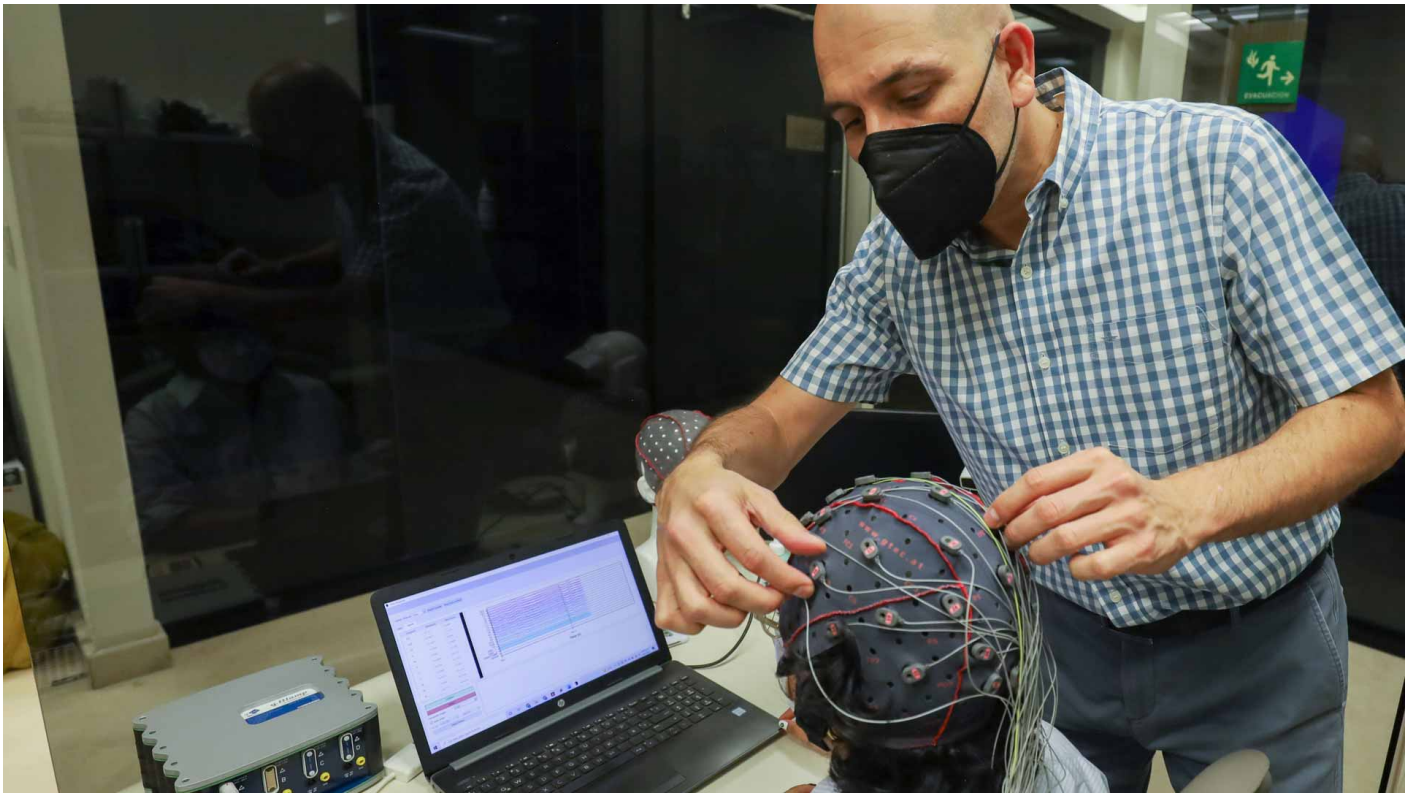
Tec researchers work on neurological decoder that reads brain signals



The iconic computerized voice of **Stephen Hawking** in the later years of his life came from an advanced communication system he used to express himself as his **Amyotrophic Lateral Sclerosis (ALS)** progressed.

Through slight movements of his cheek, Hawking selected the words he wanted to say on a screen, which were then **translated into speech.**

Now, research scientists at **Tec de Monterrey's Guadalajara campus** are working on new solutions for people who, like Hawking, are unable to talk. They are testing a **neurological decoder that reads brain signals** and instantly **translates them into speech.**

"What we want is for patients to be able to communicate verbally by using a brain-computer interface, without invasive surgeries or chips implanted in the brain," explains **Mauricio Antelis,** leader of the Tec's Laboratory of Neurotechnology and Brain-Computer Interfaces.

Investigación del Tec. width="900" loading="lazy">

The researchers have been analyzing healthy people in the laboratory to **detect signals from their brains and muscles** as well as **recording what they say** in everyday situations such as asking for food or water.

They place a kind of cap on them with **small metal discs containing electrode**s, which go on the scalp and certain facial muscles.

“The volunteers pronounce or think of words such as ‘yes, no, water, food, or sleep,’” adds **Denisse Alonso**, who is a researcher on the team and a Ph.D. student at the Tec.

This information is decoded by **Machine Learning computational algorithms** designed at the Tec, which are being programmed to reproduce the words as audio.

Mauricio Antelis width="900" loading="lazy">

Mentally controlling “robot hands” or wheelchairs

Their laboratory research includes finding a way to tell a wheelchair to do an “emergency stop” and also includes **practical devices** that are being tested in hospitals.

For instance, patients at TecSalud’s ALS Multidisciplinary Clinic at the **Zambrano Hellion Hospital** in Monterrey are attempting to regain their mobility through a robot hand that utilizes a brain-computer interface.

“Patients make a visual selection from six options on a screen, which correspond to the five fingers and the whole hand. ***When we detect a brain signal, the robot performs the corresponding movement****,”* explains Antelis.

In the end, this **ability to listen to brain activity,** understand it, and act upon it has the potential to improve people’s lives. That, concludes Professor Antelis, is what it’s all about.

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