



Football player spotting

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Problem

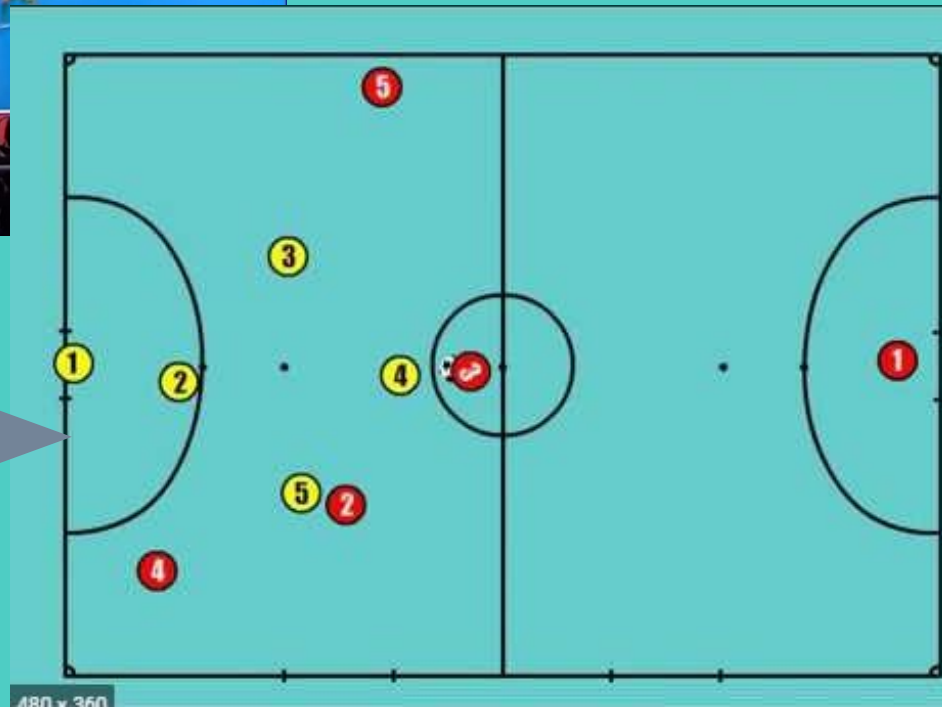
Clear view of the player positions

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

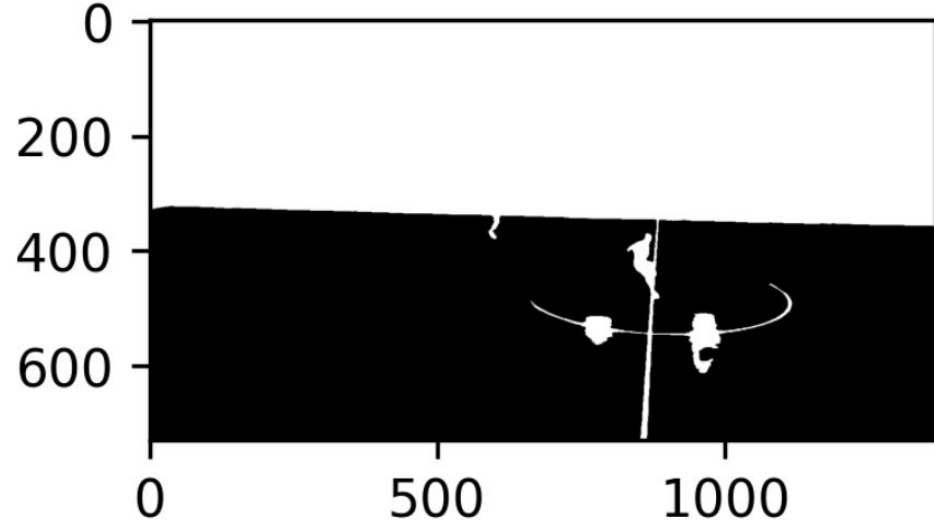
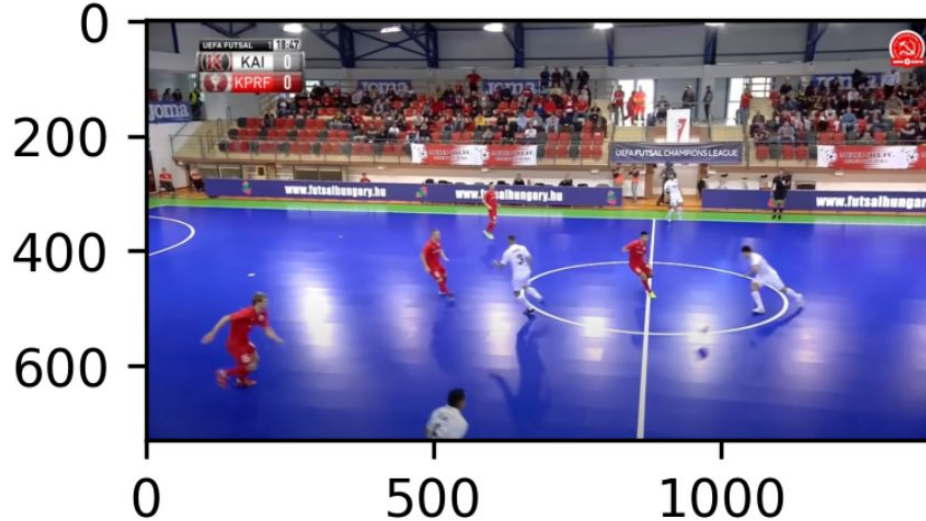
We started with Futsal because:

Pitch that is clear to see and less players



However... Detecting the pitch is a trouble

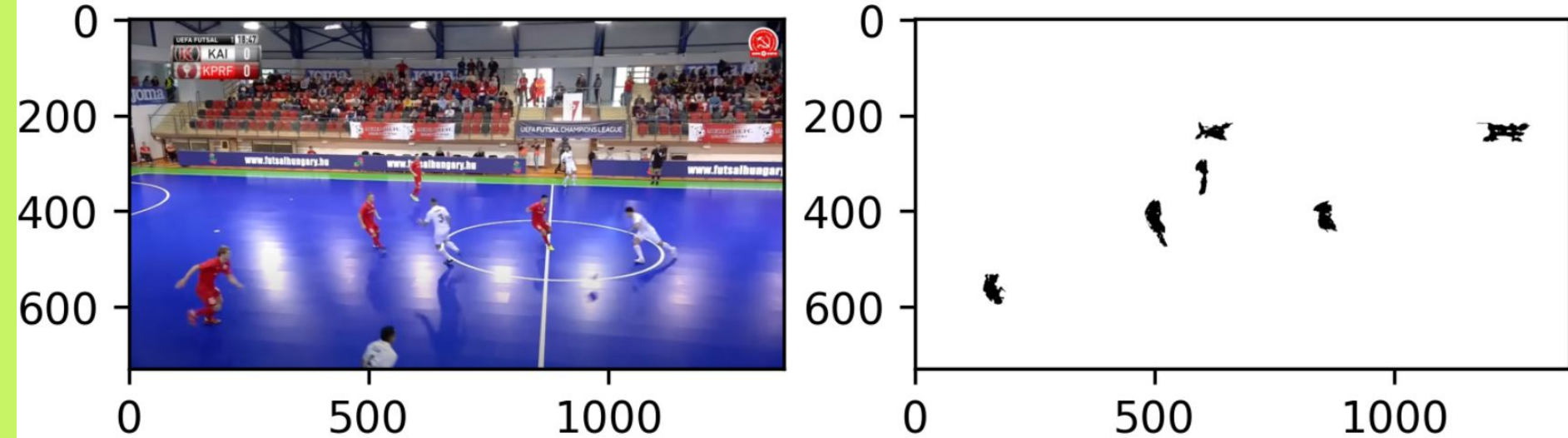
Most techniques did not work. Detecting by mask is close, but the line splits it.





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)

PES2016
PRO EVOLUTION SOCCER

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!

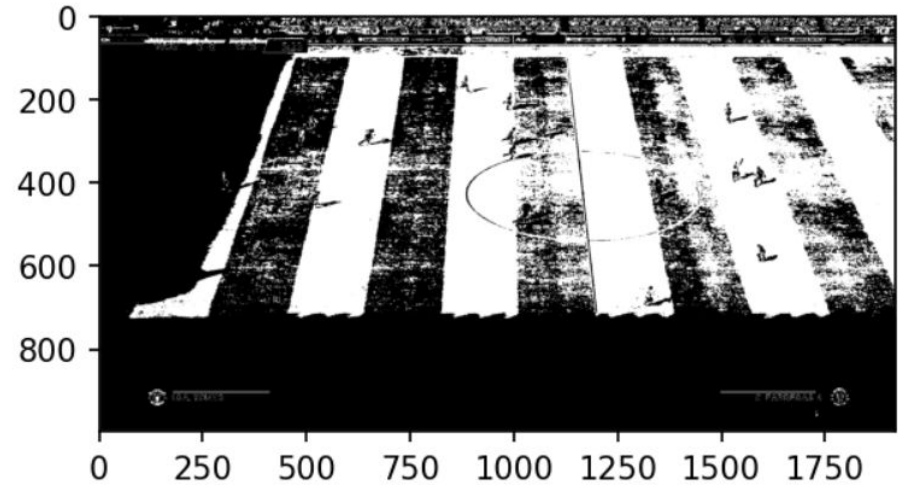
Field detection.

We tried:

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

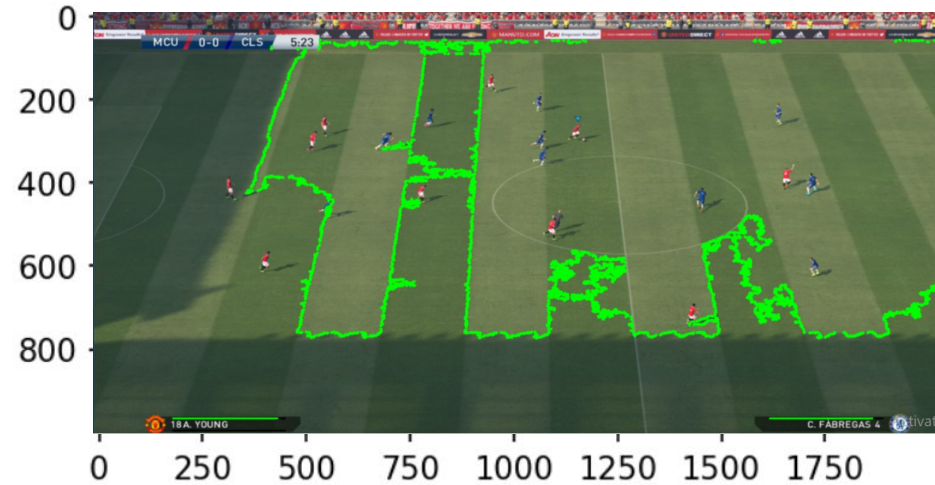


Detect Field by color



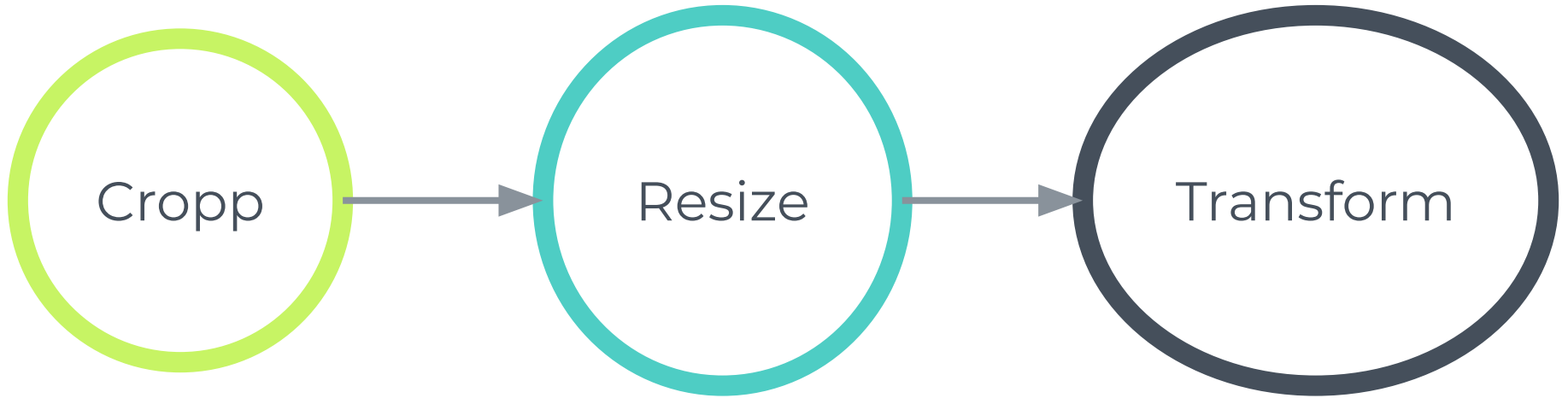
50 shades of green...

Detect Field contours



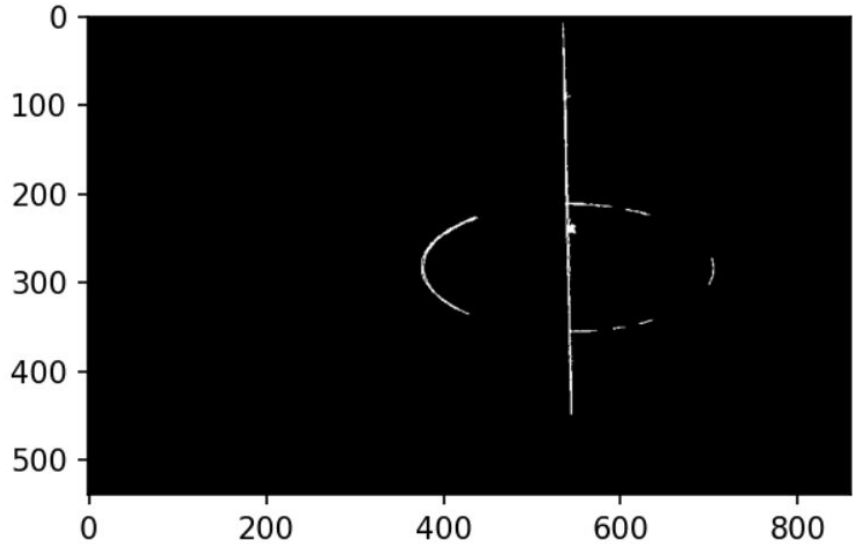
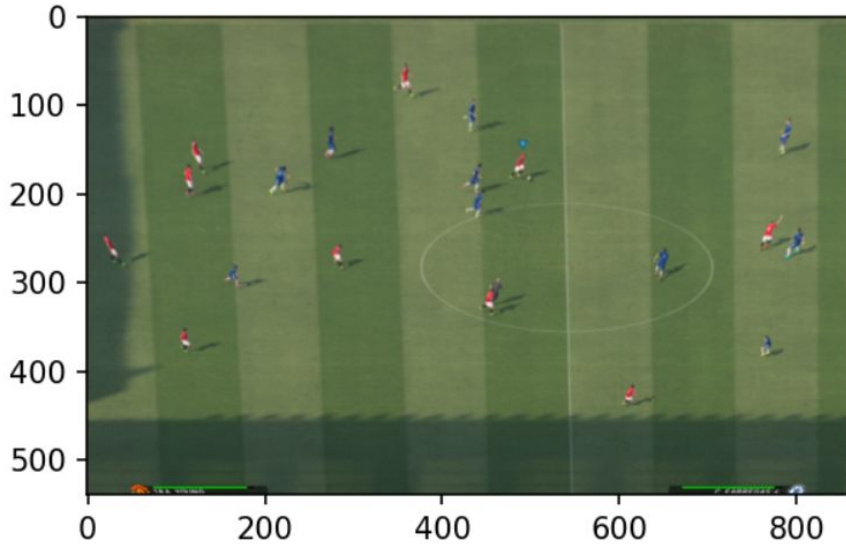
No clear contour of the pitch

What we did?



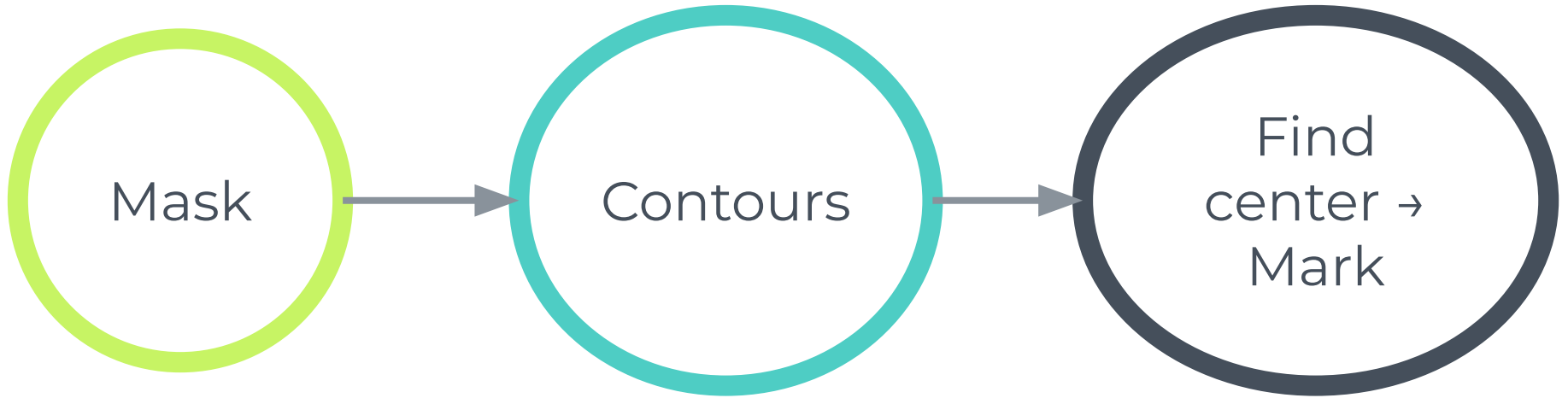


Tactic Board Representation

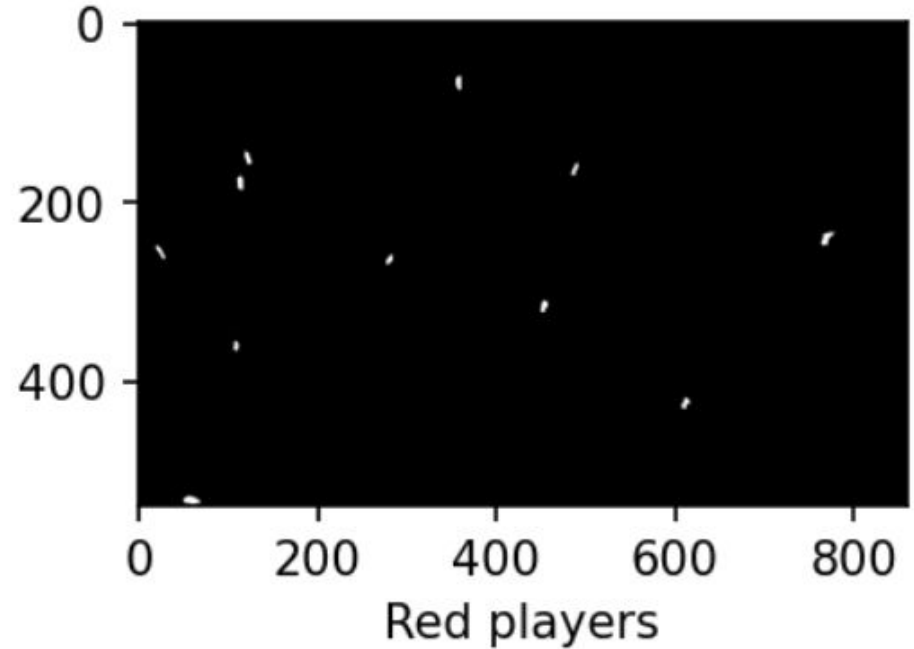
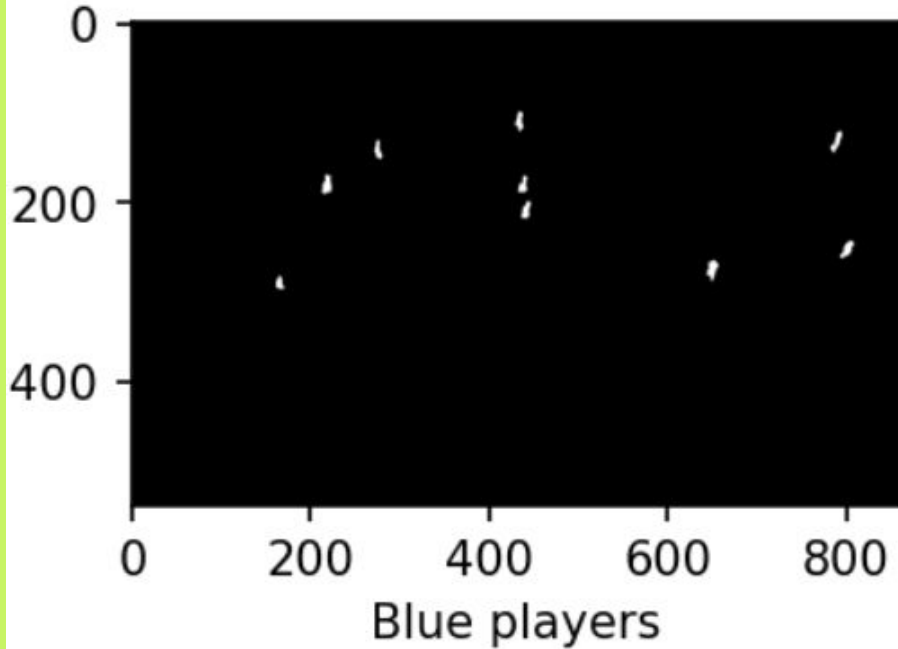


On such “board” easy to see important things.
No distractions.

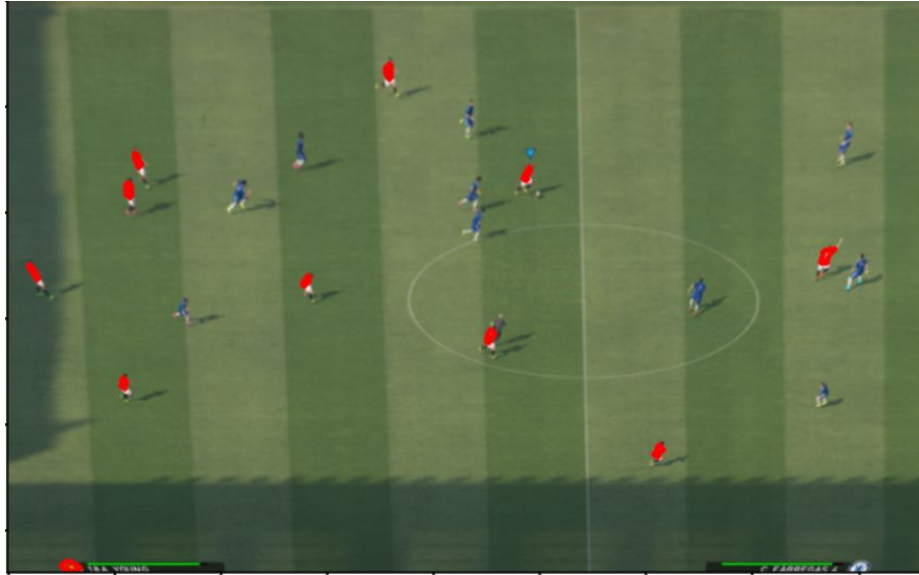
Player detection



Players color masks

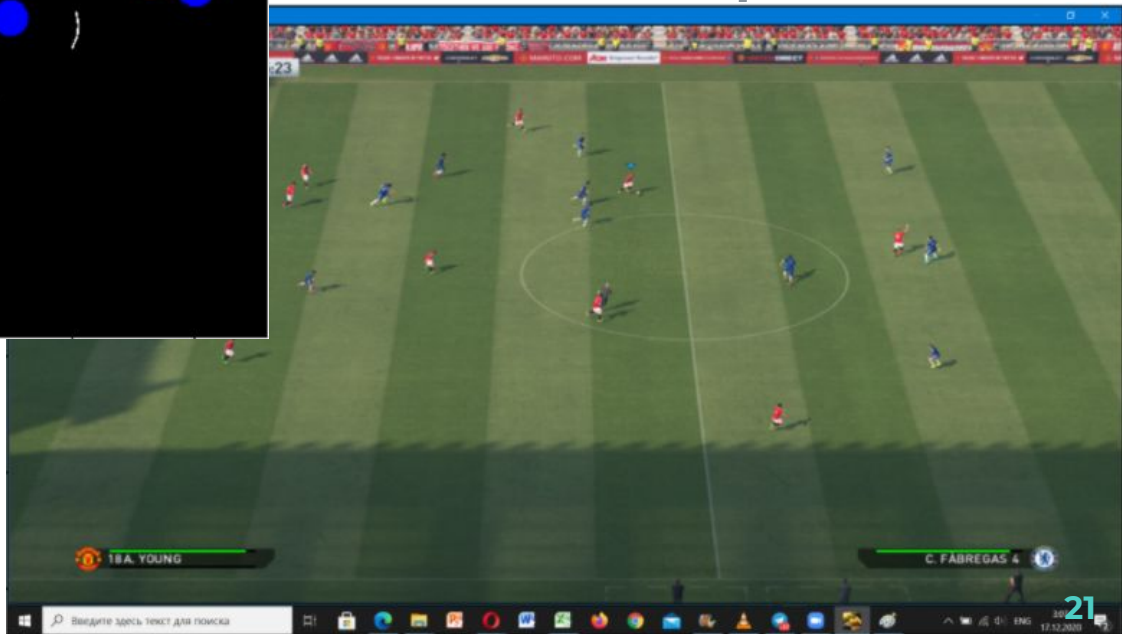
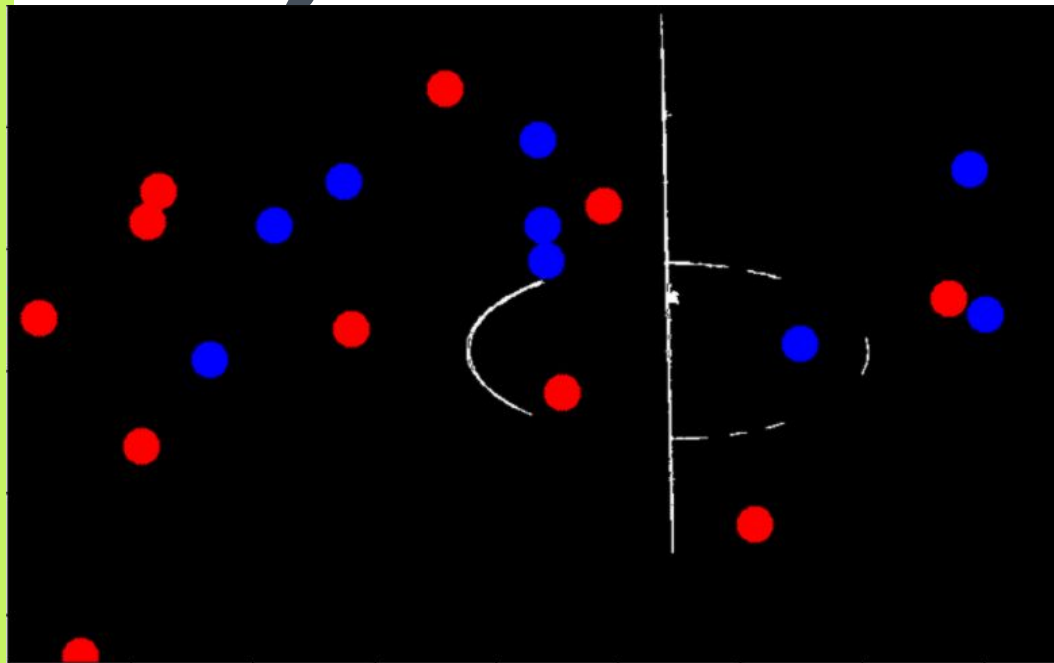


Players contours

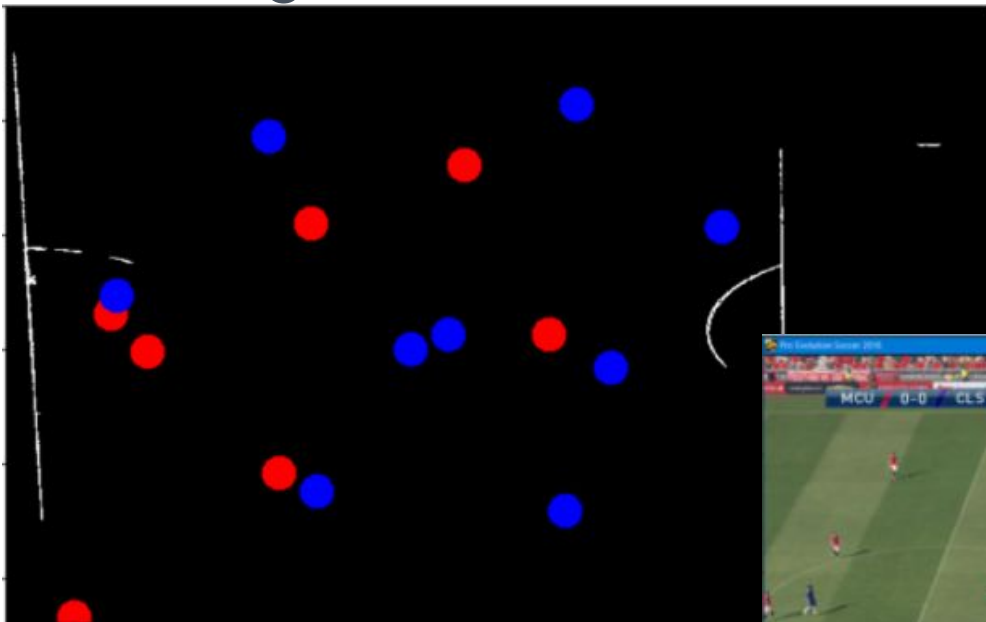


Man Utd logo is the issue here...
Actually everywhere

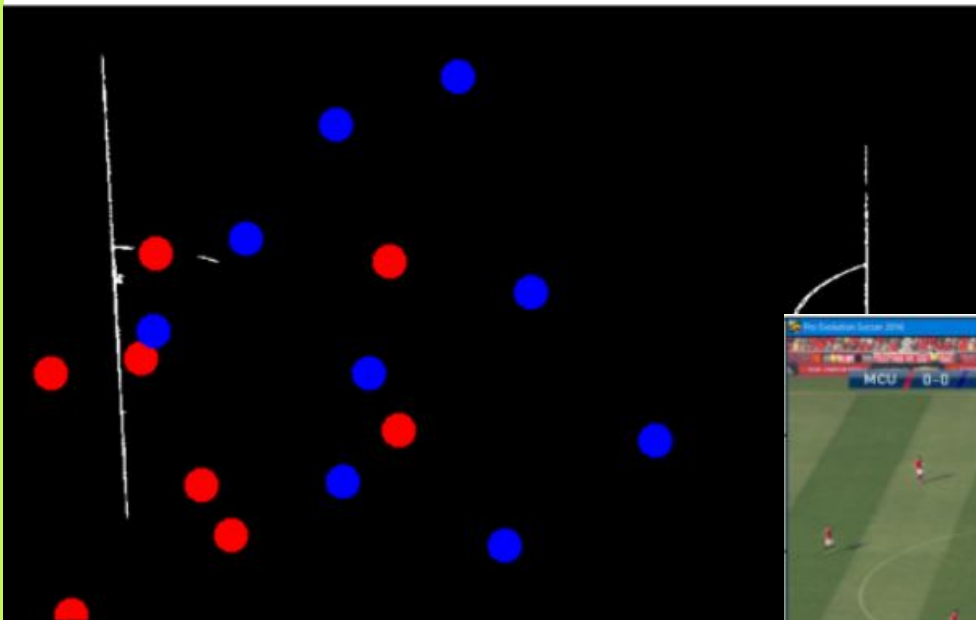
Players on the board!



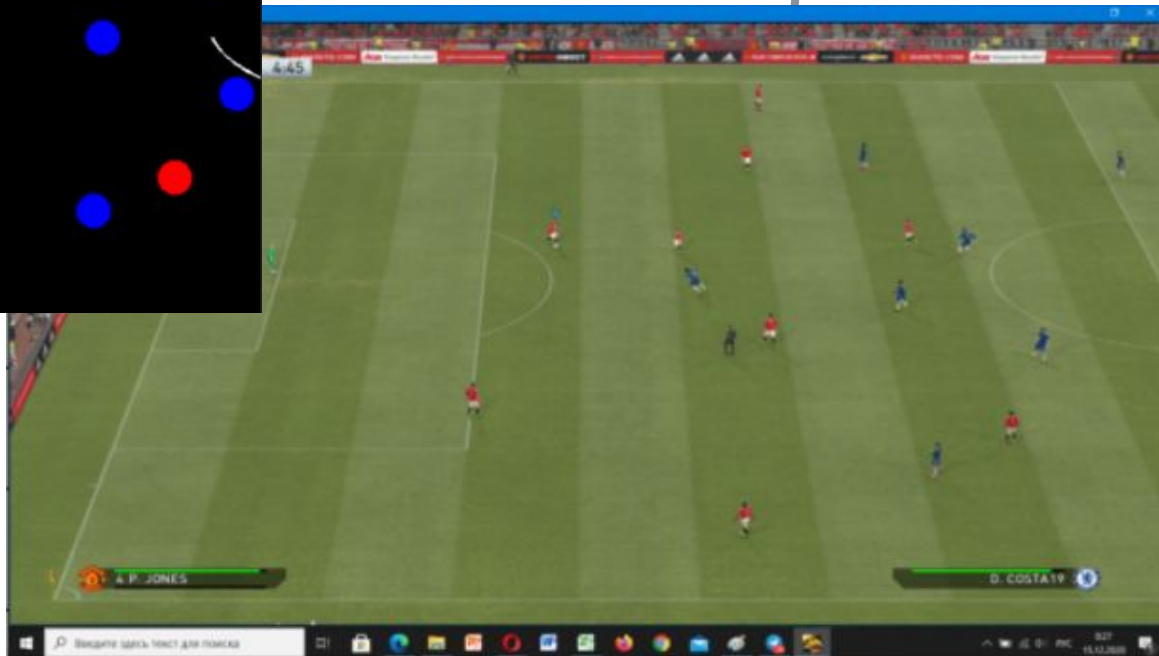
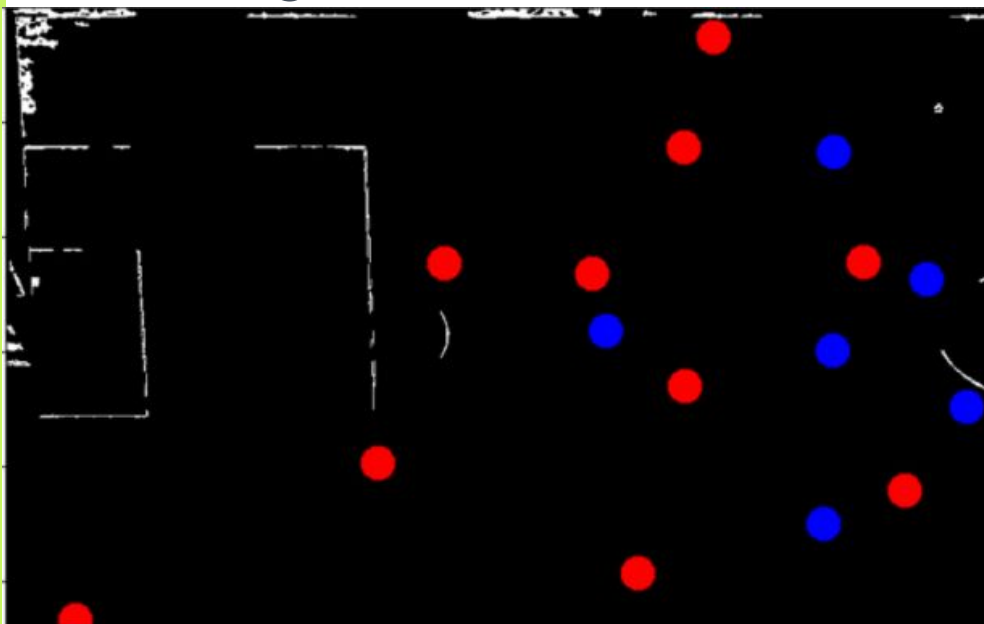
Players on the board!



Players on the board!



Players on the board!



84
%

Accuracy

- 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





Thx

Questions?