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ISIAA 2017: 1st International Workshop on Investigating Social Interactions with Artificial Agents (Workshop Summary)

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Abstract

The workshop “Investigating Social Interactions With Artificial Agents” organized within the “International Conference on Multimodal Interactions 2017” attempts to bring together researchers from different fields sharing a similar interest in human interactions with other agents. If interdisciplinarity is necessary to address the question of the “Turing Test”, namely “can an artificial conversational artificial agent be perceived as human”, it is also a very promising new way to investigate social interactions in the first place. Biology is represented by social cognitive neuroscience, aiming to describe the physiology of human social behaviors. Linguistics, from humanities, attempts to characterize a specifically human behavior and language. Social Signal Processing is a recent approach to analyze automatically, using advanced Information Technologies, the behaviors pertaining to natural human interactions. Finally, from Artificial Intelligence, the development of artificial agents, conversational and/or embodied, onscreen or physically attempts to recreate non-human socially interactive agents for a multitude of applications.

CCS CONCEPTS

- **Computer systems organization** → Robotics
- **Human-centered computing** → **Human computer interaction (HCI)** → **Interaction paradigms** → Natural language interfaces

KEYWORDS

Artificial agents, Robotics, Conversational Systems, Language, Cognitive sciences, Neurosciences, Social Signal Processing

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1 INTRODUCTION

There is a growing need for understanding the changes caused by social interactions in realistic settings, from pairs to large groups and crowds at the behavioral, neural and physiological levels. Based on this, this workshop seeks to review how new technologies for interacting artificial agents can be and are being used to increase our knowledge of deeper social interaction involving, for instance, emotion, and factors of embodiment and cognition. Realistic interaction contexts require new experimental tools and paradigms, combining social sciences and humanities with neuroscience, engineering and computing. This is necessary to ground future social media with the aim of improving social engagement, mutual understanding, collaboration, cognitive resonance, with outputs in entertainment, training and wellbeing, among others.

The aim of the workshop is to bring together an interdisciplinary group of experts in three complementary fields. In neuroscience, investigating natural social interactions with modern neuroimaging techniques is the new frontier that must be reached to truly understand the neural specificities of normal as well as pathological human behaviors. From humanities, the core of research in linguistics and social sciences has been to investigate the behavioral and cognitive underpinnings of natural social interactions through spoken and written language. Computer Science has made tremendous progress in the extraction of social signal from multimodal data, including audio and video recordings of natural interactions. In addition, Computer Science allows us to close the loop, by providing controllable artificial agents – such as computer animated agents or humanoid robots – that can be used as benchmarks to

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test hypotheses about behaviours influencing the social competence of an agent.

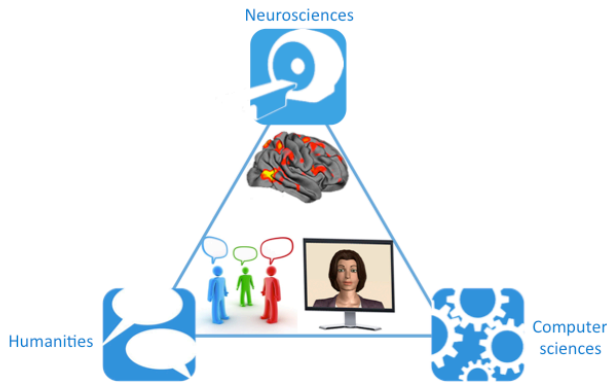


Figure 1: A graphical representation of the three domains of science involved in the proposed interdisciplinary approach.

2 A GLOBAL OBJECTIVE, FOUR DISCIPLINES

The workshop plan has been organized around the interventions of 2-3 colleagues in each of the following 4 disciplines:

- o Neuroscience of social cognition (chair T. Chaminade).
 - Thierry Chaminade, Institut de Neurosciences de la Timone, CNRS - Aix-Marseille Université;
 - Marc Cavazza, Intelligent Virtual Environment, University of Kent;
 - Agnieszka Wykowska, Instituto Italiano di Tecnologia.

This session has introduced how artificial agents, and in particular humanoid robots, have been used to investigate mechanisms involved in human social cognition, in particular addressing the issue of whether humans adopt an intentional stance when interacting with artificial agents [1]. Also advanced brain-computer interfacing that can be used for online control of artificial agents pave the way in that direction [2].

- o Automatic analysis of social signals (chair M. Ochs).
 - Alessandro Vinciarelli, School of Computing Science, University of Glasgow;
 - Louis-Philippe Morency, School of Computer Science, Carnegie Mellon University.

This session was devoted to the description of Social Signal Processing, defined as the automatic extraction by computing systems of social signals displayed by a human in their everyday life and, in particular, in their interactions, such as emotions displayed by the face, the direction of gaze or the distance between two interacting people [3]. Social Signal Processing approach is central to the ideas defended in this workshop, and is located at the interface between Computer Science and experimental psychology.

- o Endowing artificial agents with spoken language skills (chair N. Nguyen).
 - Philippe Blache, Laboratoire Parole et Langage, CNRS - Aix-Marseille Université;
 - Matthew Aylett, School of Informatics, University of Edinburgh.

This session was primarily focused on human natural language, and emphasizes the links between the analysis of natural language and the generation of artificial language, with the presentation of an application for training doctors to break bad news [4].

- o Control of social artificial agents (chair F. Lefèvre).
 - Catherine Pelachaud, Institut des Systèmes Intelligents et de Robotique, Université Pierre et Marie Curie
 - Louisa Pragst, Institute of Communications Engineering, Ulm University;
 - Fabrice Lefèvre, Laboratoire d'Informatique d'Avignon, Université d'Avignon.

In this session, the latest findings in communicating artificial agents' development are reviewed with a particular focus on their social capacities. The importance and influence of laughter and smiles in an avatar setup are discussed in the context of an intelligent expression of emotions scheme [5]. Likewise, cultural adaptation of an information retrieval platform to relieve difficulties of migrants in accessing health information is a good illustration of an endeavor to develop new socially-inspired systems in complex domains [6]. Finally, online training of interactive systems should improve their adaptation process and favor their use in human science experimental protocols to study human social interactions in light of observations from human-computer interactions with socially-able artificial agents [7].

3 CONCLUSIONS

Altogether, efforts must be – and are being – made to boost this triadic interaction between Computer Science, Humanities and Biology. The aim of this workshop is to illustrate, with past and ongoing projects, the fruits that such endeavors can bear. In addition to boosting existing interactions, the objective of the workshop remains to promote a larger community of researchers endorsing this approach in the future.

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