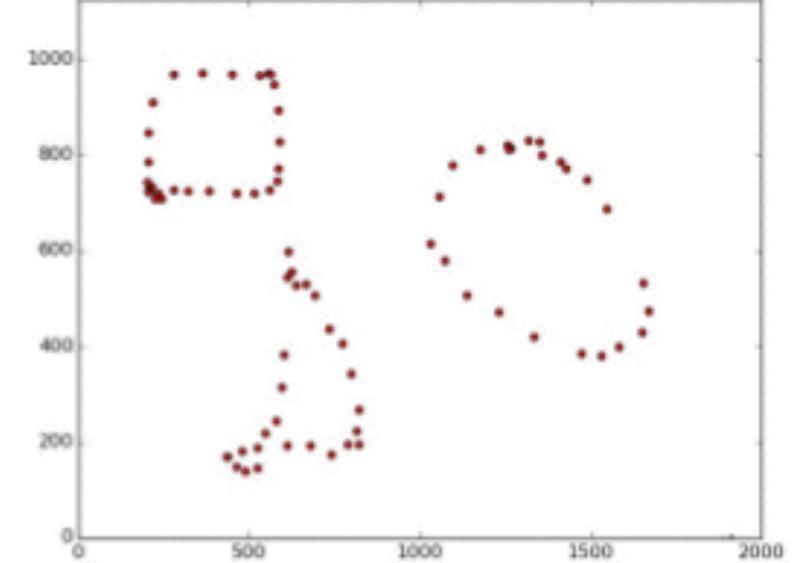
images/frames/red/  
detec=1, roi=auto



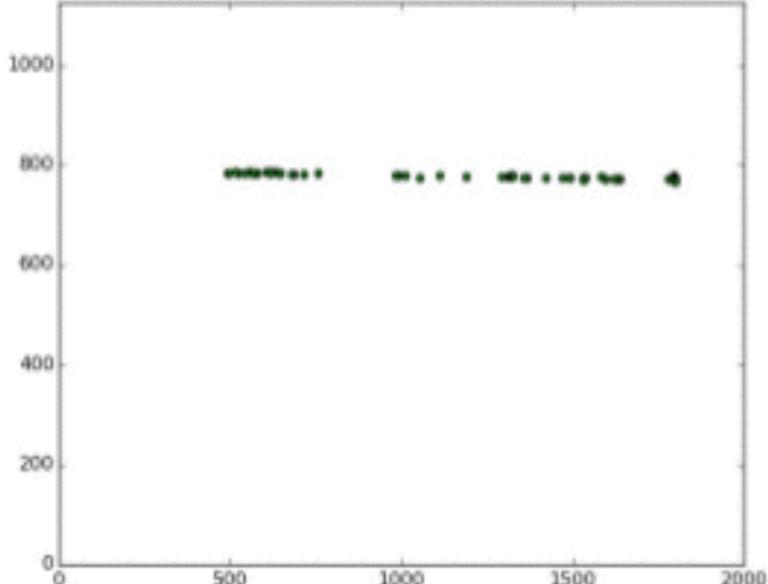
images/frames/red/  
detec=2, roi=auto



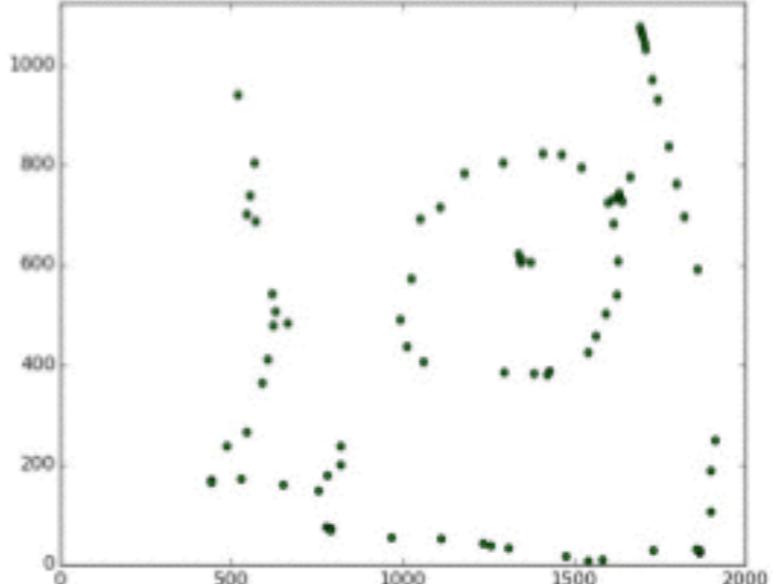
AUTO-COLOR MASKING + BACKGROUND DIFFERENCE (101)  
images/frames/red/



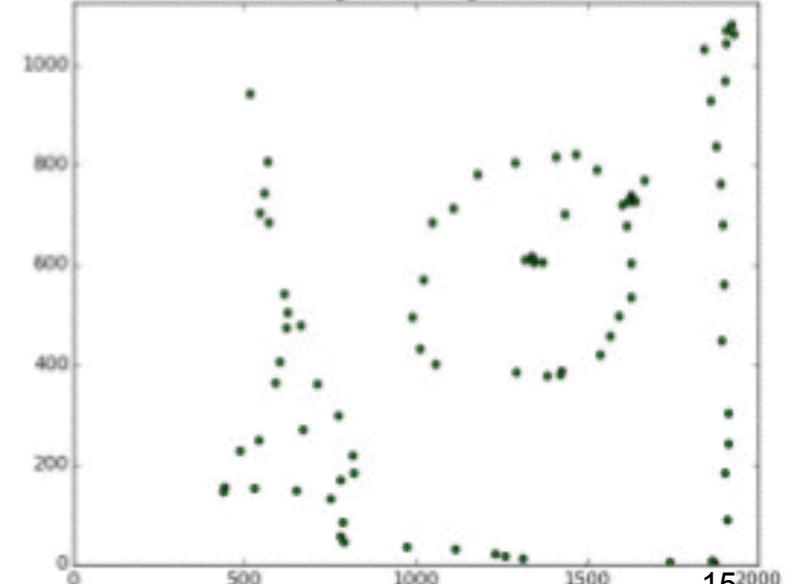
images/frames/green/  
detec=1, roi=auto



images/frames/green/  
detec=2, roi=auto



AUTO-COLOR MASKING + BACKGROUND DIFFERENCE (102)  
images/frames/green/



# Evaluation (Guideline)



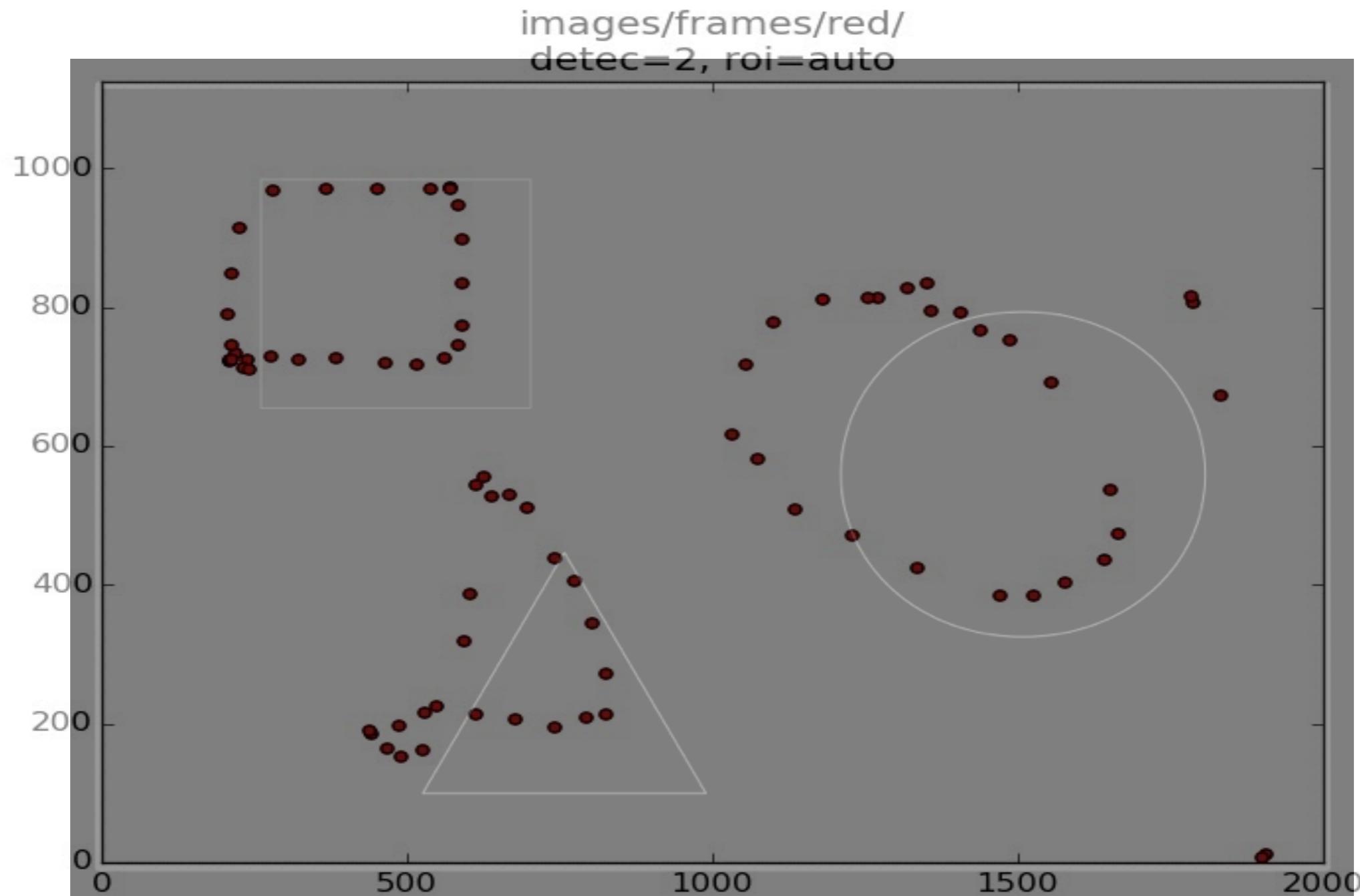
Delay

Accuracy

Detections

# Evaluation

## (Guideline → Accuracy)



# Task Distribution

Data capture [Argentina].

Marker detection (color mask) [Argentina].

Marker detection (background segmentation) [Nicolas].

Color recognition [Argentina].

Marker pixel coordinates [Nicolas].

Position reconstruction [Nicolas].

Point re-projection [Argentina].

# Questions?

Thank you for your attention!