Abstract

Communication is a collaborative process, and as such requires the communicators to create common ground - the assumption that they mutually understand each other on a sufficient level (Clark, 1996). The AI-powered virtual agents capable of using natural language to communicate with humans have recently attracted the attention of both the general public and experts, as the progress enables humans to give virtual agents more complex tasks in which *a conversation itself* is a crucial part of a task, such as in education, healthcare or mental health.

While the virtual agents are getting better at understanding natural language, their ability to fulfill complex independent tasks (conducting semi-structured interviews, tutoring, coaching, etc.) is bounded by the limitations of their communication skills, and thus they perform the best at rather short, domain-specific conversations (Drouin et al., 2022).

The goals of this thesis were to 1) create an experimental framework designed for a brief (5min) social voice chat between humans and virtual agents that would allow to experimentally manipulate different conversational strategies; 2) propose the first set of conversational strategies for mutual understanding and suggest appropriate self-report and behavioral metrics to measure the impact of the strategies on humans' feelings and bond created between humans and virtual agents; 3) test the experimental framework for the first set of hypotheses and test whether it is feasible to gather dependable data through virtual agents.

Thus, a pilot experiment was conducted (N=898) in which three conversational strategies which differed in the virtual agents' reactions to presented human input were designed and implemented into a globally available mobile app. Using a between-subject experimental design with the conversational strategies as the dependent variable, the goal was to assess human participants' feelings (enjoyment, frustration), and their bond with the virtual agent (trust, net-promoter score, and altruism) after a brief conversation. In the preliminary analysis, no differences were found in participants' feelings and bond to a virtual agent. The analysis of the impact of different conversational strategies on mutual understanding between participants and virtual agents is in progress.

Keywords: Conversation; Digital; Mutual understanding; Joint attention; Virtual agent