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ASSESSING THE IMPACT OF AI TEAMMATES ON DECISION-MAKING AND TEAM COORDINATION IN DEEP SPACE MISSIONS TO MARS

Abstract

Mars has captivated human imagination for decades, with an inherent desire to explore the Red Planet driven by the quest for scientific discovery, potential colonization, and the extension of human presence beyond Earth. As space agencies and private enterprises gear up for ambitious Mars missions, the challenges inherent in deep space exploration become increasingly apparent. In space missions, communication signals travel across expansive interstellar distances. The time lag between sending a command and receiving a response ranges from several minutes to upwards of 20 minutes one way, depending on their respective positions in their orbits around the Sun. This delay can hinder real-time decision-making, impacting the ability to address unforeseen challenges promptly. In scenarios where split-second decisions are crucial, such as emergency responses or navigating through dynamic space environments, the inherent lag in communication introduces a layer of complexity that demands innovative solutions to ensure the success and safety of deep space missions. The purpose of this between-group study is to assess the efficacy of an AI teammate in ameliorating decision-making and team coordination among individuals from diverse cultural backgrounds. The research compares the outcomes of scenarios with and without the presence of an AI teammate, examining their effects on decision-making performance, team coordination, human-AI metrics, and crisis management. The control condition involves decision-making without AI assistance, while the treatment condition involves participants collaborating with an AI teammate during simulations of Martian surface exploration, replicating emergency conditions on the planet. The study's outcomes aim to contribute valuable insights into the role of AI teammates in enhancing decision-making and team coordination in astronauts during deep space exploration, shedding light on the intricate interplay between human and artificial intelligence in the quest for successful and safe deep space missions.