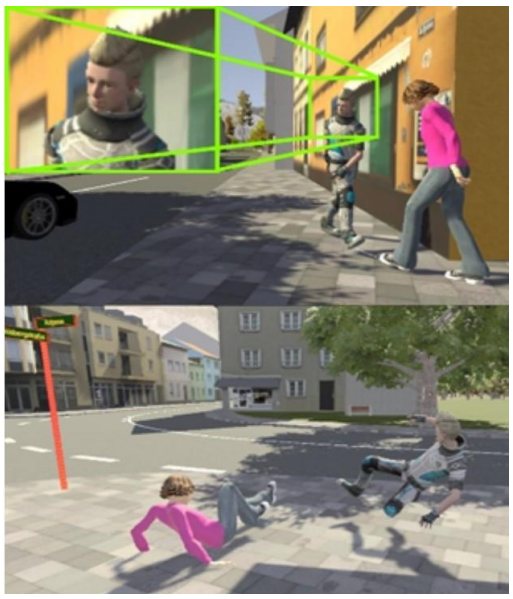
COGNITIVE AGENTS IN VIRTUAL REALITY AND GAMING ENVIRONMENTS

PROF. RAINER HERPERS, BONN-RHEIN-SIEG UNIVERSITY.



Dr. Rainer Herpers is a Full Professor in Computer Science at Bonn-Rhein-Sieg University of Applied Sciences, Germany. Since 2011 he serves as Founding Director of the Graduate Institute and as Co-Director of the Institute of Visual Computing. His research interests span the following areas: Image Processing, Computer Vision and Computer Graphics with emphasis on Virtual Environments and Virtual Reality, Medical Informatics. He acted as grant holder in numerous research and development projects. His most recent research is in the field of cognitive and perceptive agent technology. Currently he is spending his sabbatical at UNB in Fredericton.

ABSTRACT: In most virtual reality simulations (VR) scenarios presented are no longer static but rather animated. The active entities in VR environments, called "agents", move around and interfere with the user. Current approaches for creating these agents leads to predictable but often unnatural behavior in the agents. For agents to behave more realistically, the agent's behavior should reflect the abilities and limitations of actual human beings. A noteworthy example of this concept is in traffic simulations. Although the behavior of all traffic participants is supposed to be predictable and follow well-established rules, real humans tend to take risks and, therefore, might violate these rules from time to time – especially if they find that the risks are considered acceptable under certain conditions. This will result in behavior changes that result from breaking the rules, which is not randomized but based on an underlying individual risk taking strategy.

In the presentation a framework is introduced that allows for modelling these sometimes dynamically changing conditions and constraints so that cognitive agents are able to develop individual characters. A traffic simulation framework has been developed which shows more realistic behavior in its agents and can therefore overcome some known shortcomings of existing approaches (e.g., the 4-way stop-sign dilemma). Moreover, the virtual perception of human-like virtual agents is introduced. The limitations of humans or better sub-optimal behavior often originate from sensor data limitations, e.g. missing visual information (e.g. fog, darkness or amblyopia) or others (alcohol). Moreover, a virtual attention strategy has been realized that is integrated into the cognitive agent framework. In this way, the framework is able to model and compute sub-optimal, but more realistic, agent behavior by using impaired sensory information.

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BUILDING Oland Hall G31
TIME 3:00 p.m.

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