IACSS - Newsletter

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INSIDE IACSS

PREAMBLE

8th International Symposium *Computer Science in Sport* in Shanghai, China, September 21-24, 2011.

INTERESTED PERSONS/COLLEAGUES

At present 569 colleagues from over 50 countries are interested in IACSS – they either are subscribed to receive this Newsletter or to the E-Group.

Imprint

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INSIDE THIS ISSUE

8th International Symposium – IACSS 2011, September 21-24, 2011, Shanghai, China

IACSS and the Shanghai University of Sport (SUS) organized the 8th International Symposium on Computer Science in Sport from 21-24 September, 2011 in Shanghai, China.

IACSS thanks the main organizer, Prof. Hui Zhang as well as all other involved parties for a stimulating scientific and an impressive social program.

A detailed summary of the event can be found in the appendix of this newsletter (special thanks to Prof. Keith Lyons for outlining the most important objectives of the conference).

During the General Assembly of IACSS a new Board of Directors was elected for the period 2011-2013:

President: *Arnold Baca* (Austria)
General Secretary: *Martin Lames* (Germany)
Treasurer: *Hristo Novatchkov* (Austria)

Further members of the Board of Directors:

Jian Dai (China),
Hayri Ertan (Turkey),
Larry Katz (Canada),
Rajesh Kumar (India),
Yong Jiang (China),
Martin Lames (Germany),
Dario Liebermann (Israel),
Keith Lyons (Australia),
Chikara Miyaji (Japan),
Stuart Morgan (Australia),
Didier Seyfried (France),
Josef Wiemeyer (Germany),
Kerstin Witte (Germany),
Hui Zhang (China).

In addition, it was announced that a Pre-Olympic congress will be held from 24-25th July in Liverpool, UK. The event will be organized by Prof. Yong Jiang from the Nanjing University of Information Science and Technology in China.

Finally, details on the following two international symposia were given. The next conference will take place in Istanbul, Turkey in June, 2013, while the 10th symposium will be held in Paris in 2015.

The Eighth International Symposium of Sport was hosted at the Shanghai University of Sport in September 2011

Symposium Notes

Day One 22 September 2011

Welcome Speeches and Opening Addresses

The Symposium commenced on 22 September with welcome speeches and congratulation addresses. The auditorium was full with invited guests, delegates and Shanghai University of Sport (SUS) students. Professor Zhang Hui introduced the session and each speaker.

Official speeches were made by:

Professor Dai Jian (Vice Chancellor, SUS), Ms Guo Bei (SUS) and Professor Arnold Baca (IACSS).

This was the third IACSS conference to be held outside Europe.

IACSS 2011

This Symposium had seven keynote addresses and 61 oral presentations.

The Symposium program extended over three days and was hosted on the campus of the Shanghai University of Sport.

Keynote 1

Arnold Baca presented the opening keynote of the Symposium. The title of Arnold's talk was Education in Computer Science in Sport. Arnold used twenty-three years of personal experience to frame the content of his talk. Arnold first taught about computer science in sport in 1988 and was using an IBM XT with 47MHz processor. He explored early examples of data acquisition. At that time programming language was Turbo Pascal. Arnold's talk illustrated how the curriculum content changed to the present day.

Day 1: Oral Presentations 1

There were two strands in the Symposium's first oral presentations. Martin Lames was the chair of one session and Yaping Zhong was the chair of the other session. In Martin's session, papers were presented by:

- Stuart Morgan *Spatial Trends in Hockey*
- Ye-peng Guan *Table Tennis Tactical Analysis*
- Anthony Bedford *Australian Football*
- Lijuan Yu *Antagonistic Sports*
- Sho Tamaki *Table Tennis Tactical Analysis*
- Qiang Feng *Tennis*

In Yaping Zhong's session, the papers were:

- Jing-guang Qian *Pommel horse*
- Thomas Holleczek *Alpine Skiing*
- Peng Wang *Pole Vault*
- Roland Leser *Football*
- Jing Yang *Basketball*
- Juan-li Wei *Computer Simulation*

Contemporary Issues for Education in Computer Science in Sport

In his talk Arnold Baca identified some contemporary issues in education in computer science in sport. He noted the University of Magdeburg's program on *Sport and Technology* and outlined the University of Vienna's approach to computer science in sport.

Keynote 2

Professor Yong Jiang presented the second keynote address of the Symposium. The title of his talk was '*Predicting results/scores for the upcoming 2012 London Olympic Games based on computer modeling'*.

Key points from his address were:

1. There are still ten moths of data to be acquired for London! But this work is based on work prepared for Beijing 2008.

2. Predictions based on multi factor analysis with regression analysis (including multiple linear regression).

3. Predictions based on time series data (moving average and Grey model) to improve predictive potential.

Professor Yong jiang provided a very detailed account of his statistical approach to the prediction of performance.

Other points from Professor Yong Jing's talk

In addition to his main points, Professor Yong Jing pointed to estimates of anticipated winning times of athletic performances at Beijing.

He identified the factors he used to derive his estimates (including GDP, educational index, demographic density). Data from 2008 have been added to data from 2000 and 2004 to prepare a model for London. He discussed the use of linear and non-linear techniques.

Keynote 3

Professor Larry Katz presented the third keynote of the first day. Larry's presentation was titled *'Successes and Challenges with Performance Analysis: An International Perspective'*.

Key points from his address were:

1. There is a global community of practice using performance analysis in high performance sport.

2. The Netherlands, the USA, Canada, China, Japan, South Africa, the United Kingdom and Australia have examples to share.

3. There are examples from professional sport to share.

Other points from Professor Larry Katz's talk

Larry looked at what constitutes performance analysis and what it takes to deliver world - class performance.

He discussed the interaction between athlete, coach and technological applications.

He developed his theme with a consideration of the coach's role in observing and transforming performance.

Larry considered the role of performance in making informed (good) decisions.

Day 1: Oral Presentations 2

There were two strands in the Symposium's second oral presentations. Jürgen Perl was the chair of one session and Weiqing Li was the chair of the other session. In Jürgen's session, papers were presented by:

- Minh Huynh *Badminton Expertise*
- Quian Tao *Table Tennis Tactical Skills*
- Jing Sun *Table Tennis*
- Michael Stoeckl *Golf*
- Chuanjie Zhao *Fencing*
- Lei Cai *Basketball*

In Weiqing Li's session, the papers were:

- Ulf Jensen *Golf*
- Peijun Zhao *Gymnastics*
- Peter Lamb *Golf*
- Ji Rong *Basketball*
- Kerstin Witte *Combat Sport*
- Gongbo Liu *Swimming*

The Eighth International Symposium of Sport was hosted at the Shanghai University of Sport in September 2011

Symposium Notes

Day Two 23 September 2011

Day Two

The Eighth Symposium commenced on 22 September. On Day 1 there were three opening addresses, three keynote speeches, twelve oral presentations and a tour of the University's Performance Research Laboratory.

Day 2 had four keynote speeches, twenty-four oral presentations and the IACSS General Assembly.

This was the third IACSS conference to be held outside Europe (Canada 2007, Australia 2009).

The Ninth Symposium will be held in Turkey in 2013.

This Symposium had seven keynote addresses and 61 oral presentations.

The Symposium program extended over three days and was hosted on the campus of the Shanghai University of Sport.

Keynote 4

Jürgen Perl presented the first keynote address of Day 2 of the Symposium. The title of Jürgen's talk was *Concepts and Methods of Modelling: A Case Study*. Jürgen discussed basic approaches to modeling and some of the problems that might occur in the modeling process.

Day 2: Oral Presentations 3

There were two strands in the Symposium's third session of oral presentations. Larry Katz was the chair of one session and Yong Jiang was the chair of the other session. In Larry's session, papers were presented by:

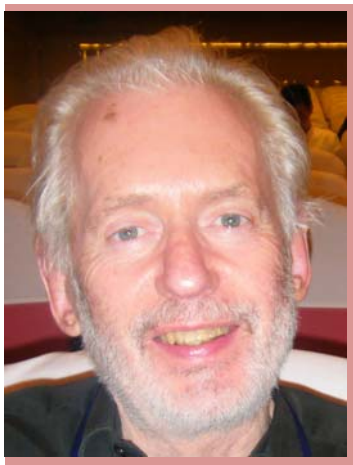
- Ian Heazlewood *Classification Accuracy*
- Shangbin Li *Physical Education*
- Jia-Hong Sie *Table Tennis*
- Yao Yao *Performance Management*
- Huai-jin Liu *Distance Education*
- Jing Zhao *Basketball Referees*

In Yong Jiang's session, the papers were:

- Kerstin Witte *Movement coordination*
- Siyin Han *Optimal Control*
- Hristo Novatchkov *Real-time data acquisition*
- Chen Shuhui *Physical Education*
- Bjoern Eskofier *Golf*
- Haibo Bai *Volleyball Referees*

Modelling: Points from Jürgen's Keynote Address

Jürgen introduced his talk with a discussion of a flow model and its refinement through a closed loop system. Jürgen noted that these models are disturbed by external events and he considered how disturbance is stabilized in a model. Jürgen advocated the use of simple ('easy') models. Jürgen illustrated his discussion with a case study of performance modeling of a marathon runner. This model uses a closed loop system controlled by load (running speed). This led Jürgen to discuss antagonistic dynamics. Jürgen illustrated data visualisations from his PerPot software and noted the cost of small increases in output when fatigued in relation to IAT. Jürgen used only heart rate to predict marathon speed control. He noted the impact of ambient temperature on IAT measurement. Jürgen concluded his discussion with multiple load components and the use of PerPot DoMo.



Keynote 5

Professor Roger Bartlett presented the fifth keynote address of the Symposium. The title of his talk was '*The Use of Artificial of Artificial Neural Networks in Studying Movement Coordination'*. This was a paper written with Peter Lamb. Key points from his address were:

1. Artificial Intelligence and Artificial Neural Networks. The focus of the talk was on one type of neural network: self-organising maps (SOMs).

2. SOMs learn without a teacher! They are non-linear representations. Iterations of data lead to convergence. Roger explored the potential of using SOMs to understand dynamical systems.

3. Basketball and Golf examples of SOMs. (See Lamb et al, 2010; 2011)

Other points from Professor Bartlett's talk

Roger explored the strength of SOMs in overcoming the 'black box' criticism of neural networks. He reviewed four papers that used SOMs:

- Discus Throwing (1997): absence of invariant behavior. (Bauer and Schulhorn)
- Javelin Throwing (1998): no optimal movement pattern, a personal pattern (Schulhorn and Bauer)
- Analysis of soccer kicks Lees et al (2003; 2005): detection of movement characteristics.

Keynote 6

Professor Martin Lames presented the sixth keynote of the Symposium. Martin's presentation was titled *'Positional Data in Game Sports – Validation and Practical Impact'*.

Key points from his address were:

1. The generation of positional data is an important paradigmatic topic for computer science in sport

2. A discussion of the validity of the data acquisition process (technologies and precision)

3. The consideration of the practical impact of the positional data acquired. He discussed: training implications; relative phase; software development (ELF)

Other points from Professor Martin Lames' talk

Martin provided some background information on the development of the acquisition of positional data. Today there are up to 20 companies offering positional data services. Their services involve general data, positional data and play actions. Martin noted the use of: Radar technology and transponders; GPS; video based image detection (used by the Bundeslegia).

Martin discussed the precision of position detection from video images (process steps, operational steps and error sources). Martin reported the results of reliability tests on video based image detection. He noted the problems caused by filtering and segmenting and exemplified this with a discussion of acceleration and deceleration. He spoke too about 'blobs'.

Martin concluded his talk with a discussion of the practical implications of positional data acquisition. He noted the variability of the measurement of total distance covered and alerted delegates to the variation of the length of games. Similar variability has been found in movement categories ('cruising' was a classification discussed in this regard).

Martin explored the impact of game intensity on the measurement of distance covered and classification of movement. Martin noted too issues arising from the measurement of fatigue and discussed game state (using data from 306 Bundeslegia games).

We have a wealth of information but we must establish standards.

Keynote 7

Professor Peter O'Donoghue presented the seventh keynote address of the Symposium. Peter's presentation was titled *'Automatic recognition of balance in soccer defences using player displacement data'*.

Key points from his address were:

1. Background information about automated tracking. See for example Di Salvo et al (2010) (speed gates) and O'Donoghue and Robinson (2009) (observation).

2. A discussion of a balance approach to soccer defence: pressure, back up and cover. Note Egil Olson and Albin Tenga's work on balance.

3. The development of a specification file for algorithm refinement.

Other points from Peter's talk

Peter acknowledged work undertaken with Prozone Data and Dr Albin Tenga to produce algorithms for defence balance in football. Peter noted the use of displacement data in soccer coaching. He referred to the emerging literature on tactical aspects with automated analysis.

Peter spent some time in his talk discussing the development of a specification file for the algorithm to measure balance in defending formations in soccer.

Peter used data from a half of a Premier League soccer match to present a case study of the use of the algorithm to identify automatically balance in defence. He shared a sequence of defence prior to a goal to illustrate the **dynamic** nature of tactical formations, balance and imbalance.

Day 2: Oral Presentations 4

There were two strands in the Symposium's fourth oral presentation session. Roger Bartlett was the chair of one session and Huiqun Zhao was the chair of the other session. In Roger's session, papers were presented by:

- Patrick Kugler *Mobile Recording System*
- Lejun Shen *Monte Carlo Simulation*
- Daniel Link *Beach Volleyball*
- Yong Peng *Swimming*
- Chikara Miyaji *Sport Video*
- Fang Qi *Sports Achievement*

In Huiqun Zhao's session, the papers were:

- Ted Vickey *Mobile Fitness Apps*
- Shuhui Chen *Teacher Management*
- Keith Lyons *Football*
- Ling Zhu *Table Tennis*
- Ertan Hayri *Archery*
- Zhao Peiyu *Physical Education*

IACSS General Assembly 2011

Arnold Baca introduced the IACSS General Assembly.

Reports were received from the President and the Treasurer.

Arnold, in his President's report, listed the events that had occurred since the last Symposium in Canberra, 2009. These included conferences and symposia in India, Australia, Turkey, Japan and Germany.

The Treasurer's, Hristo Novatchkov, presented IACSS accounts for the last two years. Hristo noted that 569 colleagues from 50 countries have expressed interest in IACSS and that there are 95 subscribers to IJCSS.

Jürgen Perl acted as the coordinator of elections to IACSS official positions and Peter O'Donoghue the teller.

- Arnold Baca was elected as President
- Martin Lames was elected as General Secretary
- Hristo Novatchkov was elected Treasurer
- The Board was elected.

Arnold concluded the Assembly with a discussion of the e-book in Computer Science in Sport and the oral history project. Arnold noted his vote of thanks to Peter Dabnichki. It was confirmed that the 9th Symposium will take place in Istanbul 2013.

The Eighth International Symposium of Sport was hosted at the Shanghai University of Sport in September 2011

Symposium Notes

Day Three 24 September 2011

This Symposium had seven keynote addresses and 61 oral presentations.

The Symposium program extended over three days and was hosted on the campus of the Shanghai University of Sport.

Day Three

The Eighth Symposium commenced on 22 September. On Day 1 there were three opening addresses, three keynote speeches, twelve oral presentations and a tour of the University's Performance Research Laboratory.

Day 2 had four keynote speeches, twenty-four oral presentations and the IACSS General Assembly.

On Day 3 there was one keynote address, thirteen oral presentations and the formal closing ceremony,

This was the third IACSS conference to be held outside Europe (Canada 2007, Australia 2009).

The Ninth Symposium will be held in Istanbul in Turkey in 2013. The Tenth Symposium will be held in Paris in 2015.

Keynote 8: Dario Liebermann

Dario Liebermann presented the eighth and final keynote address of the Symposium. The title of Dario's talk was *Technological Diffusion Between Sport Science and Motor Rehabilitation Science*.

Dario compared sport and rehabilitation technologies and approaches. One part of his talk explored the use of virtual reality (VR). Another looked at Internet based training. He asserted that there is a synergy between sport and rehabilitation technologies. He shared his vision for community based fitness training.

Day 3: Oral Presentations 5

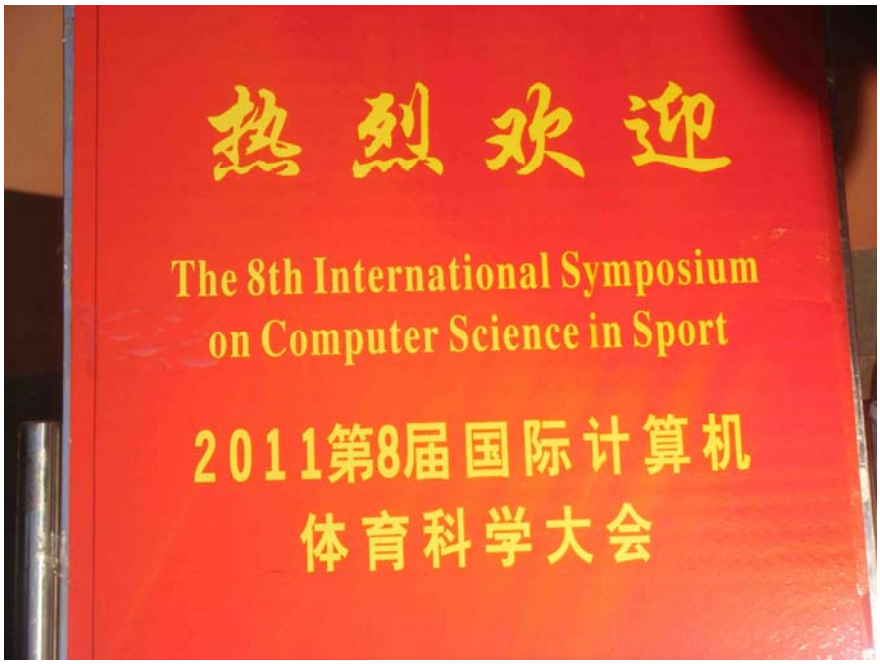
There were two strands in the Symposium's fifth and final session of oral presentations. Peter O'Donoghue was the chair of one session and Yicheng Xu was the chair of the other session. In Peter's session, papers were presented:

- Bahadorezza Ofoghi *Cycling*
- Minchao Zhang *Digital Campus*
- Chunyu Bao *Office Workers*
- Qiurong Wang *Multi-Agent System*
- Kiyoshi Osawa *Baseball*
- Yi Liu *Basketball*
- Franz Gravenhorst *Rowing*

In Yicheng Xu's session, the papers were:

- Rajesh Kumar *Athletics*
- Sheng-li Zhang *3D Animation*
- Ziwen Huo *Basketball*
- Yin-jiun Tseng *Table Tennis*
- Yo Dong *Flash Sports Library*
- Liaozhen Ning *Physical Testing*

Dario discussed science and technology in sport and rehabilitation. He outlined the potential of flow of ideas and practices between both fields of study. He noted the differences between sport and rehabilitation. He discussed the assumptions of both domains. Dario looked at sport performance technologies (note the 2002 summary of twenty years' development paper). He considered technological redundancy and pushing biological limits. Dario discussed rehabilitation technologies next and the little accidents that lead to rehabilitation. He noted the work of Jonas Zander (1883) and developments thereafter. He looked at the rationale for robotic training in rehabilitation (note Dario's 2006 review of rehabilitation technologies). He looked at VR approaches after cybertherapy and the potential of immersion in rehabilitation. Dario concluded his talk with the synergies between sport and rehabilitation technologies and presented work in progress with robot-based fitness training in the global community.



Closing Ceremony

Arnold Baca, President of IACSS, closed the Eighth International Symposium on Computer Science in Sport with a formal vote of thanks to Professor Hui Zhang and his organizing committee. Arnold noted how much the delegates had enjoyed visiting Shanghai and the Shanghai University of Sport. He congratulated Professor Zhang on the organization of the Symposium and for the kindness and generosity the delegates had received.
Arnold noted that the next Symposium would be held in Istanbul in 2013 and he looked forward to meeting colleagues at the Ninth Symposium.