

Theme: **Video-Based Athlete Monitoring for Sports Applications**

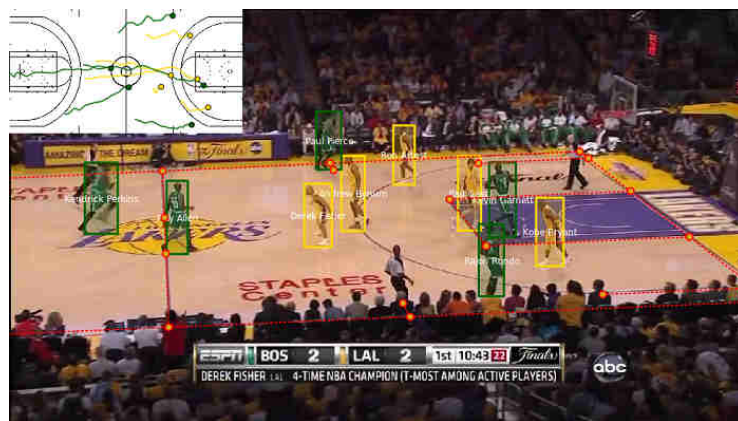
Objective methods for the assessment of athletes are of major interest in order to get insights in subject-specific skills and group-specific behavior on the pitch, e.g. in basketball. Nowadays, the monitoring of athletes is performed by video-based systems [1]. Visual sensing facilities are used to monitor the athlete's behavior and environmental changes. Computer vision techniques are applied including feature extraction, structural modeling, movement segmentation, action extraction, and movement tracking in order to analyze visual observations for pattern recognition [2, 3]. The general applicability of the proposed solutions to a new application field is often not predictable.

Thus, the goal of this master project is to develop and implement video-based athlete monitoring solutions for a specific chosen sports application. A performance comparison regarding, e.g. accuracy and computational complexity of the approaches, should identify the best suitable technique.

The detailed tasks include:

- Literature research: state-of-the-art approaches for video-based monitoring of athletes
- Hardware research and testing: systems available on the market
- Implementation of several video-based athlete monitoring algorithms, e.g. in Matlab
- Comparison of different approaches in one specific team sport, e.g. basketball.

Current software standards like maintainability, reusability and appropriate documentation have to be maintained.



Supervisor: Dominik Schuldhuis, Prof. Dr. Björn Eskofier (LME)
Constantin Zwick, Harald Körger (adidas AG)
Contact: **dominik.schuldhuis@fau.de**
Students: TBD
Start of the project: TBD
End of the project: TBD

References

- [1] F. Chen, D. Delannay, and C. De Vleeschouwer. An Autonomous Framework to Produce and Distribute Personalized Team-Sport Video summaries: A Basketball Case Study. *IEEE Trans Multimedia*, 13(6):1381–1394, 2011.
- [2] Liming Chen, Jesse Hoey, Chris D. Nugent, Diane J. Cook, and Zhiwen Yu. Sensor-Based Activity Recognition. *IEEE Trans Syst, Man, Cybern C, Appl Rev*, 42(6):790–808, 2012.
- [3] T. B. Moeslund, A. Hilton, and V. Krüger. A survey of advances in vision-based human motion capture and analysis. *Comput Vis Image Und*, 104(2-3):90–126, 2006.