

hands on

processing software—then translates Emotiv’s data stream into meaningful information about activity in various brain regions.

Scores of videos on YouTube show EPOC users training their brains to control a video game, keyboard, robot, or wheelchair. But this is a long way from—to steal Tesla’s term—thought photography. “Learning to control things using our brain activity is not the same as mind reading,” Frith says. “I agree that control via a brain is no longer science fiction. But it will not lead to thought monitoring.”

Ken Norman, principal investigator at Princeton’s Computational Memory Lab, says people should be “superskeptical” about any claims of mind-reading technology.

“Brain data is noisy,” Norman says. “The cognitive states we’re trying to detect are complicated. And we’re measuring all sorts of things in the brain that have nothing to do with the thought we want to decode.”

He adds, though, that devices like the EPOC could still find some amazing applications.

We can measure whether someone thinks they’re doing something right or wrong, how much effort they’re expending, their focus of attention, or their familiarity with an object, Norman says. “Most of the cleverness is going to come from people coming to grips with the limits of the technology and then being really smart about what sorts of applications you can make work with that signal.” —MARK ANDERSON



SMASH HIT: After stripping printers of useful parts, hackers let attendees release their technofrustrations at a Hacktory event. PHOTO: THE HACKTORY

SULTANS OF SOLDER

At hackerspaces like the Hacktory, geeks turn on, tune in, and hack out

IT’S A TUESDAY night in Philadelphia—hacker time. A small group of do-it-yourself engineers and hipster geeks gather in a cluttered space downtown. One holds a Kinect, the motion-sensing controller for Microsoft’s Xbox 360 system. But he’s not playing a video game. He’s about to

take the Kinect apart to see if he can get it to work with a shoot-em-up space game for which it wasn’t intended.

It’s a typical challenge at the Hacktory, a free-wheeling engineering clubhouse and just one of the many self-described “hackerspaces” popping up in cities around the world. The group takes its name from Andy Warhol’s famous 1960s hangout, the Factory, hoping to bring that sort of imaginative spirit to the technically inclined—and reclaim the word *hacker*. “It’s a way to take something apart and put it back

together in a new way,” says Hacktory director Georgia Guthrie. “It’s a creative act, not a destructive act.”

While many people think of hacker communities as existing online, there’s also a desire to collaborate in person. “Physical hackerspaces sprang out of a need to have a sense of community and a place to hang out,” says Jonathan Lassoff, president of Noisebridge, in San Francisco, which operates out of a former sewing shop and at almost 500 square meters is one of the larger hackerspaces around.



Hackerspaces.org, a hub for the collectives, lists dozens of groups, from Toylab in Argentina to Blind Security in Uganda. In addition to being a clearinghouse for information on the scene, the site holds a monthly call-in, which allows groups around the world to share ideas (the audio files are kept for future reference). Hackerspaces.org also organizes hackathon events every month. A recent example, The Playing Card Box Challenge, required participants to “create a hackerspace gift that will fit inside the box from a set

of playing cards and mail it to another hackerspace.”

Launched in 2007, the Hacktory was an outgrowth of the burgeoning “maker” scene—the do-it-yourself subculture that spawned its own glossy magazine, *Make*, and convention series, the Maker Faire. The Philly group sought to distinguish itself by focusing on creativity, letting the engineering sneak in by the side door. For example, a design workshop in which kids created jewelry tacitly introduced them to light-emitting diodes. “We’ve decided to cater more to art and integrate technology with art in any way possible,” says Guthrie, an art historian who became interested in electronics after getting disenchanted with her museum work. “I thought, museums are old and stuffy,” she says. “They don’t let you touch anything.”

The Hacktory offers a weekly open house. The club hosts special events, such as Nerf Gun Hacking, and concerts by musicians who perform on Nintendo Game Boy devices. One of the more popular activities was a sex toy hacking workshop, in which participants made their own devices using materials as diverse as plastic eggs and bicycle parts. Newcomers look for a place to build something themselves and end up sharing their knowledge and tools. “The network is the most important thing,” says Andrew Davidson, a graphic designer who helps organize Hacktory events. “The people I’ve become friends with at

the Hacktory are reliable resources for information.”

Nonprofit Technology Resources, a Philadelphia-based group that offers computer hardware and training to low-income families in the city, provides the Hacktory with classroom space, financing from state grants, and management of those and other funds. Stanley R. Pokras, president and chief executive officer of the group, says the Hacktory fits in with his organization’s mission to educate and inspire people to express themselves through technology. People understand technology by actually making things, he says.

The Hacktory has tried to overcome the stereotype of hacking as something only for postadolescent boys. “Most hackerspaces strike me as male nerds who are so superinvolved in their nerd-dom that they can’t comprehend something like sewing,” says Davidson. “We try to be a little more female friendly—and kid friendly.”

One of the more popular events is the egg drop, which challenges participants to wrap an egg so that it won’t break when it’s dropped from a building. Another favorite happening is the printer smash, a stress-relieving way to get rid of old machines—and salvage the shattered parts for reuse. The Hacktory lets people have at the devices with the help of a sledgehammer. Participants don goggles and gleefully whack at the

printers, shattering the parts into pieces in a parking lot near the Hacktory. The smash was a highlight of Philly Tech Week, a springtime celebration of technology and innovation throughout the city.

With interest in hackerspaces growing, there comes a new challenge: making money. Collectives are brainstorming possible solutions. Platoniq, a Barcelona-based group, commissioned a report on business models for hackerspaces that recommends charging for services and manufacturing third-party open hardware. While many spaces are loose and casual, some of the bigger ones are getting more organized, with boards, officers, and membership dues that can reach US \$80 per month. Some use the spaces as freelance work environments as well.

The Hacktory is no exception, says Davidson: “The next step is to turn into a business and generate income.” The group is beginning to offer mainstream classes, such as basic Web development and Python programming. It’s also collaborating with hackerspaces in other cities. “We like being one of the organizations that stands for the original definition of the word *hack*,” Guthrie says. “We want to show that being a hacker is cool.”

—DAVID KUSHNER

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