

Newsletter

of the IFAC Technical Committee on Human-Machine-Systems

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From the Archive – Professor Gunnar Johannsen retired

Professor Gunnar Johannsen, who is an active member of our TC and the founder of the TC 4.5 HMS in September 1982, retired recently on March 31, 2006 after 24 years of being the head of the Systems Engineering and Human-Machine Systems department at the University of Kassel, Germany. Through his activities in the TC 4.5 HMS and in IFAC in general, it has been possible to strengthen the link between Human users and machine systems. He has compiled his experience with human machine systems in various literatures including a German book titled “Mensch-Maschine-Systeme” (Human-Machine-Systems). He also played a role in changing the name of the “Man-Machine-Interaction” discipline into “Human-Machine-Interaction”, which includes all human beings regardless of their gender.

He received many honours including the IEEE fellowship in 2001 and the Doctor honoris causa from the University of Valenciennes / France in 2005.

Dear Gunnar, on behalf of all TC 4.5 members, I would like to thank you for your pioneer work and outstanding contributions to IFAC.

I am sure that this is not the end of your engagement in HMS issues and I wish you and your wife a great time!

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Detlef Zuehlke

Chair IFAC TC 4.5 (HMS)

From the Chair – Announcing the next TC 4.5 Annual Meeting in Nancy

Following a long tradition, the next TC 4.5 meeting will be held in Nancy during the IFAC Symposium on Automated Systems Based on Human Skill And Knowledge, that will take place in **May, 22-24, 2006**.

One of the main topics of this meeting will be the input from our TC to the HMS-07 Symposium to be conducted in September next year in Seoul, Korea. This will be organized by our co-chairman Prof. Wan Chul Yoon.

I would also like to suggest that members prepare short reports of their activities in their respective countries. In this way, we will be able to learn from each other and hence be in position to tackle HMS challenges of today.

I hope to welcome many of you in Nancy!

While in Nancy, please remember to check the notice boards for the date, time and venue of the meeting.

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Detlef Zuehlke

Chair IFAC TC 4.5 (HMS)

From the Members – Discovery in Design: User-Centred Computational Conceptual Design Environments

Design is a key activity in human factors psychology, and more specifically, in human-machine interactions. The “Designing for the 21st Century Initiative” jointly funded by two UK Research Councils was established to support research that encourages and facilitates interaction between different design communities (see, www.design21.dundee.ac.uk/home.html). One of the associated clusters – Discovery in Design: User-centric computational issues (see, www.ip-cc.org.uk/did/index.html) – was concerned with identifying primary research agendas relating to the development of a user-centred, computational tool to assist conceptual design.

Computational, conceptual design

Current computer-aided-design (CAD) tools mainly support the well-defined stages of design where the product is physical, tangible and comprehensible. However, it is important that correct decisions are made as early as possible in the product life cycle (Li & Li, 2000). The early stages of conceptual design permit an evaluation of design alternatives thus enabling insight into the design problem (Espinosa, Salomone, & Iribarren, 2004) and will often determine the overall quality of the end-product: “a poorly conceived design concept can never be compensated for by a good detailed design” (Xu, Li, & Tang, 2005, p.2397). This process could be facilitated using a computational tool that provides the potential to integrate many sources of information (i.e. three dimensional virtual schemes, simulation, selective preferences, structural design, and detailed design) (Rui-qin & Hui-jun, 2005), and represent the problem accurately.

A good design *must* offer reasonable structure, appealing appearance, flexible operations, and innovativeness (Xu, Li, & Tang, 2005). However, current CAD systems have a number of shortcomings in terms of interface design, which affect human-machine interactions (see Zheng, Chan, & Gibson, 2001). Further, CAD is largely domain-specific, with little or no utilisation of cross-domain knowledge. As such, in order to facilitate the design of products befitting the demands of the 21st century, *a multidisciplinary, UCD approach is essential in developing generic computational systems to assist conceptual design.*

Discovery in design (DiD) cluster

The objective of the cluster was to identify likely requirements for a people-centred computational environment to support conceptual design. This was approached by gaining a

deeper understanding of two central issues: conceptual design and people-centred computational issues. Cluster delegates were drawn from academia and industry representing a wide range of cognitive disciplines, including: software engineering, civil engineering, social science, psychology, biotechnology and chemical engineering. The cluster's activities included a series of four workshops with presentations by invited speakers and delegates (for more details see the DiD website), which raised many issues that were addressed through round-table and break-out group activities.

As a result of these activities three key research areas were identified (in order of importance):

1. **Understanding the human.** This covers issues relating to all aspects of psychology that might be pertinent in the use of a computational tool in the design process.
2. **Search and Exploration.** This covers issues associated with how the search space is explored in order to facilitate innovative design
3. **Enabling Environment.** This refers to ways in which the design of the system interface can itself facilitate innovative design, simply by presenting information to the user(s) in a stimulating manner

Further discussion identified a number of more specific areas of possible research interest, including: capturing knowledge, visualisation, creativity, learning, modelling, representation, and (multi-)user support.

Conclusions

In developing potential research agendas, the DiD cluster adopted a multi-disciplinary, UCD approach. The utilisation of cross-disciplinary expertise enabled the development of a deeper understanding of the fundamentals of conceptual design and user-centred computational issues which proved very fruitful: a number of significant possibilities for cross-disciplinary synergies and technology transfers in computational tool support for conceptual design were identified. The novelty of this approach is that unlike other available computational tools to assist conceptual design that are task specific, the cluster has considered generic issues at all points in the proceedings. As such, the result(s) of future research based on the clusters outcomes have the potential for application to many disciplines ranging from software to drug design.

References

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Forthcoming events

- INCOM 2006: The 12th IFAC Symposium on Information Control Problems in Manufacturing
May 17 - 19, 2006, St. Etienne, France
<http://www.emse.fr/incom06/>
- The 9th Symposium on Automated Systems Based on Human Skill and Knowledge,
May 22 - 24, 2006, Nancy, France
<http://www.ensgsi.inpl-nancy.fr/ASBoHS06/>
- The 4th IFAC Symposium on Mechatronic Systems jointly with the celebration of the 50th
anniversary of IFAC
September 12 – 14, 2006, Heidelberg, Germany
<http://www.mechatronics2006.com/>

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Kizito Ssamula Mukasa

IFAC TC 4.5 (HMS) Editorial.

EDITORIALS

- You are always invited to contribute to the TC 4.5 Newsletter. As usual the main topic is "Human-Machine Systems" and other related topics/events in your field of research/work. Submission deadline for the next TC 4.5 is **May 31, 2006**. Please send your article as a MS Word Document to ifac_tc45@rhrk.uni-kl.de
- To subscribe to this Newsletter Service, send an email to sympa@uni-kl.de with the subject: **sub ifac_tc45**
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