

JNRR'09 - Session : Interaction cognitive

Interaction cognitive : de l'interaction entre les humains à l'interaction avec les robots

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Résumé :

Cet exposé a pour but de présenter les éléments essentiels pour la compréhension et l'analyse de l'interaction cognitive entre les humains sans toutefois avoir la prétention de proposer des définitions univoques. On s'intéressera, notamment, aux signaux d'interaction pour la communication verbale et non verbale, d'émotions, d'intentions... ainsi que pour la régulation de l'interaction. Nous présenterons des études montrant l'importance de ces signaux dans l'interaction face-à-face. Ensuite, nous montrerons comment ces signaux sont exploités et analysés en robotique. Ces méthodologies font appels à des domaines très variés couvrant le traitement du signal, la reconnaissance des formes ou bien encore l'intelligence artificielle. Cet exposé se propose également de pointer les challenges ainsi que les limitations des méthodologies et applications en interaction cognitive.

Biographie :

Dr. Mohamed CHETOUANI received the M.S. degree in Robotics and Intelligent Systems from the University Pierre and Marie Curie (UPMC), Paris, 2001. He received the PhD degree in Speech Signal Processing from the same university in 2004. In 2005, he was an invited Visiting Research Fellow at the Department of Computer Science and Mathematics of the University of Stirling (UK). Dr. Chetouani was also an invited researcher at the Signal Processing Group of Escola Universitaria Politecnica de Mataro, Barcelona (Spain). He is currently an Associate Professor in Signal Processing and Pattern Recognition at the University Pierre et Marie Curie. His research activities, carried out at the Institute of Intelligent Systems and Robotics, cover the areas of non-linear signal processing, feature extraction, pattern classification and fusion for human centered interaction analysis: verbal and non-verbal communication, physiological signals. He is member of the Management Committee for the COST action 2102: "Cross-Modal Analysis of Verbal and Non-verbal Communication". He is an Associate Editor of the Cognitive Computation Journal (Springer) and a Guest Editor for a Special Issue in Speech Communication on "Non-Linear and Non-Conventional Speech Processing". He was the Chairman of the ISCA Tutorial and Research Workshop on Non-Linear Speech Processing in 2007. He is also the co-chairman of the French Working Group on Human-Robots/Systems Interaction (GDR Robotique CNRS). In 2008, he led the project titled: Multi-Modal Communication with Virtual Agents and Robots for the 4th international summer workshop on Multi-Modal Interfaces (eNTERFACE'08).

Neuroscience contributions to human-robot cooperation

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Abstract :

Cooperation is one of the highlights of human cognition. True cooperation requires the ability to understand and share the goals of another individual and to create and share a coordinated plan of action to achieve the common goal. This places strong requirements on perceptual and cognitive functions. In this context we can consider that human beings are the ultimate example of cooperative agents. We can thus adopt the strategy of understanding human cooperation both from the perspective of behaviour, and in terms of the underlying neurophysiology.

Keywords – sensory motor systems, human-robot cooperation, language

"Assistive Robotics for Customized Cognitive Stimulation and Physical Rehabilitation"

Adriana Tapus

UEI – ENSTA, 32, bvd Victor, Paris.

Résumé :

In this talk, I present an online adaptation approach and a long-term learning approach for socially assistive robotic (SAR) systems that aim to provide customized help protocols through motivation, encouragements, and companionship to users suffering from physical and/or cognitive changes related to stroke, aging and Alzheimer's disease. The role of the robot's personality in the hands-off therapy process designed for stroke, focusing on the relationship between the level of extroversion-introversion of the robot and the user is also investigated. Moreover, a 8-month pilot study with people suffering from cognitive changes related to aging and/or Alzheimer's disease depict a more efficient, natural, and preferred interaction with the robot rather than with the simulated robot.

Biographie :

Dr. Adriana Tapus is an Assistant Professor at Ecole Nationale Supérieure des Techniques Avancées (ENSTA-ParisTech). She was previously a research associate at University of Southern California (USC, USA) in the Interaction Lab/ Robotics Research Lab, Computer Science Department. Her current research mainly focuses on socially assistive robotics for post-stroke patients and people suffering from cognitive impairment and/or Alzheimer's disease. She received her Ph.D. in Computer Science from Swiss Federal Institute of Technology, Lausanne (EPFL) in 2005, her M.S. in Computer Science from University Joseph Fourier, Grenoble, France in 2002 and her degree of Engineer in Computer Science and Engineering from Politehnica University of Bucharest, Romania in 2001. Her current research interests include socially assistive robotics, human-robot interaction, humanoid robotics, machine learning, and computer vision. Most of her publication and research details can be found at: <http://www.ensta.fr/~tapus>.