Football player spotting

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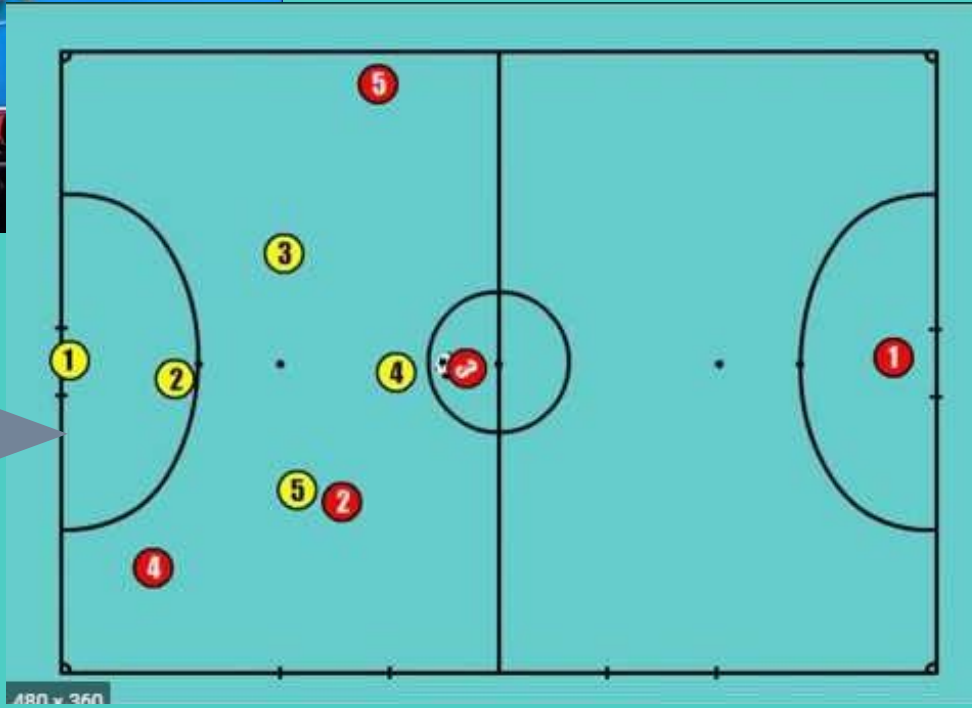
Problem

Clear view of the player positions

When you look at the video, you cannot see tactical mistakes as clear as when you look at the tactical board

From that



To this

Why important?

It is easier to see tactical positions on the board.

Seeing yourself on the board, helps to better understand mistakes and improve the game quality

Solution

CV to process the images

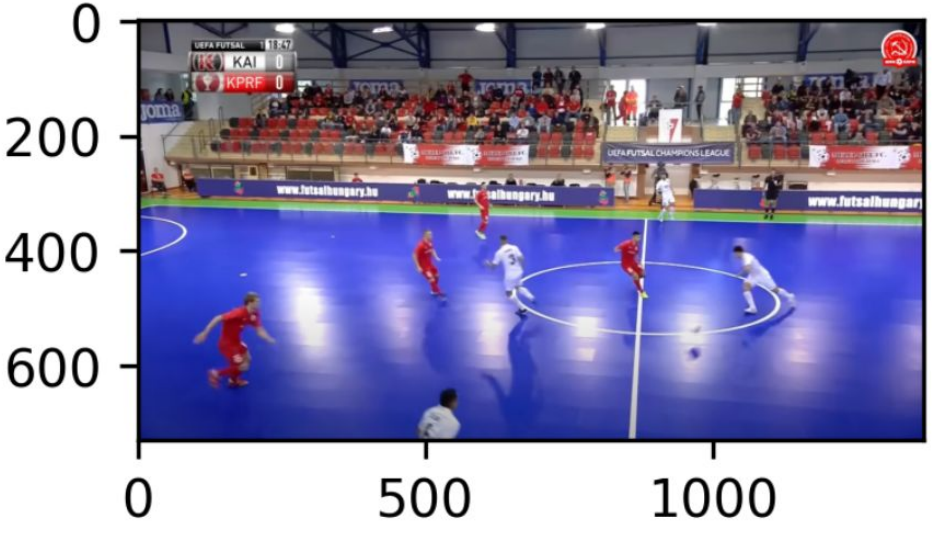
1. Determine the field boundaries
2. Transform the image to the top view
3. Detect the players from different teams
4. Position players as spots in the tactic board

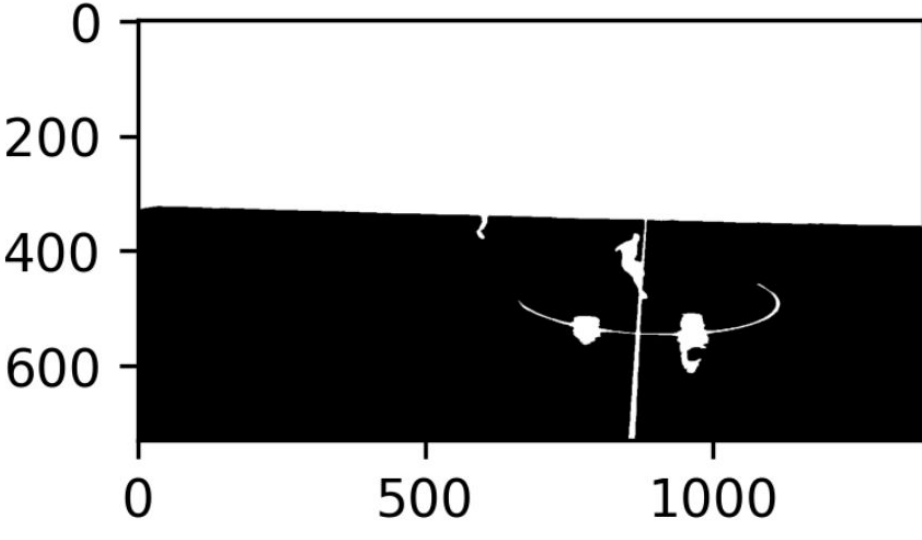
We started with Futsal because:

Pitch that is clear to see and less players

However... Detecting the pitch is a trouble

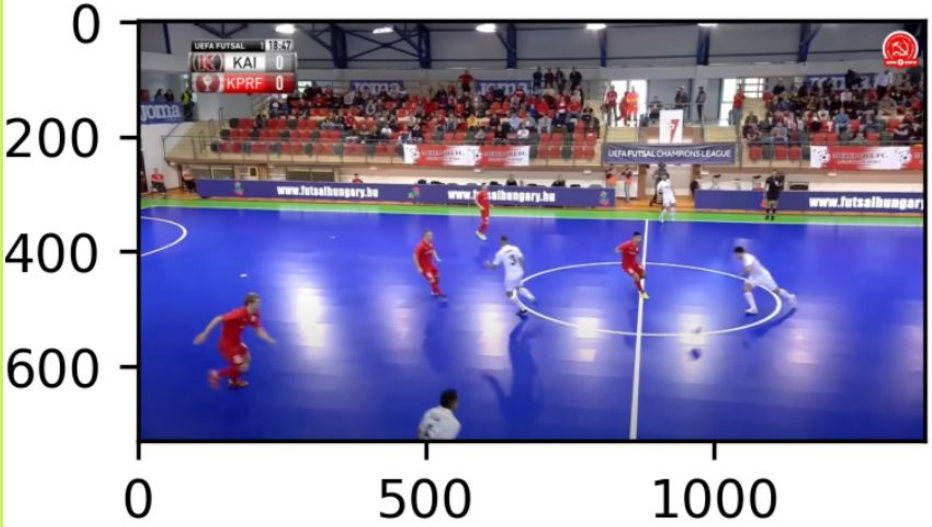
Most techniques did not work. Detecting by mask is close, but the line splits it.

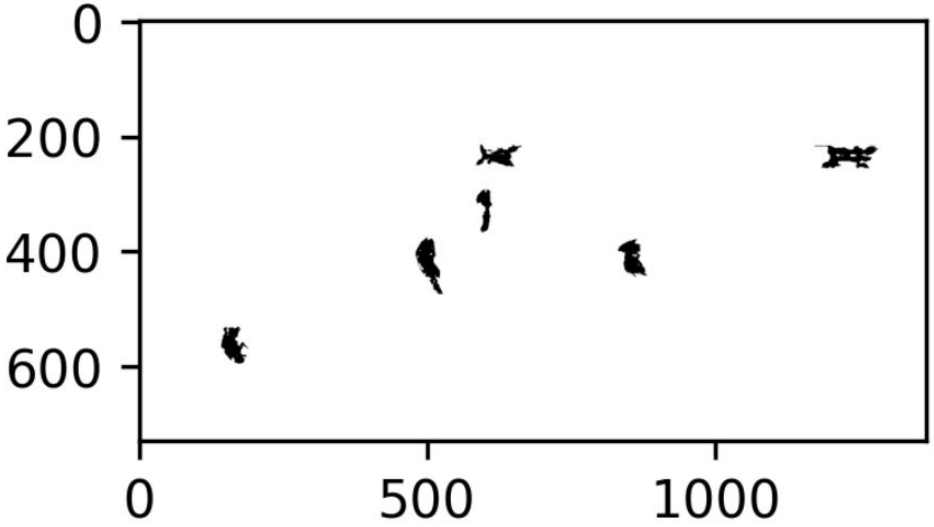




And project transform from this angles looks really terrible

Also player detection issues





Fans are very close (same size) and they have same colors.

We choose

Football

(PES screenshots)

1. Static camera
2. Less colors noise

Detect field → Transform

Hough transform, Harris, CENSURE, BFmatcher, SIFT, contours, color scheme segmentation.

Lines detection→Board

Use white lines mask

Detect and Mark Players

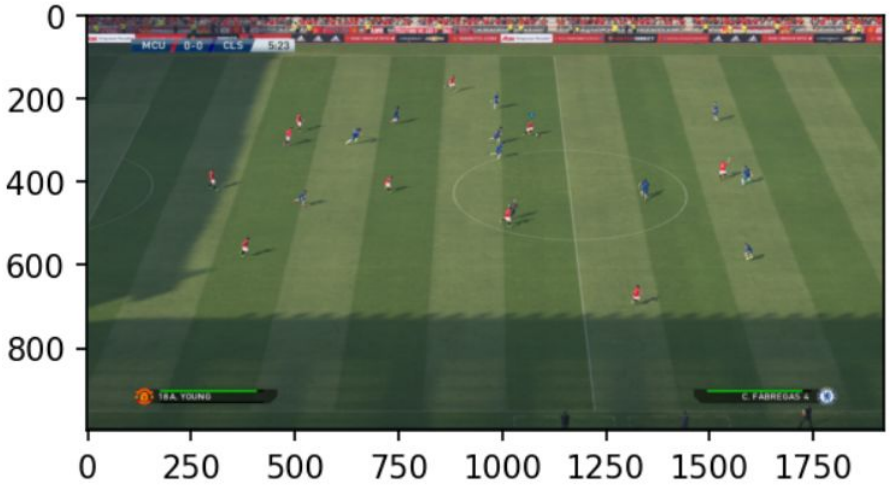
Total success!

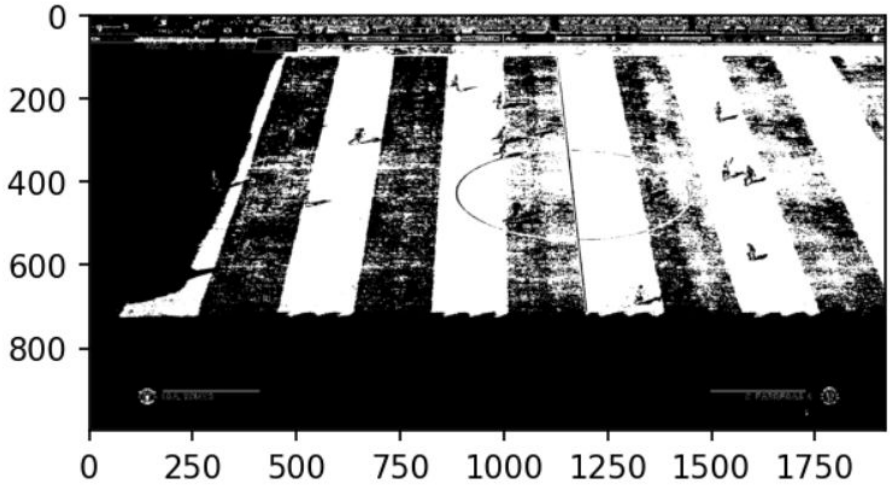
Field detection.

We tried:

- Hough transform
- Harris Corners
- CENSURE
- BFmatcher
- SIFT
- Contours
- Color scheme segmentation.

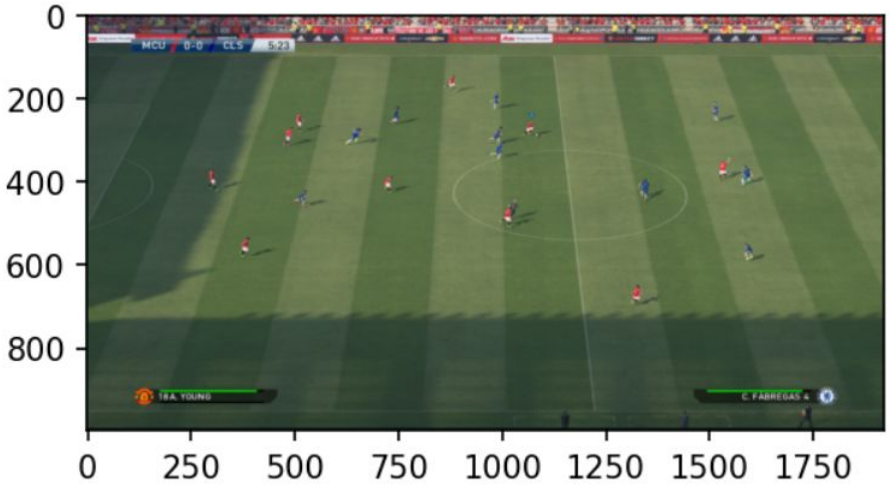
Detect Field by color

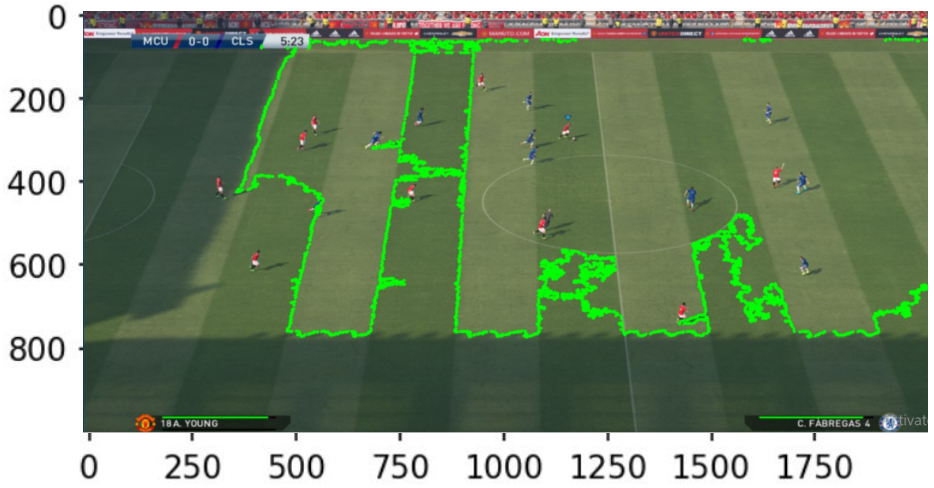




50 shades of green...

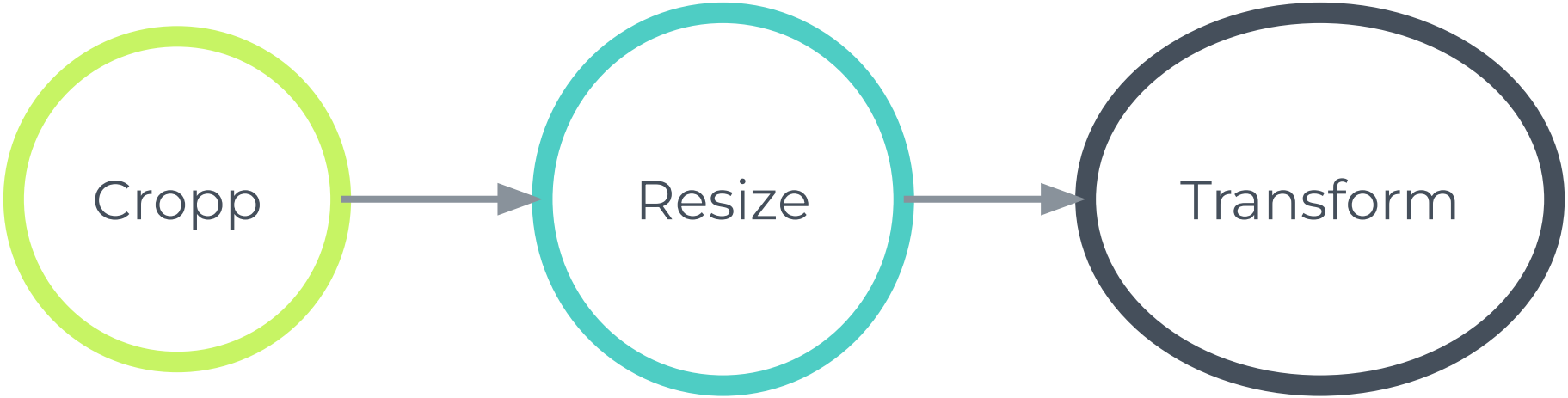
Detect Field contours





No clear contour of the pitch

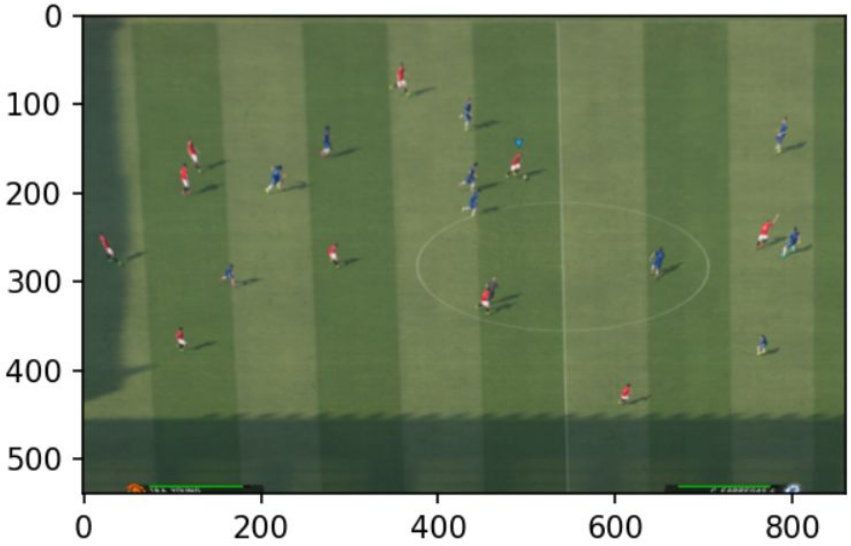
What we did?

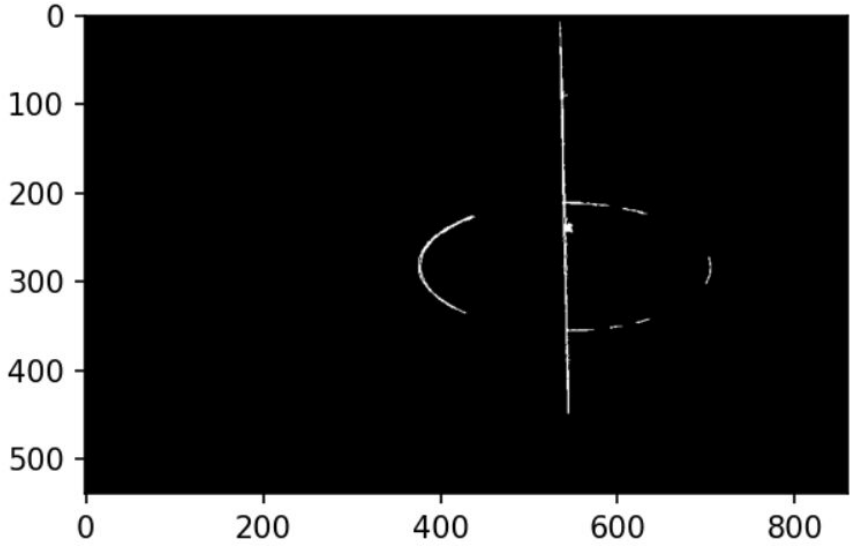


P.S. Static camera made it possible


I.R.A. YOUNG
C. FABREGAS 4

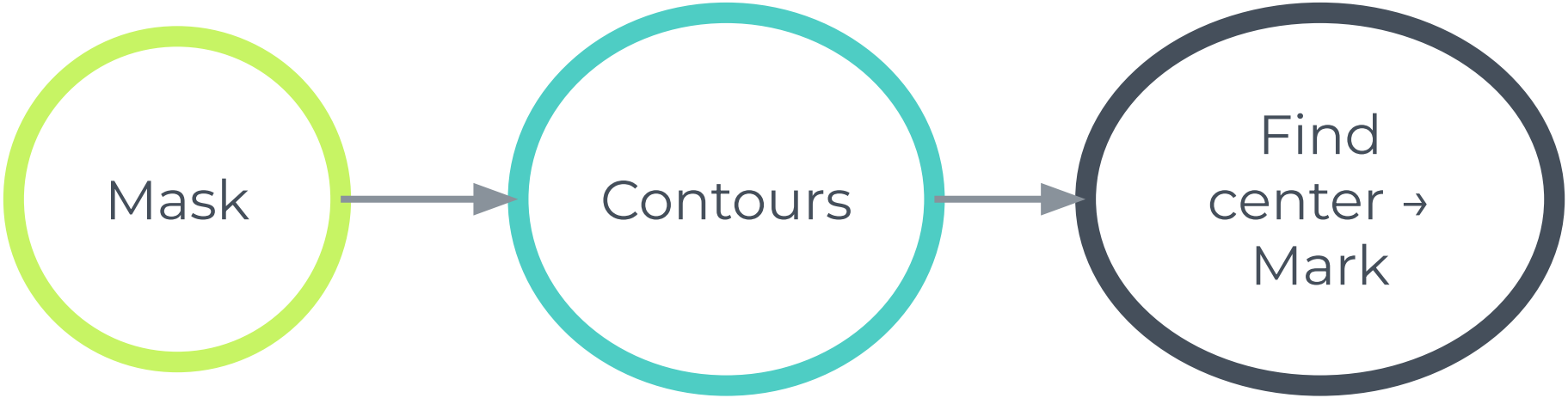
Tactic Board Representation



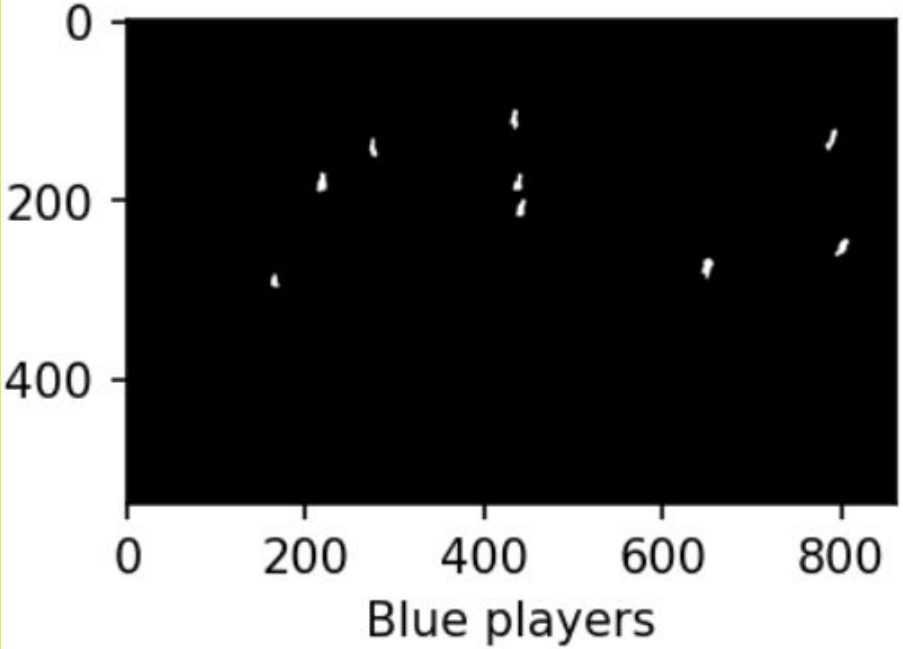


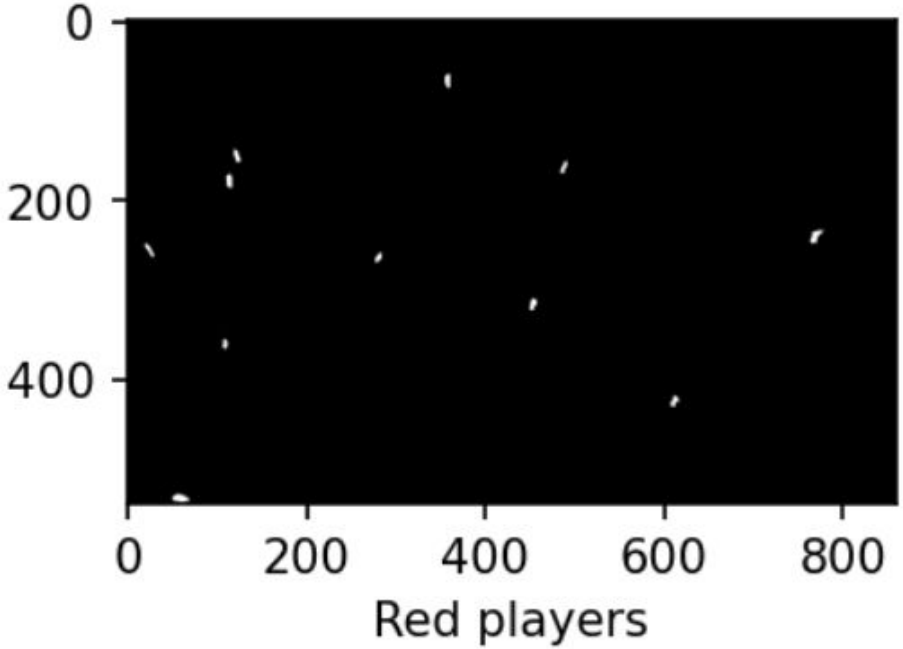
On such “board” easy to see important things.
No distractions.

Player detection

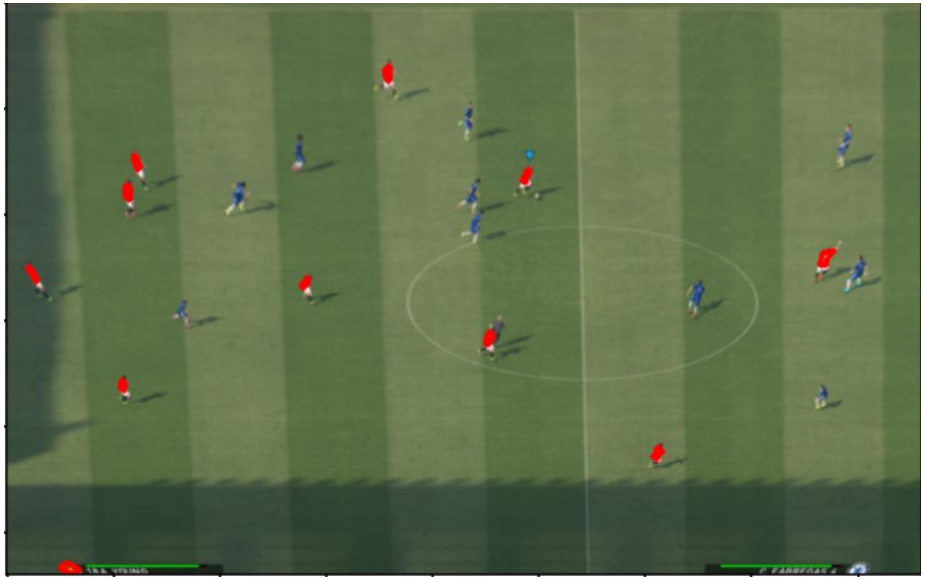


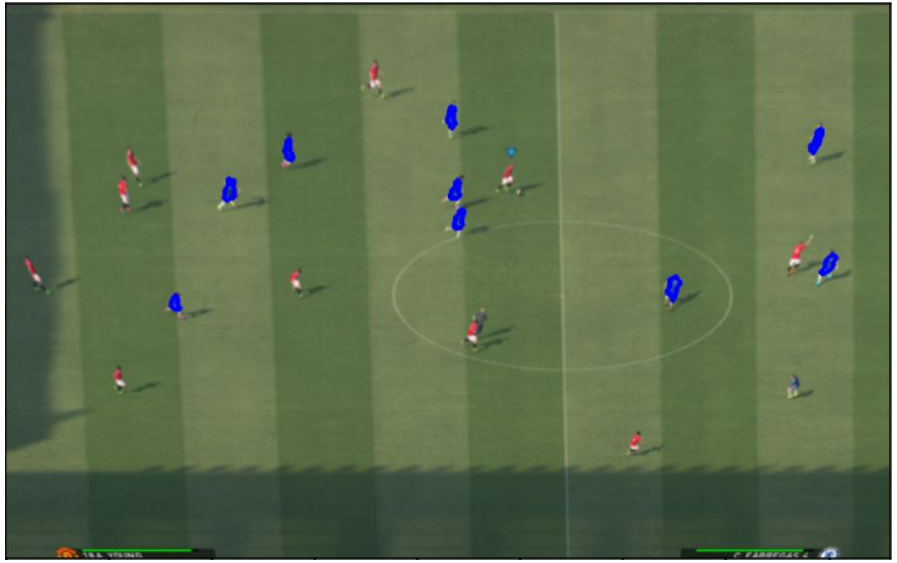
Players color masks





Players contours

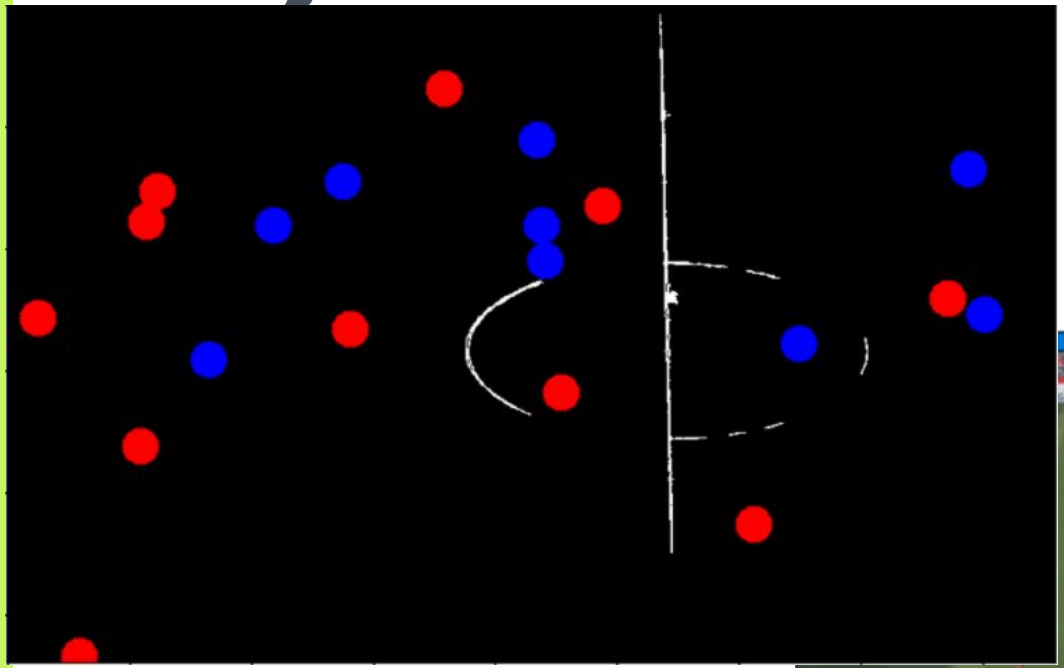


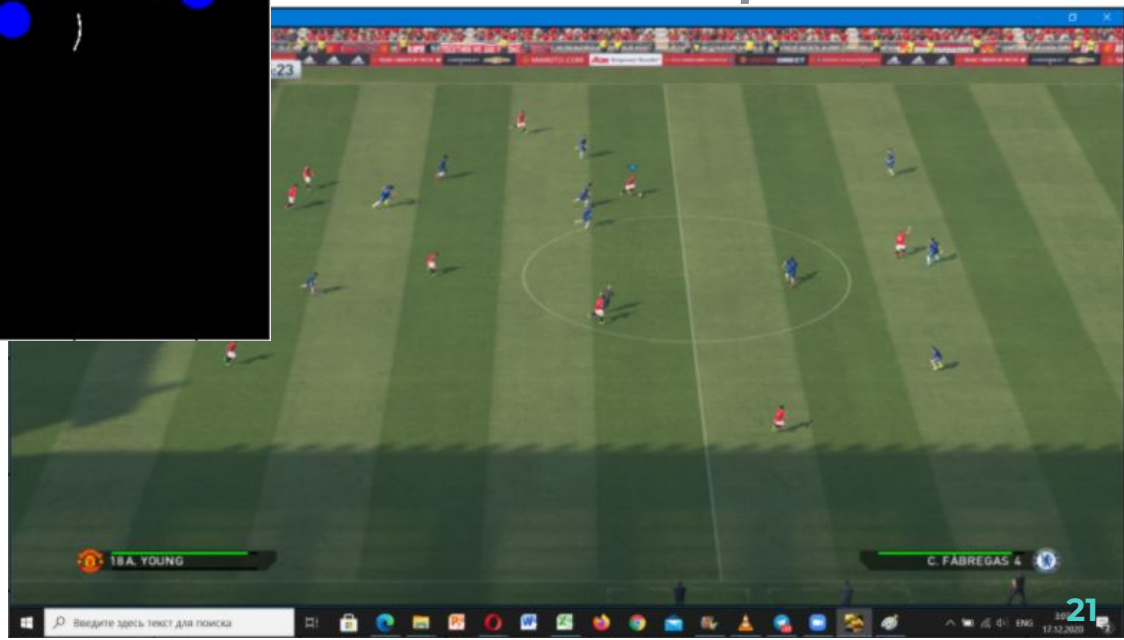


Man Utd logo is the issue here...

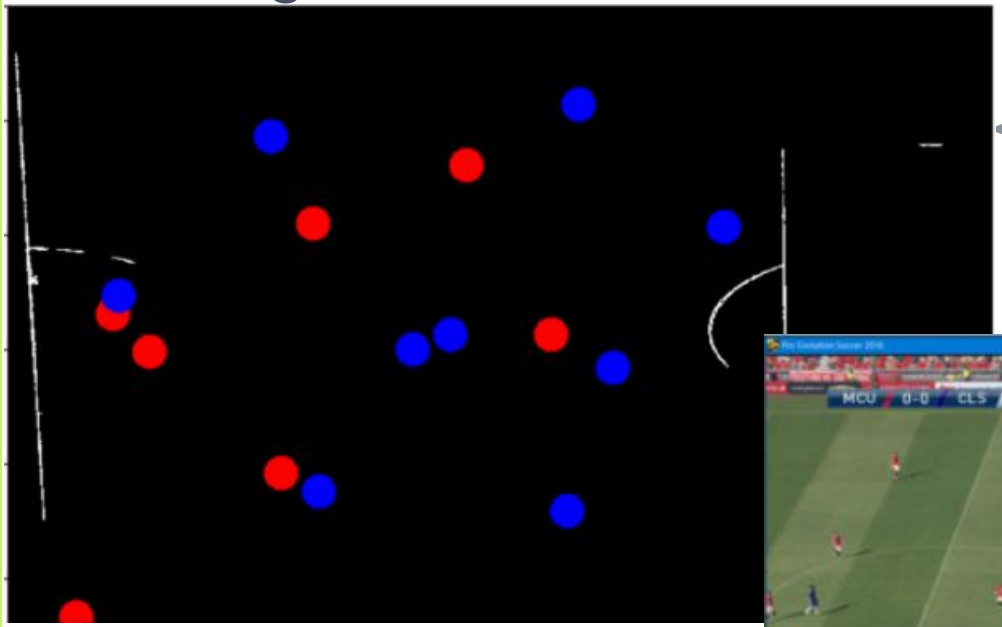
Actually everywhere

Players on the board!

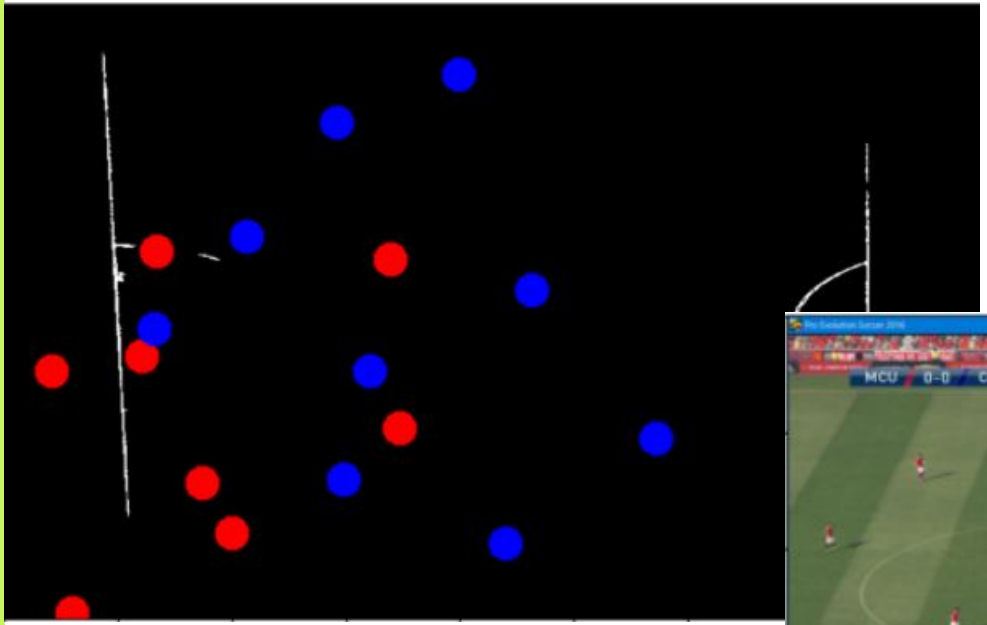




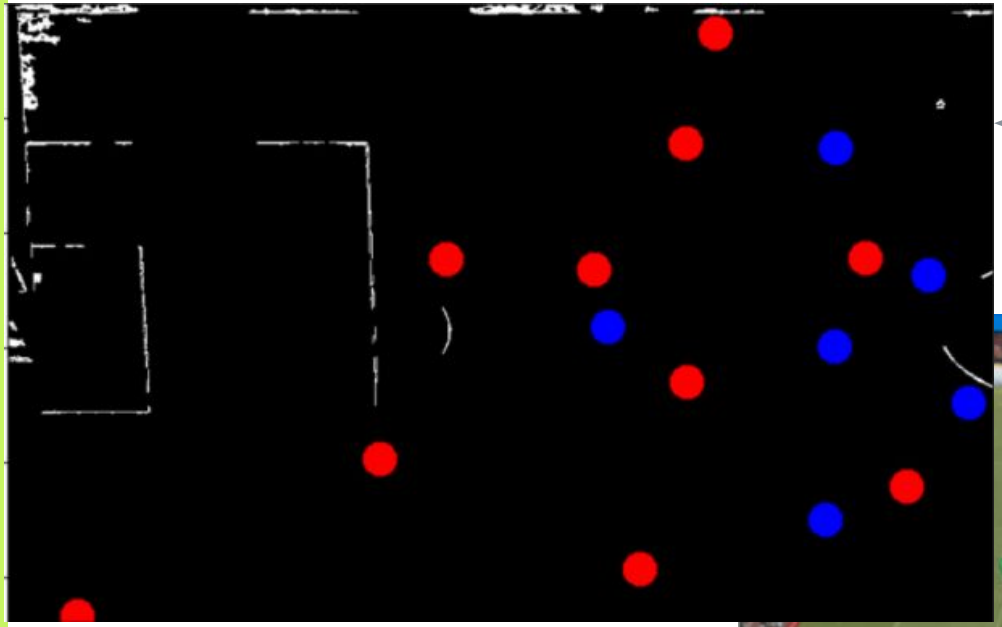
Players on the board!

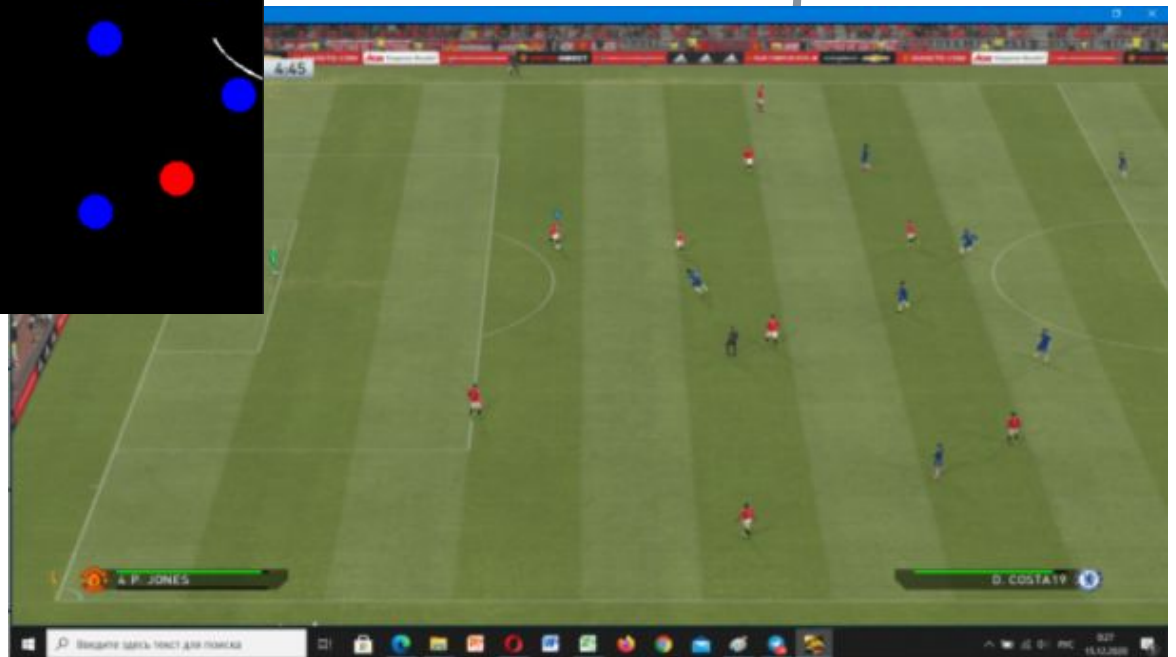


Players on the board!



Players on the board!





Accuracy

84%

- Players lost on the transform step (left/right sides)
  - Logo False Positive
  - Some not found :(

Accuracy

N	Real amount (blue)	Real amount (red)	TP(red)	FP(red)	FN(red)	TP(blue)	FP(blue)	FN(blue)	Accuracy
1	10	9	7	1	2	10	0	0	0,850
2	7	9	9	1	0	7	0	1	0,889
3	9	7	6	1	0	8	1	1	0,824
4	9	9	7	1	2	9	0	0	0,842
5	10	9	8	1	1	10	1	0	0,857
6	10	9	7	1	2	9	0	1	0,800
7	10	10	6	1	4	10	0	1	0,727
8	10	10	10	1	0	10	0	1	0,909
								Mean =	0,837

To improve

1. Keypoint detection algorithm
2. Hough lines Transform


EXTRA! EXTRA!


MCU 0-0 CLS 4:24

Thx

Questions?