

Success Story

COMET



FFG



SCCH

Software Competence Center Hagenberg

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iKM, 01/2015 – 12/2018, multi-firm

Video-based Analysis of Game Strategies in Sport

Computer-Vision and sensor-based data acquisition are the foundations for new applications in the area of sports game analysis. Especially the analysis of the individual player performance in tactical decision making is of great interest. Video-based analysis frameworks allow the reconstruction of the behavior of the players in respect to the ball/puck. This information is used by coaches to gain a deeper insight into the tactical game play.



Game Strategy in Sport

Analysis of game strategies, player positions, travel paths, velocities and acceleration curves in combination with biometric player data such as heart and breathing frequencies is state of the art. One such system is LPM (Local Position Measurement) by abatec group AG group's subsidiary inmotioTec GmbH. This system was used, e.g., by the Dutch national football team to prepare for the world champions-hip in 2014 and by Red Bull Salzburg for data analysis. In a precursor project, SCCH developed a framework that was integrated in the LPM system. This framework enables the filtering of position data for objects or persons from video sequences. It builds on highly developed image processing methods that provide high precision and flexibility in object tracing and that were optimized regarding real-time conditions. Thus the resulting data can be evaluated already during training and integrated in the training process.



Pucktracking – How does it work?

In the current image-based Knowledge Mining (iKM) project, we are enhancing available technologies and know-how in order to cover additional sports with different challenges regarding image processing. One example is ice hockey, where the puck is significantly smaller than a football (easier to hide), generally less conspicuous (black), often much faster (blurred images) and thus as a whole more difficult to detect. Classical methods of object detection confront their limits, and so other methods must be applied, e.g., deep learning with convolutional neural networks. The difficult part in this project is to find a method which allows the training of networks which are able to recognize the puck despite the fact that the puck itself covers only a very tiny fraction of the image itself.

In one part of the project, we are working on the evaluation of context information such as player

and stick positions. We are also researching new methods that are based on spatial-temporal attributes and that can also be used for the analysis of tactics.

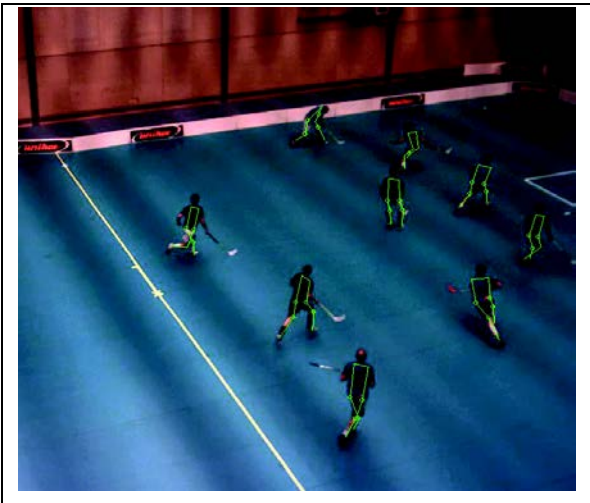


Abb. 1: Unihock (SCCH)]

Impact and effects

The estimation of the puck position is an important task for the game strategy analysis since the evaluation of the player position is always done in relation to puck position. A precise localization of it allows for new ways of tactical analysis, as it has been done already at the SCCH in the project WiMoiS (FFG) for soccer. The developed methods help coaches to get deeper insights into game play and the behavior of players during intense combat situations. One of the goals of the iKM project is to transfer the developed methods for behavior analysis to other domains like for example to the safety industry. The methods are adapted now for the surveillance of level or street crossings in order to improve the safety of pedestrians. Through this close collaboration with KMUs from Austria we help them to find innovative solutions and to stay ahead of their competitors.

Contact and information

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Further information on COMET – Competence Centers for Excellent Technologies: www.ffg.at/comet

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