Navigating the Mazes and Sensors of Brain Science

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On June 7, U.S. Sen. Sheldon Whitehouse and U.S. Rep. James Langevin toured two labs at Brown to observe brain science research underway. In the Virtual Environment Navigation (VEN) Lab, Sen. Whitehouse walked through a virtual maze projected on his headgear. Rep. Langevin holds prototype of wireless neural sensing brain device under development

PROVIDENCE – Used to navigating political mazes, U.S. Sen. Sheldon Whitehouse and U.S. Rep. James Langevin were willing "subjects" in the Virtual Environment Navigation (VEN) Lab at Brown, which they visited on June 7 as part of a tour to learn about brain research underway at the university and its affiliated hospitals.

They donned virtual reality helmets and electronic backpack units and navigated through a virtual garden maze projected on the headgear. William Warren, professor of cognitive, linguistic, and psychological sciences at Brown, introduced the virtual exercise.

"As we walk around our normal environments, we have certain kinds of visual information that's coming in all the time," he said and explained the exercise monitors the paths people choose to determine the underpinnings of their spatial knowledge.

The VEN Lab is collaborating with the Providence VA Medical Center on several studies involving lower extremity injury and gait disturbances. Patients who have undergone surgical repair for Anterior Cruciate Ligament (ACL) knee tears have been coming to the lab to have postoperative gait function measured with the use of motion capture markers, which measures precise gait movements.

Another study at the VEN Lab involves simulating and testing the effects of peripheral vision loss on mobility in people with severe "tunnel" vision resulting from retinitis pigmentosa.

Afterwards, Sen. Whitehouse said he could see the lab floor, but nevertheless felt himself drawn inside the maze, especially when it shifted abruptly, or a barrier appeared.

Wireless brain sensor

During the tour, Arto Nurmikko, professor of engineering, also showed the Congressmen a prototype of a wireless, broadband implantable neural sensing device developed in his engineering lab, a first in the brain-computer interface field. It has not been tested in humans yet.

He showed a video of its wired precursor, used in the investigational BrainGate system. In the film, people with severe paralysis were able to control assistive devices, such as robotic arms or computer cursors, through the use of a wired system using similar implantable sensing electrodes which transmit neural signals from the cortex. The wireless "remote" would replace the wired unit connected to cables which protruded from the skulls of these patients.

"This research could really help our disabled veterans," Sen. Whitehouse noted.

"It's the next step in providing a practical brain-computer interface," added neuroscientist John Donoghue, director of the Brown Institute for Brain Science, a developer of BrainGate and a member of the Brain Initiative announced by President Obama.

After the tour, Rep. Langevin tweeted, "Turning sci-fi into reality." ❖