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ARTIFICIAL INTELLIGENCE APPLICATIONS FOR MONITORING AND DETECTING MENTAL HEALTH ISSUES IN ASTRONAUTS

Abstract

Artificial Intelligence (AI) has become indispensable in various fields, and now it is making its way into supporting mental health. Astronauts undergo immense physical and psychological challenges during space missions. The isolation and confinement they experience can lead to feelings of loneliness, anxiety, and depression. Additionally, extreme space environments, such as zero gravity and constant radiation exposure, can further impact their mental well-being. Traditional methods of mental health support, such as face-to-face counselling, are limited in space due to communication constraints and the unavailability of mental health professionals. AI can play a crucial role in promoting the well-being of astronauts facing unique space challenges. Therefore, new approaches are imperative to address these challenges effectively. Quite a few initiatives in this domain include the Crew Interactive Mobile Companion (CIMON) (Airbus, 2020), a specialized robot developed for astronauts by NASA and IBM. This unique robot can independently move within the International Space Station, facilitating communication with astronauts and supporting various operational tasks. This robot cannot predict the mental health of astronauts. By monitoring astronauts' physiological and behavioural indicators, AI can detect patterns and changes that may indicate mental health issues. This proactive approach allows for early intervention and tailored support, ensuring the well-being of astronauts throughout their missions. AI-powered systems can continuously monitor astronauts' mental well-being by analyzing various data sources. These sources include vital signs, sleep patterns, voice recordings, and social media activity. By integrating these data points, AI algorithms can detect mood, emotional state, and overall mental health changes. This monitoring enables the detection of potential issues before they escalate, providing astronauts with timely support and intervention. This paper proposes a new framework for monitoring and predicting the mental health of astronauts, using machine learning algorithms and natural language processing to analyze data collected from astronauts in real-time and aiming to enhance our understanding of psychological well-being in space missions and improve support systems for long-duration space travel.

References: Airbus, (2020). Cimon-2 Makes its Successful Debut on the ISS. https://www.airbus.com/newsroom/press-releases/en/2020/04/cimon2-makes-its successful-debut-on-the-iss.html