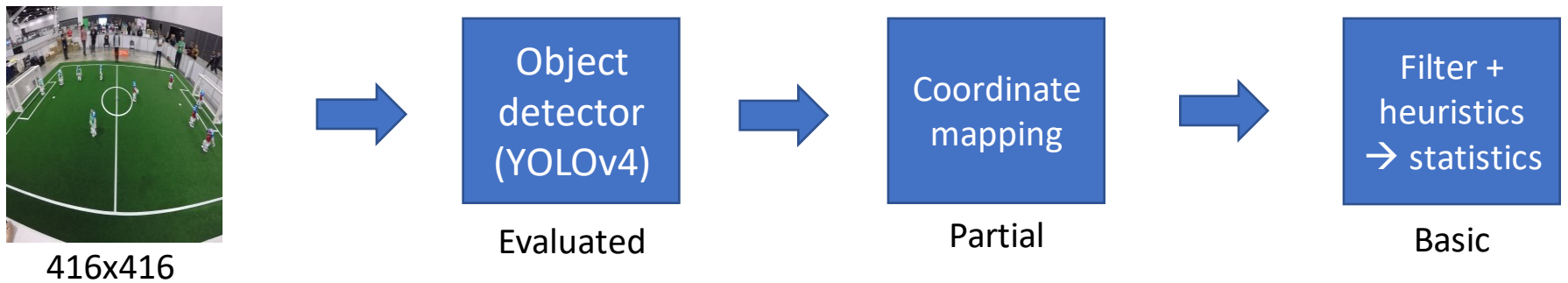
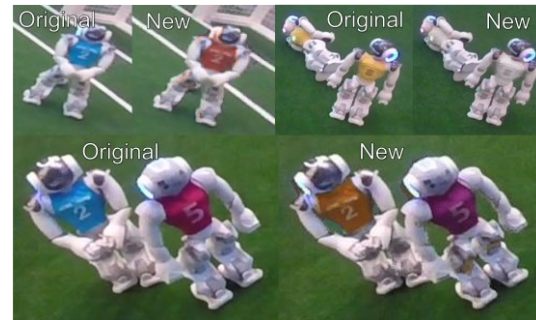
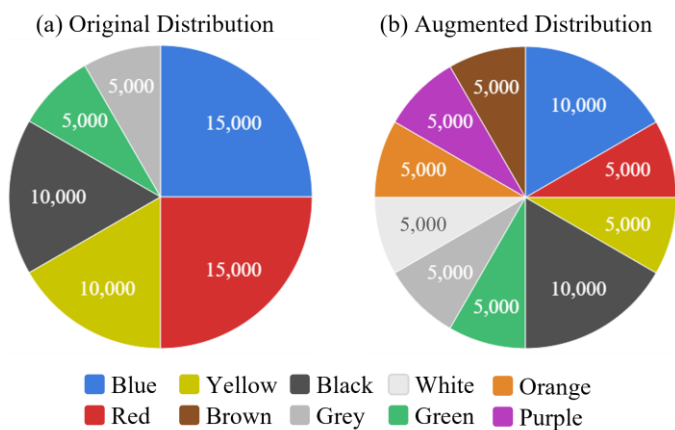


# RoboEireann Open Research Challenge – Video Analysis/Statistics

## RoboCup 2022 Standard Platform League



1 The jersey diversity in the common dataset is unbalanced. Red and blue represent half of the dataset, while colours like purple, orange and green are underrepresented or entirely absent.

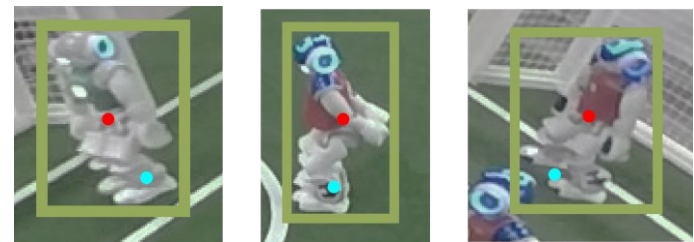


2 An augmented training set was created where under-represented colours were approximated by hue-shifting the original images. Each robot plus colour combination was considered to be a different class in the detector.

3 Object detector performance  
AP @ IoU 0.75

⚽ ball, ap = 51.24%	(TP = 1499, FP = 1004)
● red, ap = 97.60%	(TP = 1994, FP = 58)
● yellow, ap = 96.28%	(TP = 2410, FP = 104)
● black, ap = 97.52%	(TP = 4724, FP = 151)
● white, ap = 93.75%	(TP = 2332, FP = 169)
● green, ap = 97.77%	(TP = 1523, FP = 37)
● orange, ap = 95.42%	(TP = 2277, FP = 113)
● purple, ap = 95.23%	(TP = 2267, FP = 117)
● brown, ap = 94.89%	(TP = 2270, FP = 72)
● grey, ap = 97.96%	(TP = 1466, FP = 34)
● blue, ap = 95.54%	(TP = 4528, FP = 242)

Average inference time 43.1 ms (23.2 Frames/sec)



4 Map bounding box to foot position based on position in field using an empirical approximation.



5 Process ball positions to estimate touches and passes and team in control of the ball



6 Discussion and conclusions:

Due to the small number of source videos and fields, the detector appeared to be biased by the field. A larger image size and/or better detector is likely necessary for the ball, which is very small. Even with this moderate detector, robot positions are good and reasonable ball tracks are possible allowing estimation of touches, passes, etc.