Enjoying the sights and smells of a virtual garden

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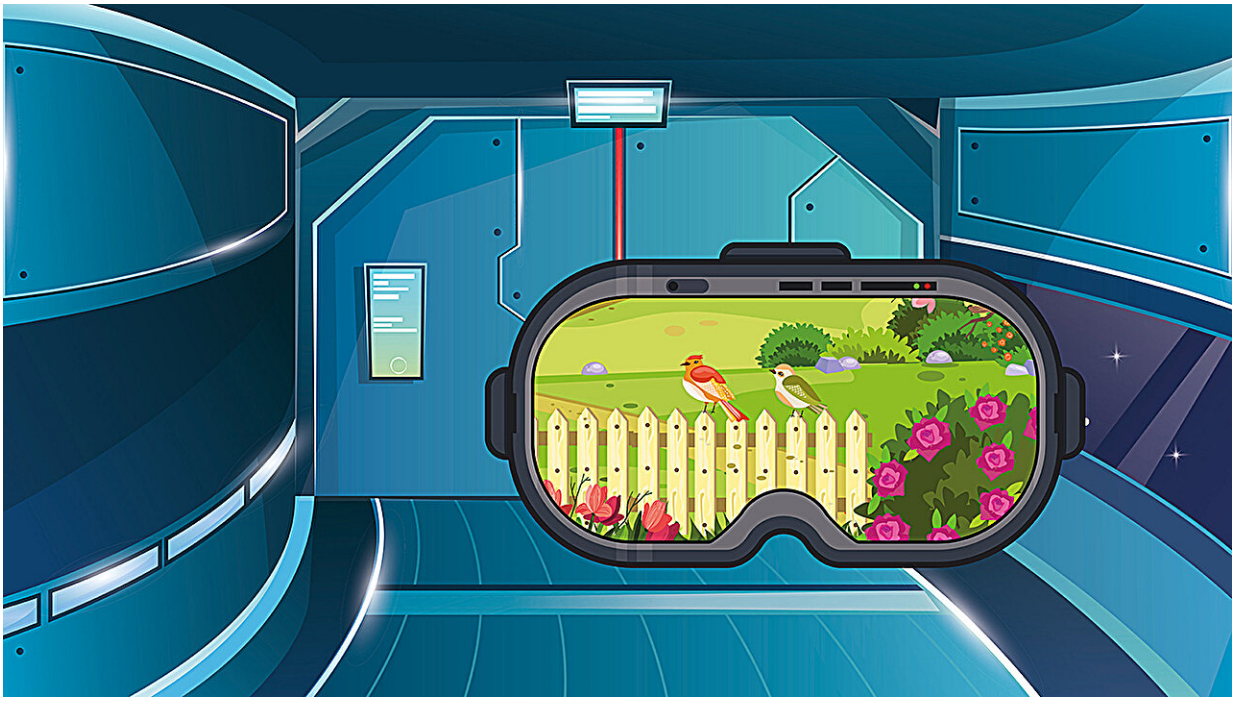

The research draws inspiration from the experiences of technology could also bring relief to individuals with mobility issues or older patients in hospitals for extended periods. Credit: Texas A&M Engineering

As we go about our daily lives, it's easy to overlook the significance of the seemingly ordinary things around us. But imagine the profound impact of the absence of the sound of birds, the scent of flowers, or the sight of trees swaying in the gentle breeze.

For those living in isolated environments, these sensory deprivations are a stark reality, endured over extended periods. They can significantly impact mental health, cognitive performance, and well-being.

Recognizing the profound impact of long-term sensory deprivation on the brain, a team of researchers at Texas A&M University, in partnership with NASA, are investigating the benefits of technological interventions on behavioral and cognitive function. These interventions aim to recreate everyday sights, smells, and sounds for those living in isolation for an extended period.

"This research draws inspiration from astronaut Scott Kelly, who expressed his longing for the smell of rain after a year in space," shared Dr. Ana Diaz Artiles, assistant professor in the Department of Aerospace Engineering.

"While astronauts like Kelly are the immediate beneficiaries, our work could also bring relief to others in similar situations, such as individuals with mobility issues or older patients in hospitals for extended periods."

How it works

The human brain expends around 106 bits per second to process sensory information from the outside world. While short-term sensory deprivation is shown to be therapeutically beneficial, sensory deprivation over the long term, such as during more extended space missions or months at sea, can induce a deterioration of behavioral health and cognitive decline.

Researchers at Texas A&M use virtual reality to provide a personalized sensory environment to people in long-term sensory-deprived environments. They are testing their technology on Navy sailors who are at sea for months.

"In addition to sensory deprivation, Navy sailors experience high stress and isolation, which more closely aligns with the astronaut experience," said Renee Abbott, a graduate student in Diaz Artiles' laboratory and the recipient of the NASA Space Technology Graduate Research Opportunities fellowship.

In its current iteration, the virtual reality technology offers a unique solution. It simulates natural environments, such as beaches, forests, and botanical gardens, with 10 scents loaded within each simulated setting.

Users can immerse themselves in these environments using hand-held controllers and experience the typical scents associated with each environment. For instance, when the user walks past a patch of flowers in the botanical garden, the system will emit the scent of roses, providing the user with an authentic sensory experience of being in that environment.

In partnership with the Behavioral Health & Performance Laboratory at NASA, the researchers will measure cognitive performance, such as memory and reaction time, and analyze answers to self-reported questionnaires on behavioral health over the duration of the Navy sailors' trip. Abbott has collected data from the first cohort of sailors, and the virtual reality system is currently being tested with the second cohort.

"As we venture into the uncharted territories of space, we must remain mindful of the challenges that accompany such exploration. We are committed to ensuring that the mental and behavioral health of astronauts is not compromised during their missions," emphasized Diaz Artiles.

"Our virtual reality system could be a key countermeasure to maintaining enriched sensory experiences and mitigating the side effects of prolonged isolation in such environments."

Provided by Texas A&M University