COMPUTER VISION - LAB 5

Computer Vision 2023,
P. Zanuttigh, G. Rizzoli, D. Shenaj

Topics: Offside Detection
Goal: Found if one of the players is in offside position in football images.

Write a C++ software which includes methods that:

1. Load one of the football images.
    a) Different images have different level of complexity, no need to solve all of them.
    b) The images offside1, offside2 and offside3 are easier.
2. Find the field lines to get the alignment of the offside line. You can use the lines of the penalty area or of the goal area as a reference, detect them with the Canny edge detector followed by the Hough Transform as in LAB3, or any other method you like.
3. Locate the players. For this task you can use image segmentation techniques (e.g., k-means or Mean Shift, etc..) to segment them from the field or an object detector based on machine or deep learning (e.g., YOLO in OpenCV). *Any other new idea is welcome!!*
4. Assign the players to the teams and eventually recognize referee and goalkeeper. You can take the player region and compute the histogram or the average color (eventually considering only the chromatic components to avoid issues due to illumination) or some smarter idea.
5. Get a “mean” position for each player, e.g., the barycentre of its pixels. Real football rules are more complex considering the parts of the body but here we simplify (if you like try more advanced things!)
6. Find the line parallel to the field one passing through the player position (or rotate coordinate system according to the field lines) and compare with the ones of the other players to get who is the closest to the football goal.