Plenary talker:

Professor
Shigeo Hirose

PT1 From dream to reality:
Snake-like, spider-like robots

Shigeo Hirose

(Tokyo Institute of Technology, Japan)

Mother Nature is precious source of imagination to develop new type of robotic system. I will introduce the history of designing a series of snake-like robots, and discuss the design and control of amphibious snake-like robot ACM R-5 and rescue robot Souryu which can crawl into the debris after a big earthquake occurred. I also talk about spider-like walking robots, such as wheel-walking hybrid vehicle Roller Walker, quadruped wall-climbing robot Ninja, and 7 ton world largest walking robot for steep slope construction task.

Education:
- In 1971, B.E. degree in Mechanical Engineering from Yokohama National University, Japan
- In 1973, Master Degree from Dept of Control Engineering at Tokyo Institute of Technology, Japan
- In 1976, Doctor Degree from Dept of Control Engineering at Tokyo, Institute of Technology, Japan

Professional Training and Employment:
- 1976 – 1979 Research Associate, Tokyo Institute of Technology
- 1979 - 1992 Associate Professor, Tokyo Institute of Technology
- 1992 - Professor, Dept of Mechanical and Aerospace Engineering, Tokyo Institute of Technology

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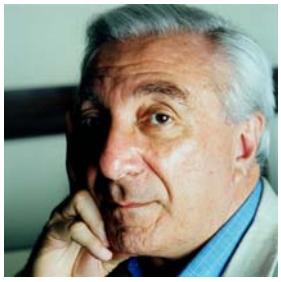
PT2 Extreme events in human society: The xevents observatory and simulator



Professor
John L. Casti

John L. Casti

(International Institute for Applied Systems Analysis, Austria)

In this plenary talk, I discuss extreme events (Xevents) created by humans, not nature. These include things like terrorist attacks, pandemics, political revolutions and financial system meltdowns. The talk explores the types of methodological tools needed to develop early-warning signals for such events—and what to do with such signals once they are obtained. We also present the outlines for a new research venture at IIASA, involving an Xevents "observatory" for development of methodology and an Xevents "simulator" to serve as a laboratory for both testing of tools, as well as identification of Xevents that have never before occurred.

Education:
- In 1969, M.S. degree in Mathematics from the University of Southern California, Los Angeles
- In 1970, Ph.D. Mathematics from the University of Southern California, Los Angeles

Professional Training and Employment:
- 1974--present, Research Scholar, Int'l Institute for Applied Systems Analysis, Vienna
- 1992-2002, Professor, Santa Fe Institute, Santa Fe, USA
- 2002-2005, Professor, Wissenschaftzentrum Wien, Vienna
- 2005-present, Director, The Kenos Circle, Vienna

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PT3 Robomusic with modular playware

Kasper Falkenberg, Niels K. Bærendsen, Jacob Nielsen,
Carsten Jessen, Henlik Hautop Lund

(Technical University of Denmark, Denmark)

Professor
Henrik Hautop Lund

Playware is intelligent hardware and software that creates play and playful experiences for users of all ages. Playware research seeks to understand play dynamics and play forces in order to implement them in play tools. Playware is of course not the only type of products which can create play and motivate users to perform actions, but digital technology contains new and expanded possibilities, e.g. when developed with embodied artificial intelligence. Playware-tools are tools with a behaviour that initiates play force (e.g. a motion, in the case of sensorimotor play) via interaction. This is the basis for the play dynamic to emerge through which the users are brought into a state of playing. Embodied artificial intelligence can be used to design behaviours of the play tools, e.g. by providing means for creating adaptive play tools. The understanding of play dynamics can help guiding this design of behaviours to be used specifically to create playful and motivating tools for a variety of play interactions, well-knowing that there are both similarities and differences in the play dynamics of different users, environments and activities. Using a modular approach inspired by behavior-based robotics gives opportunity to create modular playware that allows any user to create activities in a flexible manner, regardless of the cognitive and physical abilities of the user. Indeed, the modular approach allows a generalization over users, environments and activities as well as a commercial possibility of mass-production for customization. For Human-Robot Interaction, when considering a modular approach, we are often interested in the interactivity and the opportunities for the human interaction, so instead of developing self-reconfigurable modular robotics, we may describe the above systems in terms of user-configurable modular robotics. In this talk, I will show numerous, specific examples of how such an approach of modular playware (in the form of modular interactive tiles and cubes) facilitates generalization over users, environments and activities in the fields of playgrounds, cardiac rehabilitation, stroke rehabilitation, elderly home care, autism therapy, dementia treatment, soccer training, dancing, music concerts, etc., and how the playful approach provides motivation for users to interact with the modular technological solutions in these fields. Videos will feature use in rehab, play, sport, music, and dance.

Education:
- M.Sc. degree in Computer Science from University of Aarhus, Denmark
- Ph.D. degree in Computer Systems Engineering from University of Southern Denmark

Professional Training and Employment:
- 1992-1993 and 1994-1995, Research Assistant, the National Research Council, Rome, Italy, University of
- 1996-1997, Research Associate (Post Doctor), Department of Artificial Intelligence, Edinburgh, UK
- 1997-2000, Head of LEGO Lab
- 1998-2000, Research Associate, Department of Computer Science, University of Aarhus, Denmark
- 2000-2008, Full Professor, the Maersk Mc-Kinney Moeller Institute, University of Southern Denmark
- 2003-2007, Member of the Danish Research Council
- 2008-present, Full Professor, the Center for Playware, Technical University of Denmark

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