Internship Proposal

"Understanding In-Group and Out-Group Dynamics: Virtual Agents as Coaches for Eating Behavior Change"

6 months, starting March-April 2025

Supervisors

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Scientific context

Unlike traditional text-based conversational agents, SIAs (Socially Intelligent Agents) combine perceptive capabilities, embodiment and advanced AI (e.g., GPT-4) that enable them to simulate human-like interactions. The literature increasingly examines SIA relationships, exploring various facets, including the impact of anthropomorphism, dialogue, and non-verbal cues on user reactions, such as attachment and satisfaction (Pentina et al., 2023; Uysal et al., 2022). Previous studies demonstrate AI's capability to influence decisions and behavior, particularly when tailored messages align with user personality traits (Matz et al., 2024).

Research on homophily (McPherson et al., 2001) and social identity theory (Tajfel & Turner, 2004) indicates that similarity enhances rapport and compliance. This extends to human-agent interactions, fostering positive perceptions and behaviors (Liao & He, 2020; Rosenthal et al., 2019). Similarity may arise from factors such as age, gender, cultural, ethnic, or social affiliation, etc. It is encompassed within the concepts of in-group and out-group, derived from Social Identity Theory (Turner, 2010), which posits that individuals categorize others into social groups to which they belong (in-group) or do not belong (out-group), thereby influencing their behaviors and judgments. Research indicates that in-group and out-group cues play a significant role in shaping interactions between humans and machines (de Melo et al., 2014; Obremski et al., 2023). In-group cues, such as shared group membership or personalized features, foster trust, engagement, and positive evaluations of machines (Eyssel et al., 2011). Conversely, out-group associations often invoke skepticism or reduced interaction quality (Kuchenbrandt et al., 2013). Studies show that subtle identity cues like language, voice, or appearance can influence perceptions of robots and AI agents, aligning with social categorization theories (Hammes et al., 2023). Moreover, cultural and contextual factors impact the salience of these cues, suggesting variability in their effects across environments (Obremski et al., 2023). Emerging findings suggest that leveraging in-group cues in design could enhance human-machine collaboration and acceptance (Lee & Nass, 2002).

The question of biases such as in-group favoritism and out-group bias, which are well-established in human-human interaction literature (Hogg & Turner, 1987), remains underexplored in the context of human-SIA interaction. Understanding these biases is crucial for identifying limitations in AI's persuasive capabilities, especially when agents are perceived as out-group members. Also, the interplay between embodiment and in-group/out-group dynamics has not been examined, leaving a gap in understanding how AI embodiment influences trust, compliance, and engagement. Ultimately, prior research has not investigated whether users' behavioral responses (e.g., healthy decision-making) and cognitive evaluations (e.g., agent trustworthiness) vary based on perceived group membership. Addressing this gap could clarify how social identity affects the success of AI in domains like health communication.

This project will pay special attention to the area of **nutrition** which is of critical importance in light of the global increase in obesity, diabetes, and other diet-related health issues. The context of health professionals' scarcities and a drop in purchasing power, has laid the ground for the emergence of digital nutritional tools (mainly text-based chatbots embedded in apps). Characterized by their 24/7 availability, personalization and daily support, they represent a promising path to induce behavioral changes in users (Oliveira et al., 2021). Existing solutions have not consistently resulted in healthier eating habits. This highlights the need for alternative approaches that harness the power of AI to encourage individuals to adopt healthy diets. In this context, **the project aims at developing and testing virtual SIA coach on eating habits change**.

This internship project is conducted within the context of two individuals who collaboratively aim to modify their dietary habits (referred to as *buddies*). To achieve this objective, they interact with an SIA functioning as a nutritional coach**. The study seeks to elucidate how the in-group or out-group characteristics exhibited by an ASI influence trust, commitment, well-being, and collaboration between a pair of human subjects, ultimately leading to behavioral change**. Previous research has demonstrated that self-important buddies can impact individual weight management efforts (Dailey et al., 2018), indicating that superior outcomes are achieved when two closely associated individuals share a common goal and endeavor to attain it through mutual support. This effect remains to be empirically verified in interactions with an SIA...

Research questions

- What are in-group and out-group dynamics, and what cues indicate these distinctions?
- How can the concepts of in-group and out-group be integrated into the design of a Socially Interactive Agent (SIA)?
- Can humans recognize in-group or out-group traits in an SIA? How does perceived group membership (in-group vs. out-group) influence their evaluation of the SIA?
- Does aligning an SIA with in-group characteristics enhance user experience, engagement, adherence to recommendations, or intention to continue using it compared to out-group agents?
- What impact does this have on human collaboration with SIAs?

Internship assignments

- Conduct a literature review
- Develop research questions and hypotheses.
- Offer detailed recommendations for designing Socially Interactive Agents (SIAs), specifically addressing the integration and representation of in-group and out-group characteristics.
- Effectively communicate results to various audiences
- Contribute to the preparation of a manuscript or presentation summarizing key findings for submission to a relevant conference.

Learning Outcomes

- Deepen theoretical understanding of embodied cognition, social identity, influence and collaboration
- Become more knowledgeable about embodied virtual agents (SIA)
- Gain experience in conducting interdisciplinary research at the nexus of computer science, artificial intelligence, and social sciences.

Expected Deliverables

- A comprehensive literature review examining in-group and out-group cues in the context of human-SIA interaction and their impact on perception, attitudes, and behaviors in general and specifically within the context of eating behaviors. Recommendations for incorporating in-group and out-group cues in virtual agents

- A scholarly paper or presentation summarizing key findings for submission to a relevant academic conference

Practical context

This internship stands out in several ways. First, it is **co-supervised by researchers from two distinct disciplines** who already collaborate on related topics, including the supervision of a PhD student and a postdoctoral researcher. Thus, the project requires a unique combination of skills in computer science, artificial intelligence, and the social sciences and humanities (SSH). The subject will be adapted based on the candidate's core competencies.

Second, this internship is part of the **PEPR eNSEMBLE program**, which focuses on fostering research in digital collaboration http://pepr-ensemble.fr/. It holds the potential to evolve into a full-fledged doctoral research project. Regarding the internship, the selected candidate will join the PEPR eNSEMBLE community, and specifically the PC3 Matching, which brings together numerous PhD students and researchers from diverse disciplines working on a wide range of topics. This offers an invaluable opportunity for personal development and networking, making participation in the PEPR eNSEMBLE a uniquely enriching experience.

Dates and conditions of the internship contract

The contract will run for **6 months, starting in March-April 2025** on a full-time basis.

The intern will be based in Grenoble at **CERAG** (Centre d'Etudes et de Recherches Appliquées à la Gestion) which is dedicated to management sciences at UGA. The laboratory is structured around three research axes, in line with the IDEX project and the CERAG eco-system. The intern will belong to the Responsible Behavior and Societal Issues (CRES). For more details, refer to https://cerag.univ-grenoble-alpes.fr/en/node/105

The intern will have the opportunity to spend some days at **ISIR** (The Institute of Intelligent Systems and Robotics), Sorbonne University, Paris. The advent of artificial intelligences and robots is inducing profound transformations in our societies. Isir researchers help to anticipate them by working on the autonomy of machines and their ability to interact with human beings. For more details refer to, https://www.isir.upmc.fr/isir/presentation/?lang=en

During the internship, he/she will also have the opportunity to interact with PhD students, post-docs and interns in marketing, psychology, Information Systems, as well as AI, human-computer interaction, emotional computing etc.

One or more days of remote work per week may be arranged, depending on the requirements of the project and the constraints of the candidate (geographical distance).

Skills required

- **Cognitive sciences, social psychology**: understanding of social theories; analysis of human interaction (social influence, nonverbal communication and cognitive and cognitive biases); perception and social evaluation.
- **Methodological and analytical skills**: advanced experimental design; statistical analysis; qualitative and quantitative evaluation: competence in collecting and analyzing qualitative (e.g., interviews, surveys) and quantitative (e.g., measurable behaviors) data.
- **Interdisciplinary collaboration** experience or appetence

- **Soft skills**: proven abilities of written and oral scientific communication techniques; autonomy, decision-making ability, adaptability, good initiative and organizational skills.
- **Hard skills**: competencies in AI would be a plus
- **Language**: English level B2 minimum is mandatory; C1 or C2 would be a plus.

How to apply?

Interested candidates should submit the following documents in English:

- **Curriculum Vitae (CV):** Highlighting experiences relevant to the application (including research experience and publications if any).
- **Cover Letter:** Clearly stating research interests, alignment with the project goals, and how the candidate's expertise contributes to the position.

Applications should be sent to agnes.helme-guizon@univ-grenoble-alpes.fr and catherine.pelachaud@sorbonne-universite.fr no later than **January 13th, 2025**, including "Internship Application – SIA & Collaboration" in the email subject line.

Shortlisted candidates will be contacted for interviews on an ongoing basis, in person or by videoconference. International candidates are more than welcome.

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