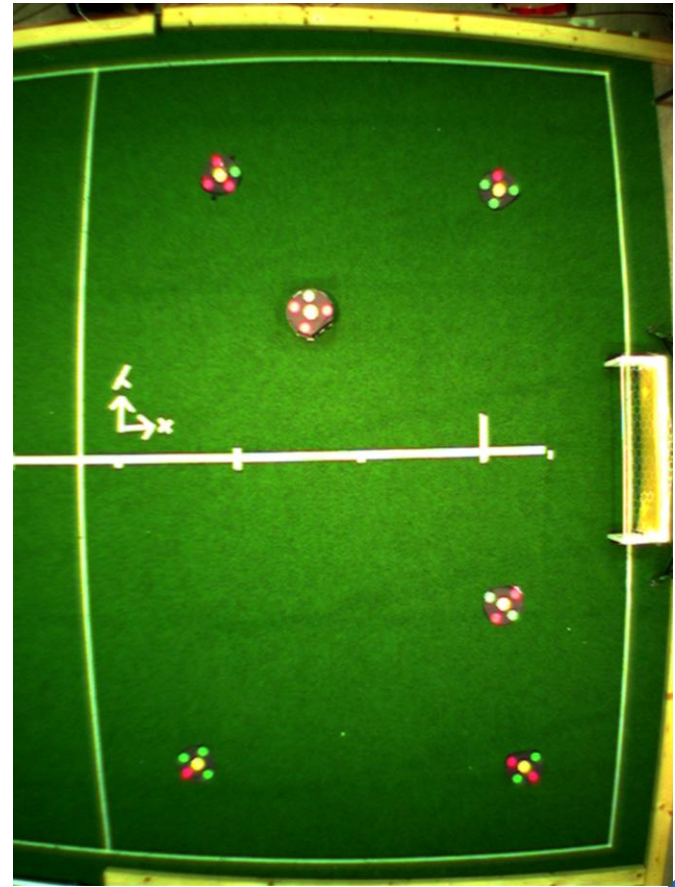




COLOR SEGMENTATION IN THE ROBOCUP SMALL SIZE LEAGUE

Results of Team Trashold

PROBLEM



EASY AND FAST SETUP

1. Empty Field
2. Capture Background
3. Put Calibration Pattern on Field
4. Capture Calibration Pattern
5. Done in $< 10s$

CPU ALGORITHM

ROIs

- Background Subtraction
- Thresholding

Team Markers

- Maximum Likelihood (yellow, blue)
- Blob filling & statistics

Pattern Markers

- ROI = around Team Marker
- Maximum Likelihood (green, pink, cyan)
- Blob filling & statistics

Ball

- ROI still unclassified
- Maximum Likelihood (orange)
- Blob filling & statistics

GPU ALGORITHM

ROIs

- Background Subtraction
- Thresholding
- Rejection of dark & bright Regions

Robot
Colors

- Maximum Likelihood (yellow, blue, green, pink, cyan)

Ball

- Maximum Likelihood (orange)
- Have to have minimal distance to robot center

Out

- Color-thresholded image

CPU vs. GPU

Pro CPU

- more robust to lighting changes and uneven illumination
- doesn't require CUDA

Pro GPU

- faster
- fewer parameters

DEMO VIDEO

RESULTS

- Setup
 - Fast and easy
- CPU Algorithm
 - 50 fps
 - Robust robot and ball detections
 - Good performance in changing lighting conditions
- GPU Algorithm
 - >60 fps
 - Robust detections on static lighting conditions
 - Easy parameter tuning