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SPACEGUARDIAN-GPT

Abstract

This abstract highlights the advantages and benefits of integration and utilization of the SPACEGUARDIAN-GPT model, a deep learning Artificial Intelligence (AI) algorithm based on Large Language Models (LLM) to safeguard the medical health and psychological well-being of astronauts during space missions. Recognizing the importance of the physical, psychological, and physiological health of crew members, SPACEGUARDIAN-GPT is trained on extensive datasets obtained from MMAARS (Mars-Moon Astronautics Academy and Research Sciences) analog simulation missions deployed since 2016 to various analog sites on Earth (for example, the Mojave Desert in California and Nepal in the Himalayas). The objective of MMAARS analog missions is to understand, summarize, generate, and predict crew medical conditions, behaviors, and deviations from the normal baseline. SPACEGUARDIAN-GPT's unique training algorithms are based on the gold standards of the Diagnostic and Statistical Manual of Mental Disorders (DSM V-TR) which provides the assessment and diagnosis of psychiatric disorders. Additionally, SPACEGUARDIAN-GPT offers psychological interventions such as Cognitive Behavior Therapy as well as peer-reviewed clinical behavioral therapies, for example, body mapping and guided meditation. The platform administers a variety of mental health tests and can recognize a wide spectrum of psychological health deviations and psychiatric disorders. During MMAARS analog missions, SPACEGUARDIANGPT can provide efficient assessment and diagnosis assistance in various scenarios such as crew members experiencing severe anxiety due to altitude sickness, stress-related gastrointestinal issues, headaches, and depression. By offering personalized and adaptive culturally congruent care and the ability to recognize nonverbal cues, SPACEGUARDIAN-GPT serves not only as a companion, but also as a medical expert, psychiatrist, and psychologist. The result of using this technology is a measurable increase and optimization of crew productivity and performance effectively increasing mission success as well as the potential for conducting longer durations.. Implementing this novel innovative technology into analog astronautics training and astronaut space missions reduces various risk factors for psychological distress and provides effective countermeasures. This presentation will discuss the testing and validation of the system in future higher fidelity analog missions with the potential to test in microgravity environments, e.g International Space Station (ISS), and in various commercial space missions including upcoming MMAARS analog astronautics missions such as, Analog Aquanautics, Antarctic and Everest missions.