PLAYER DETECTION WITH HOG, CAMSHIFT AND KALMAN FILTERS

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Signal, Image and Video
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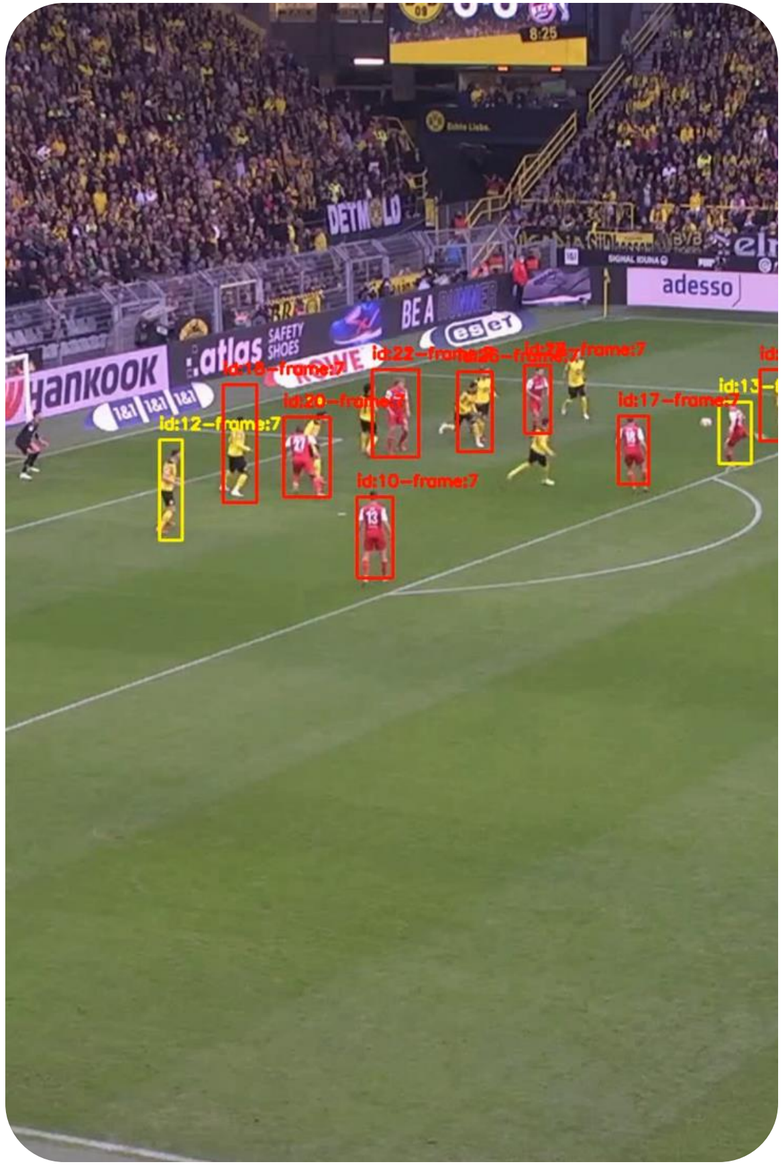
02

The goal

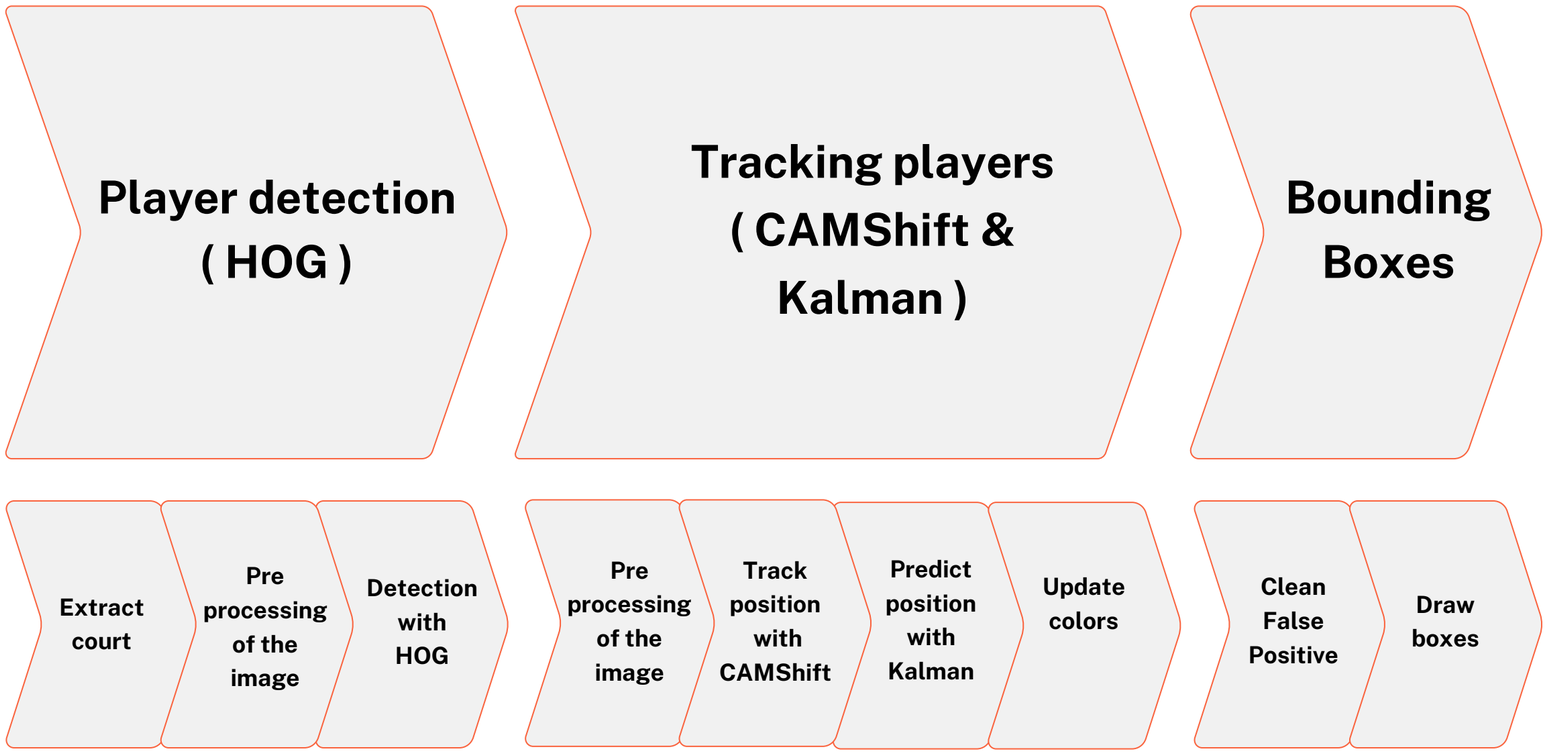
- Recognize football players in a video
- Track them with bounding boxes
- Identify the jersey team’s color



03

Workflow

Main operations of the software



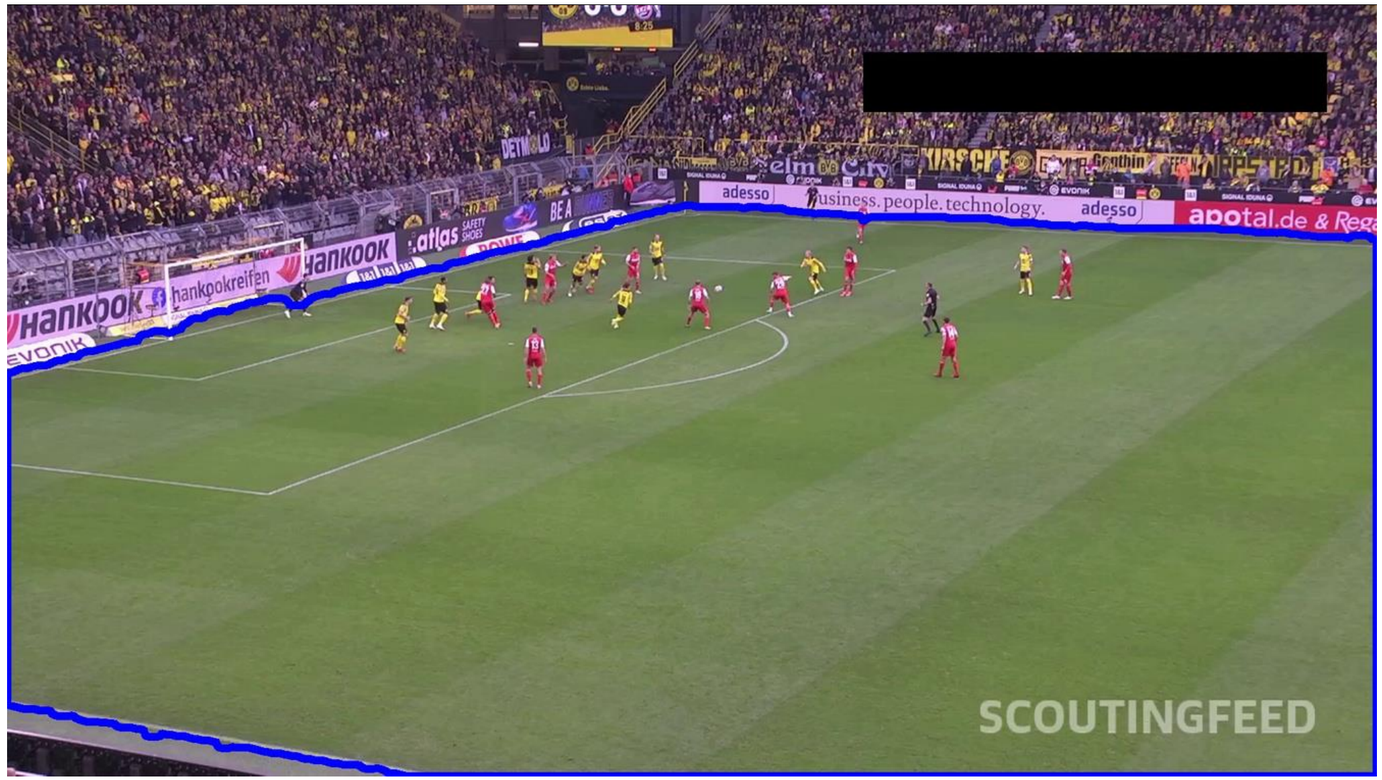
04

Extract Court

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes



05

Pre-processing of the image

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes

Reduction of

saturation

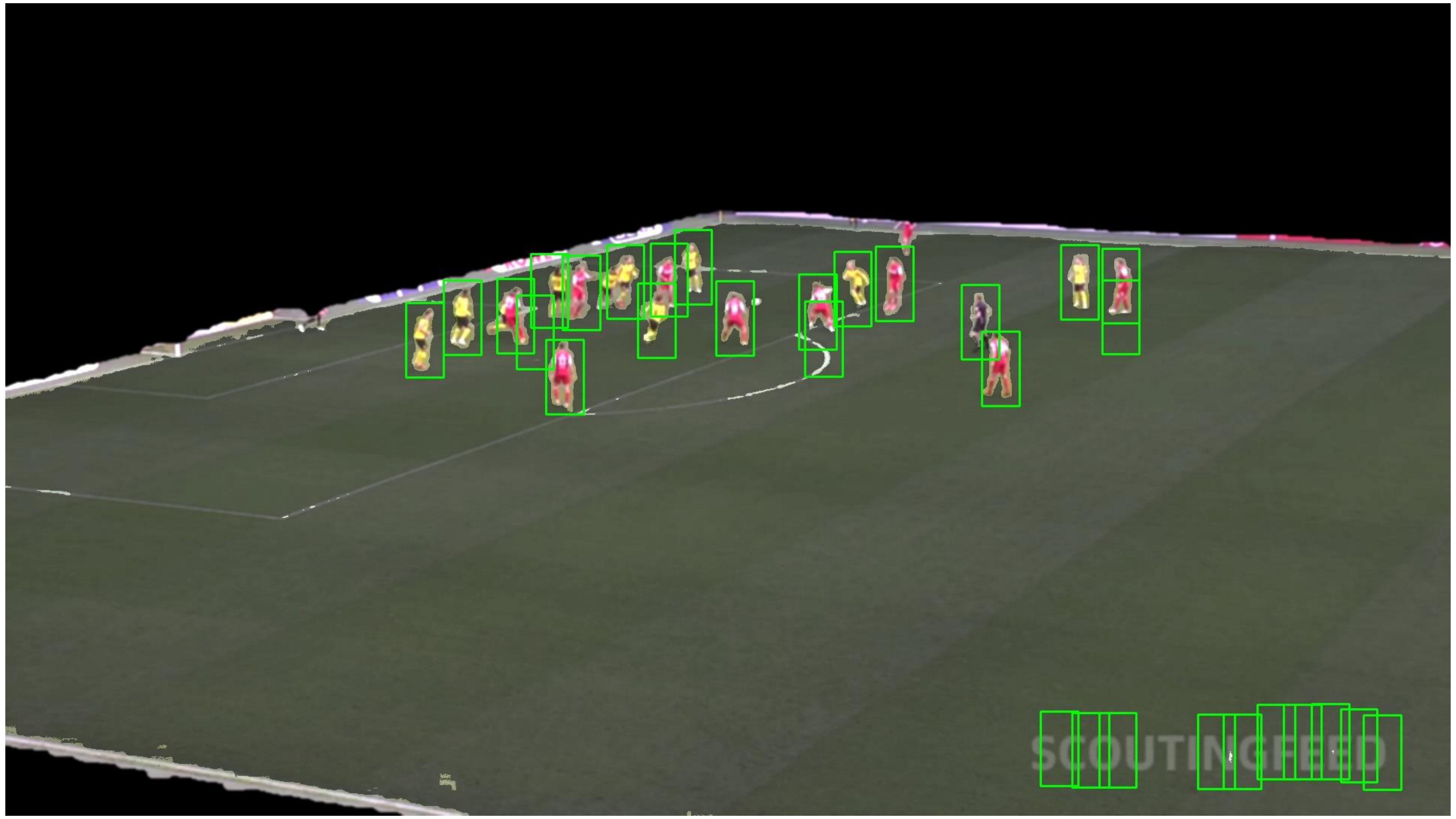
06

Identification with HOG

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes



Calculate gradient direction and magnitude for each pixel in cell

Obtain potential players

Based on Dalal pedestrian dataset

Divide image in cells

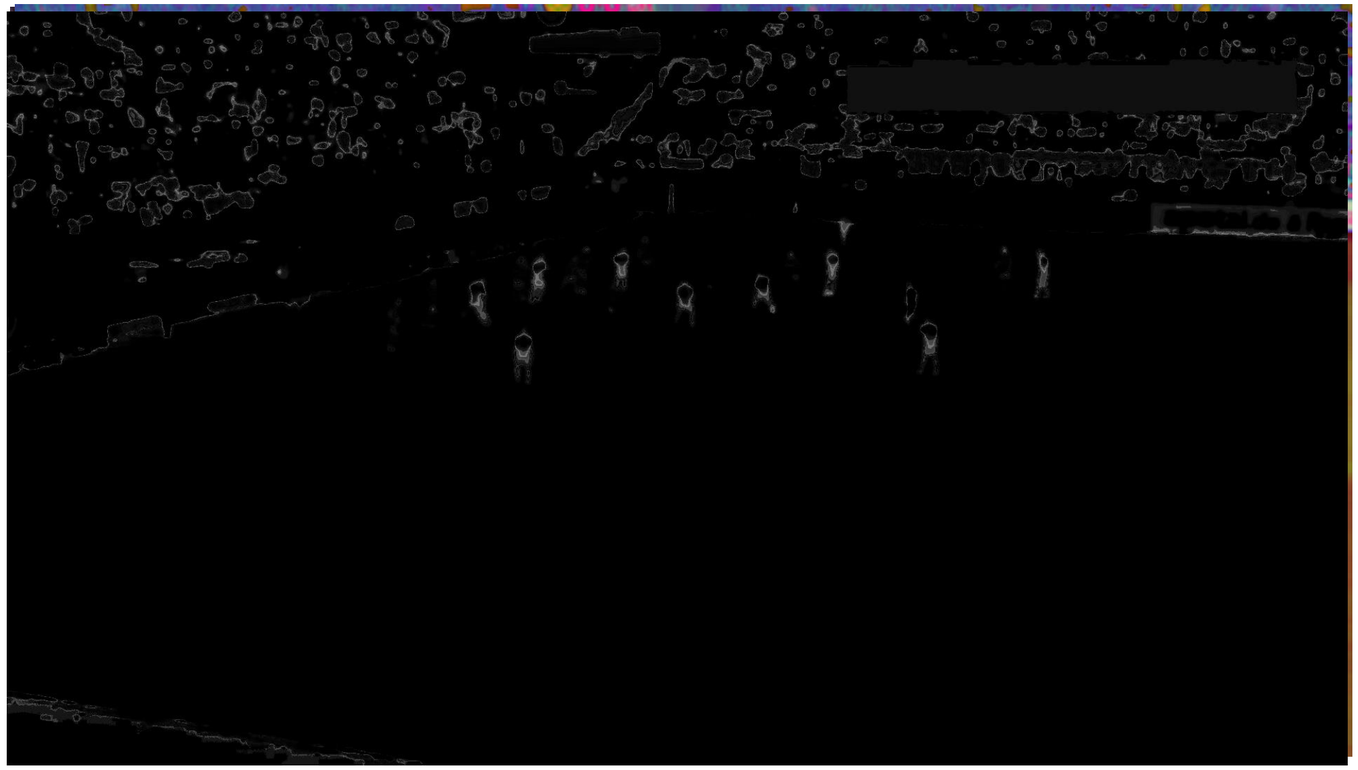
07

Pre-processing of the image

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes



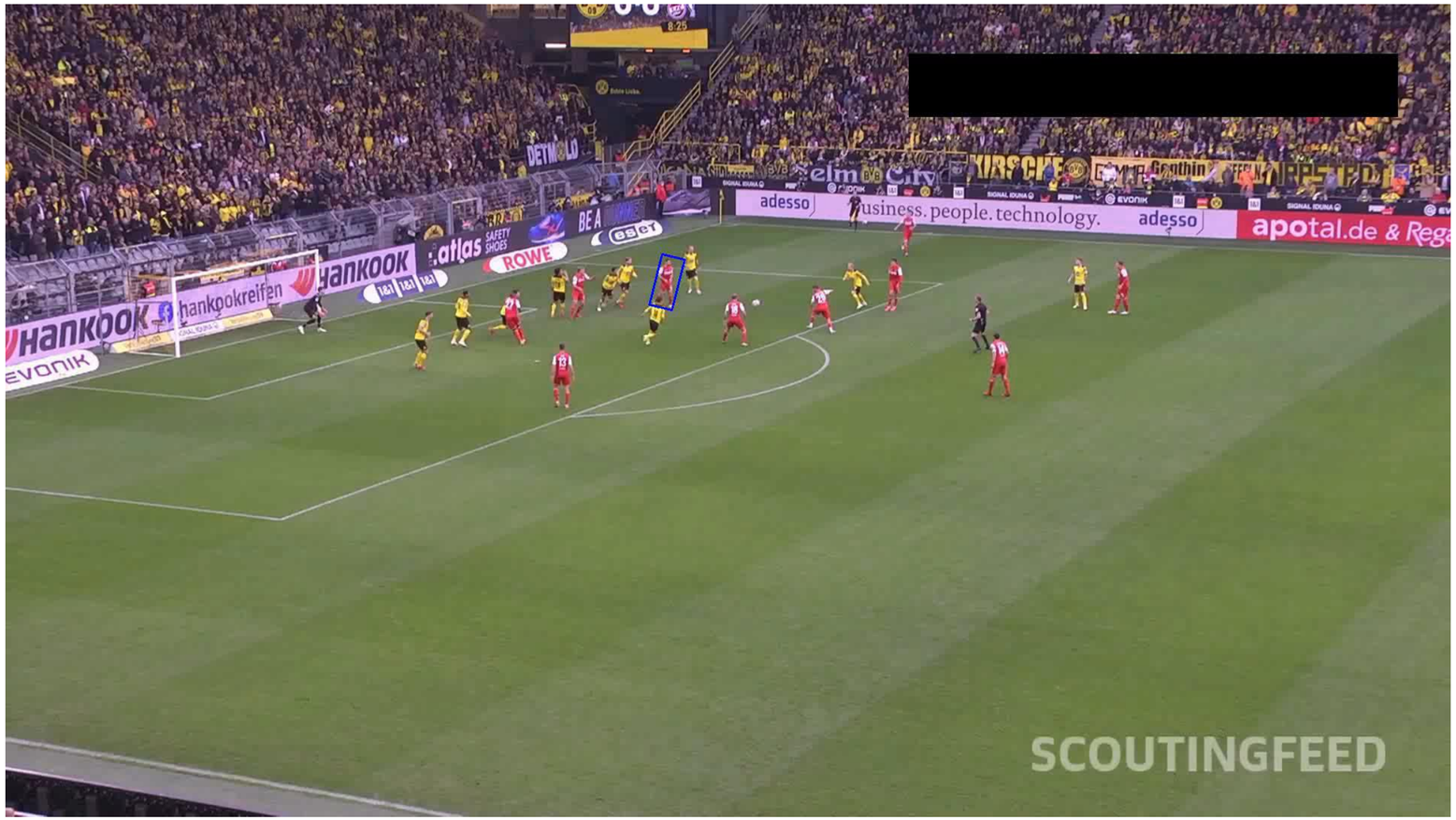
08

Track position with CAMShift

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes



Highest concentration of a color probability distribution

09

Predict position with Kalman and update boxes

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes

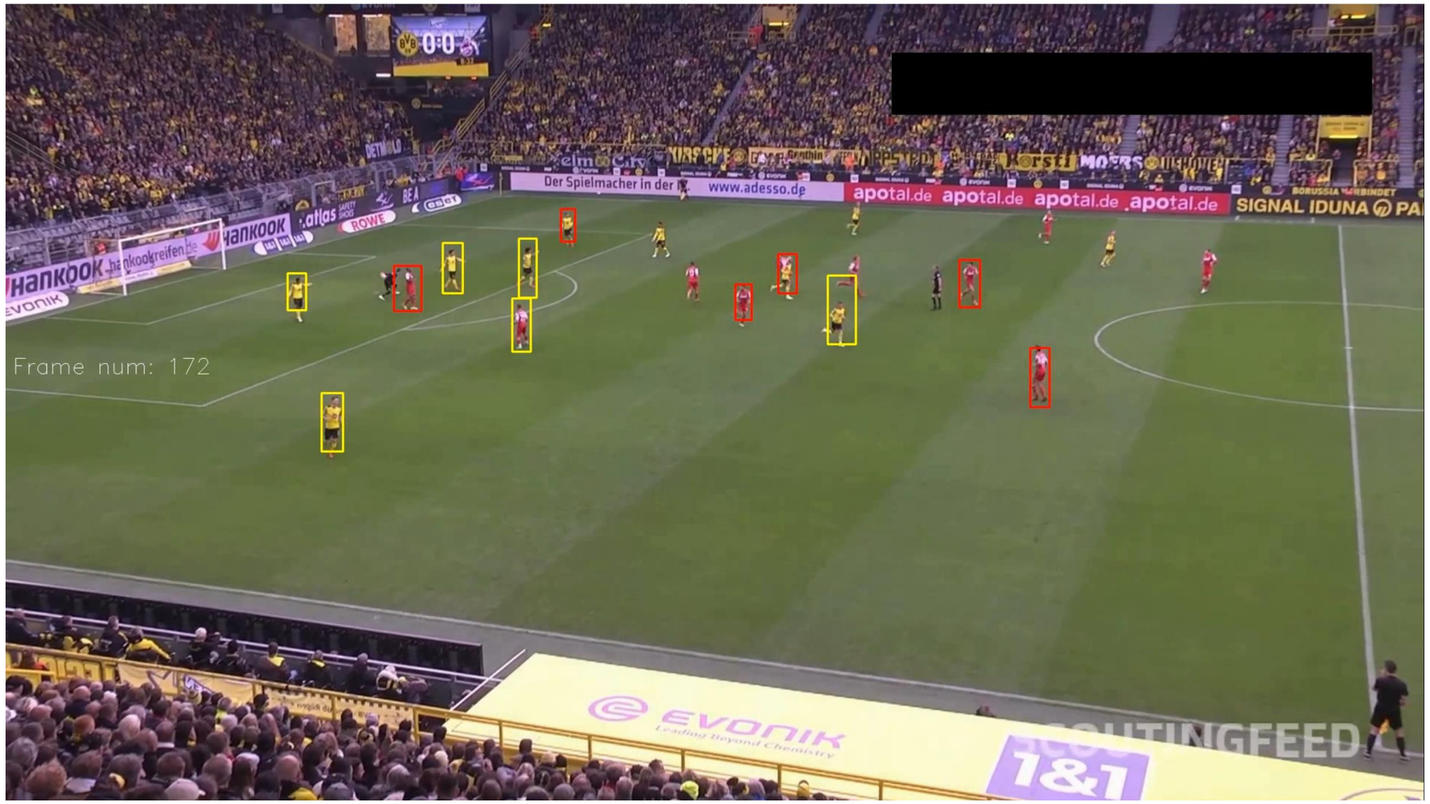
Estimate the future state of a marked object

Define colors

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes



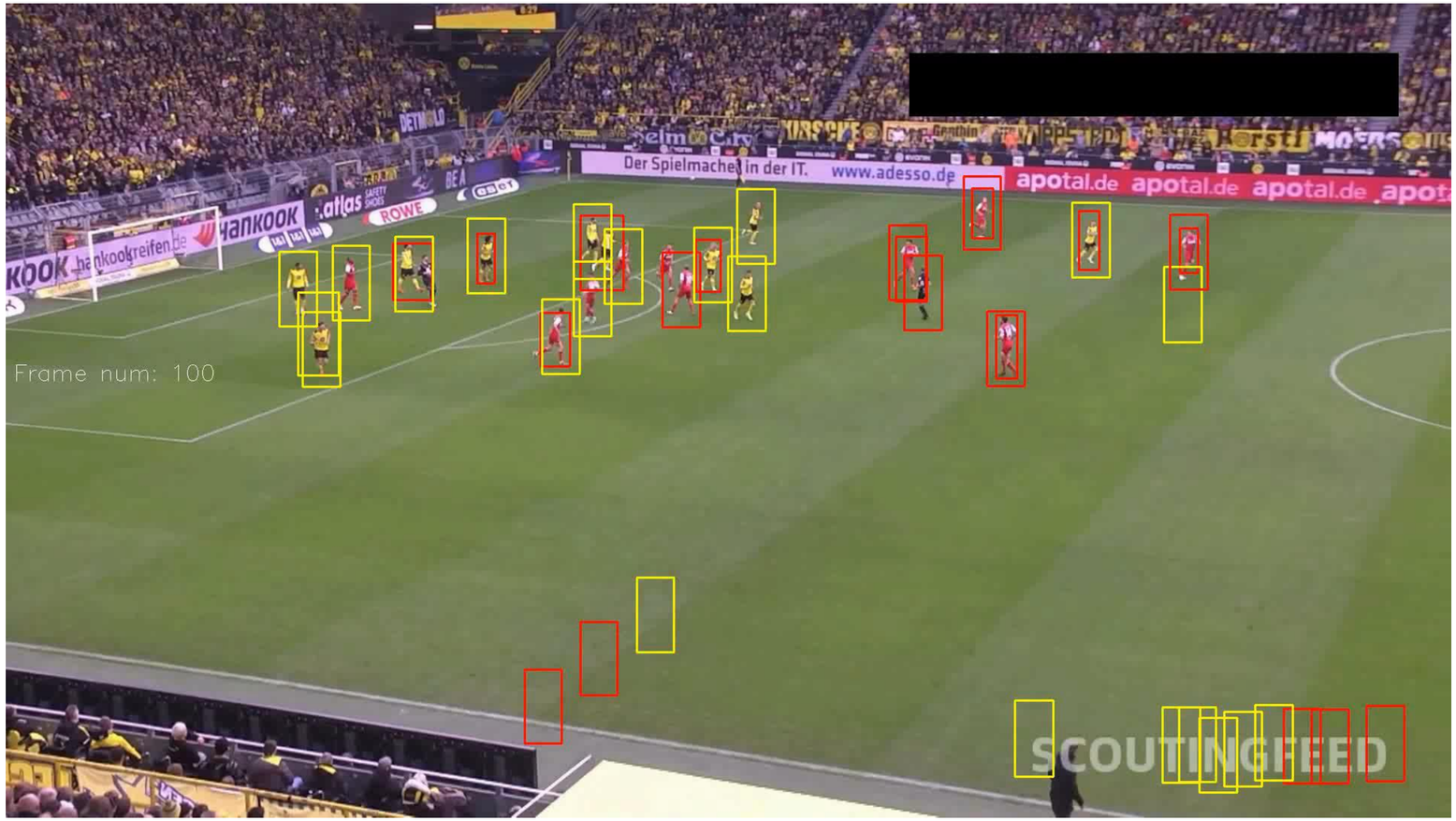
Color statistics of each b-box

Clean false-positive

Player detection (HOG)

Tracking players (CAMShift & Kalman)

Bounding Boxes



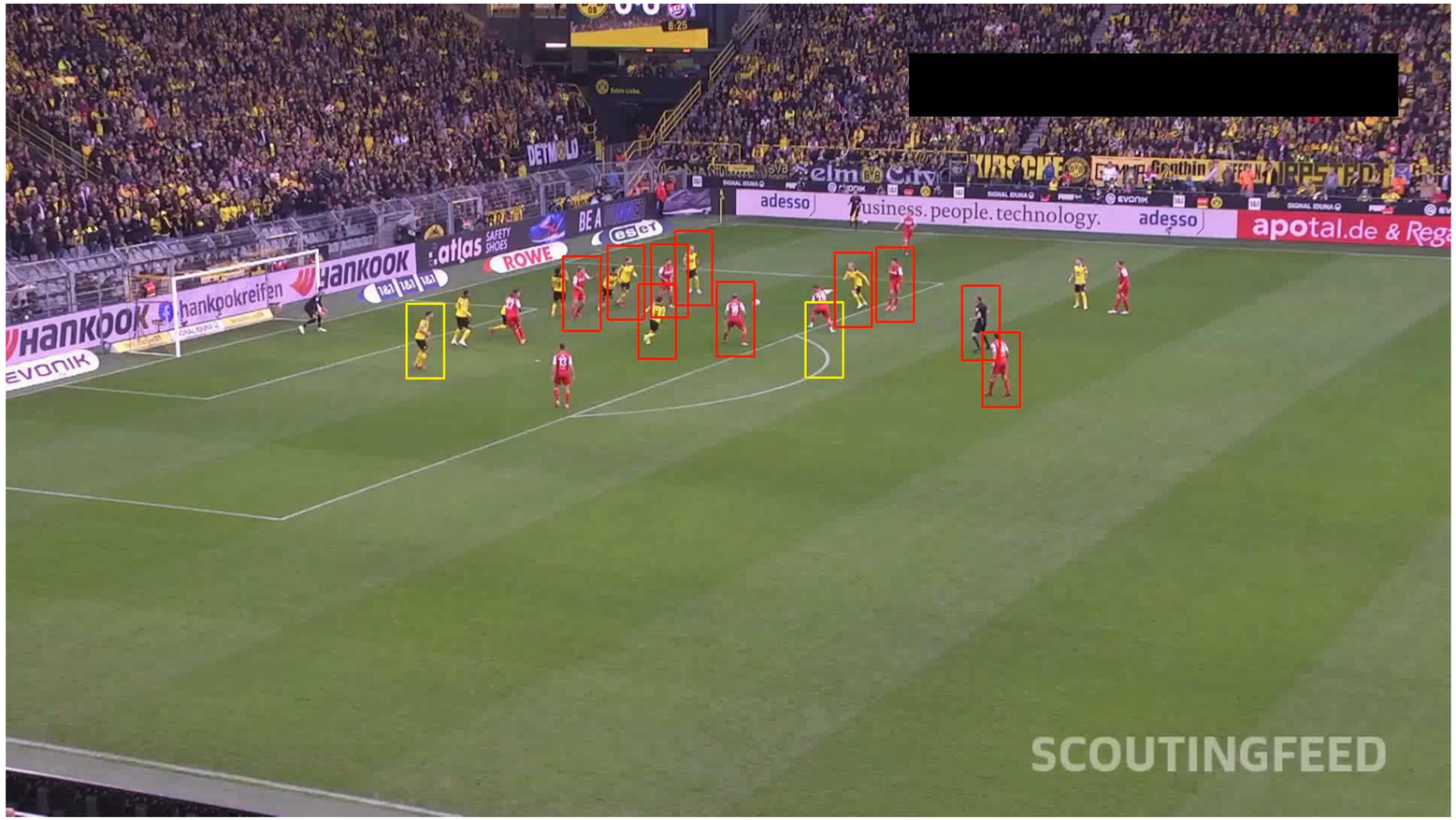
Checks on coordinates and areas of b-boxes

Final result

Player detection (HOG)

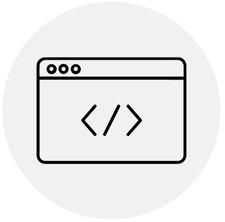
Tracking players (CAMShift & Kalman)

Bounding Boxes

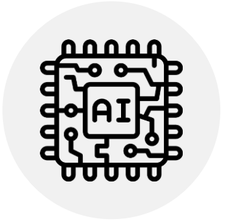


Critical aspects and possible improvements

Video quality



Improve the chosen algorithms



Use advanced algorithms

Thank you