

Cyberphysische Produkte und Produktionssysteme - eine Forschungsherausforderung

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Abstract

Der Einsatz moderner, intelligenter, proaktiver Informationstechnologie in der industriellen Produktion hat nicht nur effizienzoptimierter Produktionsprozesse und völlig neue Organisationsformen maschineller Fertigung ermöglicht, sondern ist auch ursächlich dafür, dass komplexe Prozesse in den Produktionsketten, komplexe Vernetzungen von Produktionsketten, Ressourcenallokationen in mehrstufigen Produktionsprozessen, oder die Implementierung komplexer Supply-Chains überhaupt erst beherrschbar wurden.

Immer mehr automatisierbare Aufgaben in der Produktion werden darüber hinaus von komplexen technischen Systemen übernommen. Die Kopplung physischer Systeme und realer Prozesse an ihre digitalen Datenrepräsentationen, und in der Folge die Steuerung und Kontrolle realer Produktionssysteme mittels globaler, weltumspannender Informations- und Kommunikationstechnologien definiert die Herausforderung sogenannter Cyber-Physischer Industrie-Systeme. Sie bestehen aus komplexen Sensorsystemen auf der Inputseite, hochkomplexen Informations- und Simulationssystemen, bzw. Kontroll- und Steuerungslogiken auf der Verarbeitungsseite, und dynamischen, multimodalen und oft nichtlinearen Aktuatorssystemen auf der Outputseite. Der Entwurf und Einsatz dieser cyberphysischen Systeme erfordert neue Planungsmethoden, Entwurfsprinzipien, Analyse- und Validierungswerkzeuge, Syntheseverfahren und Operationsprinzipien, und sind Kernherausforderungen einer modernen Produktionsforschung.

SHORT BIOGRAPHY ALOIS FERSCHA

Alois Ferscha was with the Department of Applied Computer Science at the University of Vienna at the levels of assistant and associate professor (1986-1999). In 2000 he joined the University of Linz as full professor where he heads the Excellence Initiative "Pervasive Computing", the department of Pervasive Computing, and the Research Studio Pervasive Computing Applications.

Currently he is focused on Pervasive and Ubiquitous Computing, Networked Embedded Systems, Embedded Software Systems, Wireless Communication, Multiuser Cooperation, Distributed Interaction and Distributed Interactive Simulation. He has lead international EU funded projects (EU FP7, FET: SAPERE, HC2, PANORAMA, SOCIONICAL, OPPORTUNITY; EU FP6, FET: BeyondTheHorizon, InterLink, CRUISE), but also national projects (DISPLAYS, SPECTACLES, PowerSaver, WirelessCampus, MobiLearn) research, and holds tight cooperation with industrial stakeholders (SIEMENS Project FACT, IBM Project VRIO). SPECTACLES (Autonomous Wearable Display Systems) in cooperation with Silhouette International, INSTAR (Information and Navigation Systems Through Augmented Reality) (2001-2003), Siemens München, AG, CT-SE-1, BISANTE, EU/IST, Broadband Integrated Satellite Network Traffic Evaluation (1999-2001), Peer-to-Peer Coordination (2001-), Siemens München, AG, CT-SE-2, Context Framework for Mobile User Applications (2001-), Siemens München, AG, CT-SE-2, WebWall, Communication via Public Community Displays, Connect Austria (2001-2002), VRIO, Virtual Reality I/O, with GUP JKU, IBM Upper Austria (2002-2003), MobiLearn, Computer Science Any-Time Any-Where, (2002-2004), Mobile Sports Community Services, (SMS Real Time Notification at Vienna City Marathon 1999, 2000, 2001, 2002; Berlin Marathon 2000, 2001, 2002), etc. Ferscha has published more than 150 technical papers on topics related to pervasive and distributed computing.

He has served on editorial boards of renowned international scientific journals (e.g. Pervasive and Mobile Computing (Elsevier), Transactions of the Society for Computer Simulation), on steering and programme committees of several conferences like PERVASIVE, UMBICOMP, ISWC, WWW, PADS, DIS-RT, SIGMETRICS, MASCOTS, MSWiM, MobiWac, TOOLS, Euro-Par, PNPM, ICS, etc. to name a few. His activities and recognition in the Pervasive Computing and Wearable Computing research communities is expressed by e.g. his chairing PERVASIVE 2004 (Programme Chair), and ISWC'09 (General Chair). In the parallel and distributed simulation community he e.g. served as the General Chair of the IEEE/ACM/SCS 11th Workshop on Parallel and Distributed Simulation (PADS'97), as Program Committee chair for the PADS'98, Program Chair for the Seventh International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS'99), the 12-th IEEE International Symposium on Distributed Simulation and Real Time Applications (DS-RT 2008), or the 13th International Symposium on Wearable Computers (2009) in Linz, Austria. He has been involved in the program committees of the major related research and FET conferences /e.g. FET11 in Budapest), and chairing DOA-SVI 12.

Alois Ferscha is an active consultant to the IST FET group within the Commission of the European Communities, Information Society and Media Directorate-General, and to the Austrian bm-wf and bm-vit. He is Austria's representative in IFIP TC-10 (International Federation for Information Processing, TC10 - Computer Systems Technology).

As an invited researcher or guest professor he was visiting the Dipartimento di Informatica, Università di Torino, Italy, at the Dipartimento di Informatica, Università di Genova, Italy, at the Computer Science Department, University of Maryland at College Park, College Park, Maryland, U.S.A., and at the Department of Computer and Information Sciences, University of Oregon, Eugene, Oregon, U.S.A.

Alois Ferscha is member of the OCG, GI, ACM, IEEE and holds the Heinz-Zemanek Award for distinguished contributions in computer science, the Cross Border Award 2009, the "Innovationspreis 2009" and the "Innovationspreis" of the "Multimedia Staatspreis 2011".