

Executive Summary

Dagstuhl Seminar on Computer Science in Sport

17.-20. September 2006

<http://www.dagstuhl.de/06381>

Arnold Baca (Universität Wien, AT)

The seminar dealt with a dynamically developing interdisciplinary area, where qualitative and non-deterministic paradigms from Sport like behavioural processes and modelling meet technological and structural paradigms from Computer Science. New demands, new concepts and technologies, and future trends in both disciplines were discussed.

The event brought together working areas of common interest without being focused on a single area such as pure practice, sport theories, or sport technologies. In particular, future-oriented working areas like process modelling and information processing were discussed.

Process modelling, for example, can have quite different understandings in sport science and computer science, respectively. While computer scientists mostly have their focus on deterministic and clearly defined structural processes like in industrial production, sport scientists think of non-deterministic and fuzzy-defined processes like those from games, motion, or training and rehabilitation. The seminar provided a platform for an exchange of experiences in order to establish new ideas and new solutions.

The fields of RoboCup (i.e. soccer playing robots) and, more generally, robotics, as another example, build a thrilling up-to-date working area, where computer scientists and sport scientists can collaborate effectively and successfully, dealing with motor phenomena as well as with tactical aspects of behaviour. In particular, artificial neural networks play an important role here, stretching from pattern and situation recognition over analysing and optimising learning processes to behaviour control.

Internationally well known researchers as well as researchers from the younger generation have been invited to participate in this seminar. From 17.9.2006 to 20.9.2006 28 researchers from 7 countries discussed their recent work and actual tendencies in Computer Science in Sport.

There were 24 oral presentations and a discussion session on Doping and Computer Science, which was introduced by lectures given by Matthias Blatt (NADA – Bonn) and Martin Lames (Universität Augsburg). The presentations were thematically grouped into the following areas.

General aspects (presentations from the organizers):

- Arnold Baca (Universität Wien – Austria) – *Computer Science in Sport – a Historical Survey*
- Jürgen Perl (Universität Mainz) – *Computer Science in Sport: Present Fields and Future Applications*
- Larry Katz (University of Calgary – Canada) – *Issues in the Adoption of Innovations in Sport*

Modelling:

- Peter Dabnichki (Queen Mary College – London) – *The Future Synergy of Computer Modelling and Smart Technologies in Sport*
- Florian Seifriz (Deutsche Sporthochschule Köln) – *Genetic Algorithms and GPS in alpine skiing*
- Tim McGarry (University of New Brunswick – Canada) – *On the Presence of Space-Time Patterns in Squash Contests*
- Mario Heller (Universität Wien – Austria) – *Mechanics of Motor Units: Modelling and Simulation of Skeletal Muscle Performance in Sport*
- Daniel Ranz (INEFC Barcelona – Spain) – *Are Oscillations of Physiological Variables a Consequence of the Homeostatic Control during Exercise?*

Biomechanics:

- Wolfgang Schöllhorn (Universität Münster) – *Identification of Emotions in Biomechanical Gait Patterns*

- Philipp Kornfeind (Universität Wien – Austria) – *The Use of Computational Fluid Dynamics (CFD) for the Development of New Oar Blades to Improve the Effectiveness of Aquatic Propulsion in Rowing*
- André Seyfarth (Universität Jena) – *Emergence of Gait in Legged Systems*
- Karen Römer (TU Chemnitz)

RoboCup/Motion Tracking:

- Alexander Ferrein (RWTH Aachen) – *Qualitative World Models for Soccer Robots*
- Sven Behnke (Universität Freiburg) – *Humanoid Soccer Robots*
- Bodo Rosenhahn (MPI für Informatik Saarbrücken) – *Markerless Motion Capture in Outdoor Environments*
- Thomas Mauthner (TU Graz – Austria) – *Tracking People and the Application in Sports Game Analysis*

Multimedia/eLearning:

- Josef Wiemeyer (TU Darmstadt) – *Current Issues of e-learning in Sport – Shifting from Media to Complex Interactions*
- Christian Eder/Oliver Strubreither (Universität Wien) – *eLearning - Potentials, Perspectives & Curriculum Integration*

Data acquisition/IT:

- Guido Töpfer (Universität Mainz) – *End-User Programming and Sport Science*
- Keith Lyons (Australian Institute of Sport, Canberra) – *Aggregation and Personalisation of Knowledge*
- Dietmar Saupe (Universität Konstanz) – *Analysis and Visualization of Space-Time Variant Performance Parameters in Endurance Sport Training*