

5-month Internship on :

Leadership Strategies in an Embodied Conversational Agent for the Development of Group's Transactive Memory System

Description

An intern position is now available at LTCI, Télécom Paris, Institut Polytechnique de Paris and LIMSI-CNRS, Paris-Sud University.

Topic

Human-Agent Interaction for Groups' Analysis

Supervisors

Prof. Giovanna Varni (LTCI)

Prof. Brian Ravenet (LIMSI)

Post-doc Beatrice Biancardi (LTCI)

Prof. Jean-Claude Martin (LIMSI)

Framework

To date, researchers in affective computing either have not addressed the study of group dynamics as a factor triggering emerging states. Emerging states are characteristics of the group that evolve over time as group members interact explicitly and implicitly to coordinate their actions and achieve their objectives [1].

One of these emerging states is the Transactive Memory System (TMS) [2], which describes the cooperative division of work that allows a group to learn, remember and communicate the team's knowledge. TMS allows group members to develop a representation of the distribution of knowledge among them ("who knows what").

In Social and Psychological Sciences, many researchers have studied the development and dynamics of TMS in groups [e.g., 3]. For example, Bachrach and colleagues have studied the role of leadership strategies. Their analyses show that 2 types of leadership are positively associated with the development of TMS: transformational leadership (TFL) and transactional leadership (TAL) [4]. TAL is a leadership style that uses rewards and punishments to motivate followers; in TFL the leader uses her charisma and enthusiasm to inspire followers [5].

Behavioural dynamics (non-verbal behaviours) are also an important characteristic in a group. Group members adhere to specific social norms which govern, for example their distance and body orientation, in order to coordinate and facilitate the interaction between them [e.g., 6]. We are currently studying which non-verbal behaviours reflect the level of TMS in a group and can therefore predict its performance.

Group dynamics and performance can also be influenced by the presence of an embodied conversational agent (ECA) within the group. For example, some research has shown that human members of a group prefer to look at the agent more than at the other humans [7]. Adamson and colleagues showed the positive influence of a conversational agent on the learning rate and knowledge exchange within groups [8]. Group learning is also facilitated by positive feedback from a conversational agent [9].

However, no research has been conducted to determine whether (and how) TMS can be affected by ECAs. In addition, in the works about leadership in human-agent interaction, ECAs mainly play the role of followers [10].

This internship aims to address and bring together these 2 issues, by studying the effects of a "leader" ECA, using a TAL or a TFL leadership style, on the development of a group's TMS.

Research Questions

Through this project, we will focus on the following research questions:

- To what extent does a leader ECA influence the development of a transactive memory system in a small group?
- To what extent does the role of the ECA impact the non-verbal dynamics of the group members (in terms of interpersonal distances, f-formation, speaking turns, etc...)?
- Is there a difference between the TAL and TFL strategy in terms of impact on TMS and/or non-verbal dynamics of groups?

The data from the behavioural experience will be used for statistical analyses to answer our questions. The results will help to better understand how people interact with an ECA and how group behavioural dynamics can be influenced by an ECA.

Role

The intern's tasks include but are not limited to:

- A quick review of the literature on social groups and transactive memory system;
- Getting started with the MARC platform [11] to generate an embodied conversational agent;
- Review of the literature on leadership and definition of the ECA's behaviours to perform the different leadership strategies;
- Implementation of the behaviors in the ECA and development of a Wizard of Oz platform to perform the interaction with the group;
- Collaboration in the design and implementation of the behavioural experience;
- Data analysis.

Candidate profile

The ideal candidate should have a strong background on Computer Science, AI, Information Technology, HCI or closely related fields. The following skills are also expected:

- Good command of English (written and spoken). French language is not a mandatory requirement;
- Interest in multidisciplinary research at the interface between Computer Science and Sociology/Psychology;
- Strong programming skills in JAVA;
- Basics on experimental research design (independent variables, dependent variables, hypothesis testing) and data analysis (R or Python);
- Very good communication skills, commitment, independent working style as well as initiative and team spirit.

Offer

Starting date: Avril 2020.

Salary

Full-time intern fellowship according to the Télécom Paris salary scale.

Application deadline

The evaluation of the candidates starts immediately and it will continue until the position is filled.

Application

To apply please send by email to: giovanna.varni@telecom-paris.fr, beatrice.biancardi@telecom-paris.fr and brian.ravenet@limsi.fr in a single pdf file:

- A cover letter stating your research interests and how they could be related to the research topic the internship focuses on;
- A detailed CV;
- Transcripts of student records of your last year.

For any additional questions about the position, please contact Prof. Giovanna Varni and Beatrice Biancardi. Please quote "Intern position" in the email subject for both asking information and application.

References

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- [10] Demary, G., Martin, J.-C., Dubourdieu, S., Travers, S., Demulier, V. (2019) How do Leaders Perceive Stress and Followership from Nonverbal Behaviors Displayed by Virtual Followers? *Proceedings of the 19th ACM International Conference on Intelligent Virtual Agents (IVA'2019)*, Paris, France, pp 56-61
- [11] Courgeon, M., Clavel, C., Martin, J.-C. (2014) Modeling Facial Signs of Appraisal During Interaction; Impact on Users' Perception and Behavior. *Proceedings of the 13th International Conference on Autonomous Agents and Multiagent Systems (AAMAS'2014)*, Paris, France.