Open Source Access to Your Brain

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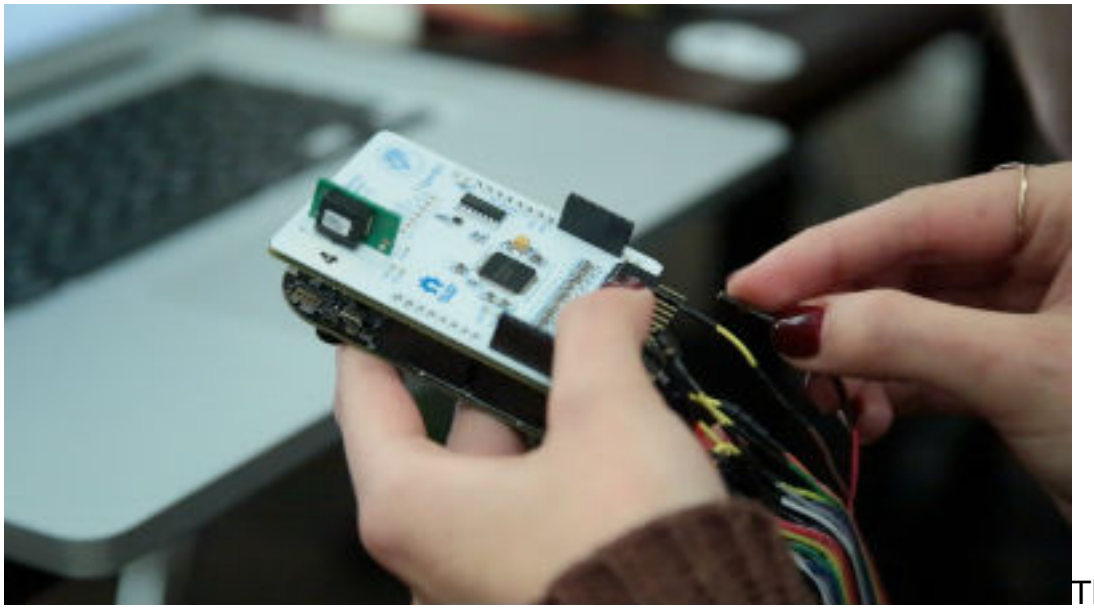
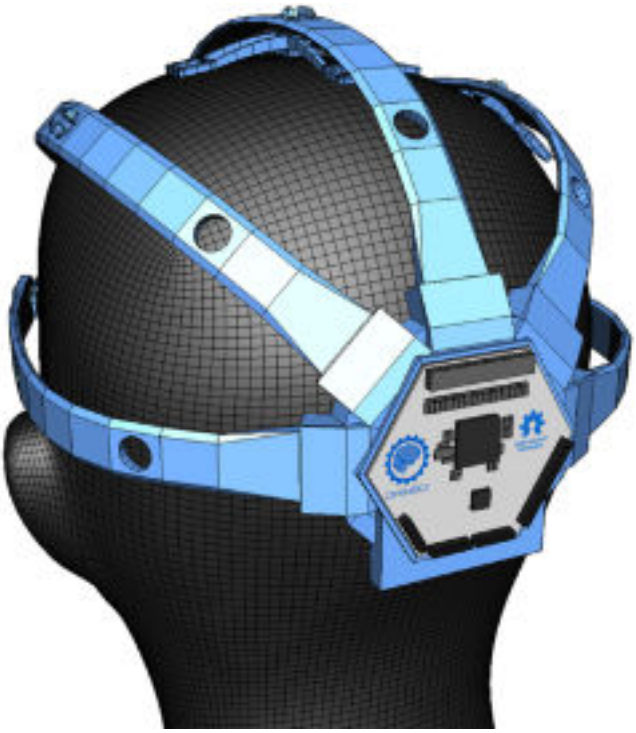
 The team at OpenBCI [1] is trying to undermine the “ivory tower of intellectual property” and prove another way to do business. The company has developed a low-cost, programmable, open-source electroencephalography (EEG) platform that gives anybody with a computer access to brainwaves.

Watch: Kickstarter of the Week: How to Undermine Intellectual Property [2]

OpenBCI, an open source brain-computer interface (BCI), is built around Texas Instrument’s ADS1299 IC [3], an 8-channel, low-noise, 24-bit analog-to-digital converter designed specifically for measuring EEG signals. Features include:

- A programmable Bias signal (DRL) and flexible input multiplexer.
- An onboard re-programmable micro-controller.
- Bluetooth low energy (BTLE).



The final design will be wireless and re-programmable with an SD card for data logging and electrode expansion capability. Multiple boards can also be daisy chained together to expand on the number of channels.

In addition to the circuit, the team has also designed custom EEG headwear. Because one-size-fits-all rarely pertains to head size, the team has turned to 3D printing to produce the headset.

Russomanno, co-founder and “Creative Khan” at OpenBCI, who has a background in art, has been using Autodesk’s Maya [4] 3D animation software and a 3D printer in the Atlas Scientific [5] offices.

The design will be customizable so users can move pieces around and disconnect pieces. Because the project is open source, the design files will be available for further customization.

One of the most difficult aspects of the project was approaching it from the open source angle.

“Its daunting in a lot of ways to take really cool technology and tell everyone that you are going to show them exactly how you are doing it,” says Russomanno.

Some of the biggest changes have been “everything,” according to Russomanno, as the BCI design challenge is so broad in scale and can’t be solved with a single discipline.

The biggest barrier moving forward is getting people to understand how to use the technology, but the company hopes to become a centralized point where people can come together and share ideas.

“Humans are obsessed with, and dependent on, technology,” says Russomanno. “A lot of people are skeptical with BCI because they think it’s the invasion of tech into our minds, which is the last sacred place, the final thing that we have over technology.” Yet he believes that technology has already invaded our minds, and at this point, it’s a one-way conversation.

“Right now our ability to talk to tech is limited,” Russomanno explains. “Our integration with technology is very unidirectional. BCI is our way of leveling the playing field and standing up against technology.”

Passively responding to brain activity, moving a curser without touching a mouse or a keyboard, and mobile apps that can track your state of mind, these are all things that can potentially happen as a result of BCI.

“It’s going to be really cool to be able to augment life in that way,” says Russomanno, and with nine days left to go and more than $113,000 raised, he is well on his way.

For more information, visit www.kickstarter.com [6].

Links:
[1] http://www.openbci.com/
[2] http://www.mdtmag.com/videos/2014/01/kickstarter-week-how-undermine-intellectual-property
[3] http://www.ti.com/product/ads1299

[4] http://www.autodesk.com/products/autodesk-maya/overview
[5] http://atlas-scientific.com/
[6] http://www.kickstarter.com/projects/openbci/openbci-an-open-source-brain-computer-interface-fo