Keynote Speaker:

Computational Deception and Non-Cooperative Behavior

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Short Biography:
Anton Nijholt received his MSc in Mathematics and Computer Science from Delft University of Technology and his PhD in Computer Science from the Vrije Universiteit Amsterdam. He has held positions at various universities in Canada, Belgium and the Netherlands. Since 1989, he has been a Full Professor of Computer Science at the University of Twente (Enschede, The Netherlands). He is now a member of the Human Media Interaction research group at the Department of Computer Science of the University of Twente. His current research interests include multimodal interaction, affective computing, entertainment computing and brain-computer interfacing (BCI). Nijholt is (co-)author of many journal and workshop papers on these topics. He is editor of some book series and books and he has been guest-editor of special issues of journals. In recent years he chaired some large conferences on affective computing and entertainment computing. Homepage: http://wwwhome.ewi.utwente.nl/~anijholt/

Abstract:
Deception is not a new issue in computer science or in human-computer interaction. In fact, the Turing Test is about deception. It works both ways. The computer tries to hide not being human, its human conversational partner attempts to detect and exploit weak parts of the computer’s intelligence by trying to mislead the computer with ‘trick’ questions and he or she is certainly not cooperative.

Human-computer Interaction is an area of computer science that is interested in how humans interact with computers and that looks at new interaction technology that allows more efficient, or more convenient, or more entertaining interactions with computers. New interaction technology makes use of all kinds of sensors and rather than being attached to a personal computer these sensors are disappearing in the environment, into walls, furniture, clothes, toys, personal mobile devices, and mobile devices in the environment, such as, for example, social robots that help human inhabitants of these sensor-equipped environments. Hence, human-computer interaction has become human-media or human environment interaction, where the environment is there to support a human inhabitant in his or her activities. Providing the best possible support requires understanding and anticipating natural human behavior and not just the explicit commands that are issued in order to get a certain task done. When multiple users inhabit the environment, it requires understanding of human-human or multi-party interaction. Members in such a party can also be social robots or autonomous agents that can sometimes take the form of virtual humans that display verbal and nonverbal behavior. In such an environment, looking at natural interaction behavior will then include looking at non-cooperative and misleading behavior and deciding how to deal with it. Obviously, this is particularly true if we have to understand human-human interaction in such environments and if we try to model natural interaction between a human and a social robot or a virtual human. But, of course, there are many more situations, and in particular applications where we are interested in trying to understand, model and design and display misleading and non-cooperative behavior. In a mixed reality training and simulation environment equipped with cameras, microphones, position sensors and maybe also sensors that gather physiological information from a trainee, we may want to enter misleading information, enable miscommunication and include non-cooperating behavior of virtual agents in order to make it more realistic [1]. In a sports simulation environment we may want to train a player on misleading actions (feints) of a virtual opponent, or the other way around, try to mislead the virtual opponent [2]. In a more traditional educational environment a virtual teacher can express disappointment or satisfaction at moments when there is a need to stimulate a student, while these are not necessarily the emotions felt by the teacher [3]. Therapy robots for the treatment of autism [4] have been
introduced. Such tools for the development of social interaction skills need to know about desired behavior as well as undesired behavior. In multi-agent negotiation systems we can send our agent away to negotiate, and, by definition of negotiation, the agent should not start negotiating by revealing his strategy and what his final offer will be. That has to be kept secret. Agents in simulation and negotiation situations can have secrets. And virtual humans or socially intelligent robots that act in social situations will have to be careful in revealing information from their interaction partners in order to gain and maintain their trust. Many applications requiring knowledge about possible ways of deceiving are related to safety, security, and warfare. Speech and text analysis are used to detect deception in speech and text. Cameras, microphones, physiological sensors and intelligent software can help to detect behavioral cues that identify misleading and suspicious activity in public spaces [5]. Models of deception and non-cooperation can help to make a virtual or mixed reality training environment more realistic, improve immersion and therefore make it more suitable for training of military or security personnel. In serious applications we can also have robots that operate in environments where they have to perform military activity, including misleading of the enemy (maybe enemy robots) or where they are involved in rescue operations. In this latter situation, not telling the truth may help to prevent a panic situation that would lead to more victims than there are already [6]. Finally, in digital games and entertainment applications deception is natural, whether it is in chess or in a role playing video game. In particular when agents in game and entertainment situations become more intelligent, more autonomous and more emotional, misleading the opponent becomes part of the game.

In this talk we survey applications where deception is natural and we mention the technology and the developments in technology that make these applications possible [7].

Reference:


