

Playware - Creating Playful Interaction with Modular Technology (Invited Speaker)

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I. ABSTRACT

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.

II. BIOGRAPHY

Henrik Hautop Lund is head of the Center for Playware at Technical University of Denmark (DTU Elektro). His interdisciplinary research center comprises staff in the fields of engineering, humanities, arts, and music. Professor Henrik Hautop Lund is known world-wide for his work in bringing robotics to use in novel ways. His approach is to combine modular robotics and modern artificial intelligence to create novel solutions to problems that occupy the citizens of the World, e.g. obesity, rehabilitation, and 3rd World development. He has recently founded the Center for Playware to focus even further on how playful aspects of robotics may provide motivation for any citizen to perform different kinds of interaction with the robots of our future daily life. He chaired the Robots at Play festivals in the open city areas where researchers, artists, entertainers, and citizens meet through playful hands-on experience with robotics in the daily life of the citizens. In all cases, Lund has shown how the combination of a modern artificial intelligence, modular robotics and entertainment may provide novel opportunities in play, rehabilitation, sport, music, teaching, third World development, etc., by trying to allow non-expert users easy access to the technology in a playful and motivating way. Professor Henrik Hautop Lund has published more than 125 scientific articles in the field of robotics, he has been a member of the Danish Research Council, and he has been invited to present his robotic work in numerous occasions, for instance for the Emperor of Japan at Akasaka Palace in Tokyo. He founded and headed the LEGO Lab in 1997-2000. He invented the RoboCup Junior robot football game for children, and his Adaptronics group won the RoboCup Humanoids Free Style World Championship 2002. Further, he developed the RoboMusic in collaboration with World Music Award winner, remix musician Funkstar De Luxe. Professor Lund's work has received world-wide interest from news media such as CNN, WIRED, etc. and he was nominated for the award for the best entertainment robots and systems research at IROS. He has led numerous research projects and projects involving collaboration between academic institutions and private companies. He founded RoboCluster, an industrial network and interest organisation for the robotics industry comprising more than 100 industrial interested parties in Denmark. Henrik Hautop Lund is director of the spin-off company Entertainment Robotics.

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