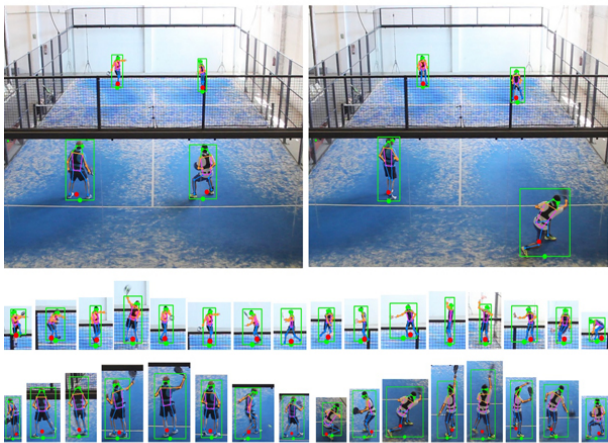


# Estimating Player Positions from Padel High-Angle Videos: Accuracy Comparison of Recent Computer Vision Methods

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The estimation of player positions is key for performance analysis in sport. In this paper, we focus on image-based, single-angle, player position estimation in padel. Unlike tennis, the primary camera view in professional padel videos follows a de facto standard, consisting of a high-angle shot at about 7.6 m above the court floor. This camera angle reduces the occlusion impact of the mesh that stands over the glass walls, and offers a convenient view for judging the depth of the ball and the player positions and poses. We evaluate and compare the accuracy of state-of-the-art computer vision methods on a large set of

images from both amateur videos and publicly available videos from the major international padel circuit. The methods we analyze include object detection, image segmentation and pose estimation techniques, all of them based on deep convolutional neural networks. We report accuracy and average precision with respect to manually-annotated video frames. The best results are obtained by top-down pose estimation methods, which offer a detection rate of 99.8% and a RMSE below 5 and 12 cm for horizontal/vertical court-space coordinates (deviations from predicted and ground-truth player positions). These results demonstrate the suitability of pose estimation methods based on deep convolutional neural networks for estimating player positions from single-angle padel videos. Immediate applications of this work include the player and team analysis of the large collection of publicly available videos from international circuits, as well as an inexpensive method to get player positional data in amateur padel clubs.