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New lie detection technology too much like scientific mind reading, ethicist says

Companies plan to begin selling fMRI services by end of year, but, with no regulation, utility of technique need not be proved

BY EMILY SAARMAN

For many, the phrase "lie detection" probably brings to mind an image of a polygraph machine and an intimidating movie-style interrogation, possibly with a subject who could expertly "beat the polygraph." But ethicist and law Professor Hank Greely said this image is about to change.

Recent advances in neuroscience promise to bring lie detection technology far beyond the notoriously unreliable polygraph and into a realm that Greely said bears eerie resemblance to scientific mind reading.

Greely, the Dean F. and Kate Edelman Johnson Professor in Law, discussed his concerns about the new lie detection technology at a campus Science, Technology and Society seminar April 14. Greely said he is excited by the potential for improved lie detection but concerned that it could lead to personal-privacy violations and a host of legal problems—especially if the techniques prove unreliable.

"If unreliable lie detection gets used, people's lives will be blighted," Greely said. "I think it's crazy for us to let these technologies be used for lie detection until we have clear, robust, peer-reviewed research that shows how well they work."

During the seminar, Greely discussed five emerging lie detection techniques. These include electroencephalograms (EEGs), which measure brain waves using electrodes taped to a subject's head and claim to detect patterns related to specific brain processes, including recognition of a scene or person. Another technique uses facial microexpressions, facial expressions lasting just a fraction of a second that can be captured on film, to reveal otherwise invisible emotions or reactions. A thermal imaging technique, claiming that the area around the eye gets warmer when a person lies, attempts to reveal deception by measuring the temperature of the eye area. Finally, two different techniques use images of brain activity to highlight lying-specific brain patterns, Greely said. Near infrared laser spectroscopy shines invisible infrared light through the skull and reflects it off the brain to reveal activity on the surface of the brain. And functional magnetic resonance imaging, or fMRI, uses powerful magnets to build a map of activity throughout the brain.

The most promising of these techniques is fMRI, Greely said, which measures oxygen usage throughout the brain. Active parts of the brain use more oxygen than inactive portions, so the fMRI can accurately pinpoint the parts of the brain at work at any given time.

In several small scientific studies, researchers have shown that telling a lie activates different parts of the brain than telling the truth, Greely said. Subjects who were lying activated a greater percentage of their brains, as well as different regions, than subjects who were telling the truth.

While Greely said he believes fMRI technology has tremendous potential for lie detection, he said there is still a lot of work to be done before the results of these tests can be trusted. To date, all fMRI lie detection studies have used only a small number of subjects who were asked to lie about simple



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things such as the identity of the playing card in their hand, he said. How these findings will bear out in real-life circumstances with diverse subjects of different races, ages and mental states remains to be seen. "Deception is not a very clear-cut, well-defined thing," Greely said. "We know people can remember things that never happened. How does that show up on an fMRI lie detection test?"



But companies who hope to profit from new lie detection techniques are not so cautious. Two private for-profit companies—No Lie MRI Inc. of La Jolla, Calif., and Cephos Corp. of Pepperell, Mass.—plan to begin selling fMRI-based lie detection services by the end of the year. And because there are no regulations to control lie detection technology, Greely cautioned, they can sell lie detection services without ever proving how well they work.

At first, the technology will likely be used only at the request of a person who wishes to bolster his or her credibility with a clean lie detection test. But Greely predicted that, in time, new lie detection techniques will find their way into civil and criminal investigations and may even be considered in court trials.

To illustrate the danger posed by inaccurate lie detection, Greely described a scenario in which a person is arrested for assault and an ineffective lie detector indicates that the person is lying when he or she denies the charges. "It could be that the case against you is pretty weak but the district attorney and the police decide to proceed anyway because they're so falsely confident in this lie detector test," Greely said. "You end up going to trial, maybe getting convicted, maybe going to jail. That would be pretty serious."

Beyond such concerns, Greely said there are ethical reasons to view the new technology with caution. "Even if it's proven to be safe and effective, we need to make decisions about when it can be used and by whom," he said. "We've never really had to confront these issues before because the polygraph has never been reliable enough for the courts to take it seriously."

Employees currently are protected from lie detection tests administered by their employers under the 1988 federal Employee Polygraph Protection Act. But, according to Greely, there are no laws controlling the use of lie detection by educational institutions, parents, friends or spouses. Like any parent of a teenager, Greely said he wishes he knew where his son really went last night, but he is not sure that using lie detection to find the answer would be ethical.

"I think it's important to consider that whole set of issues about when we think it's justifiable to invade the privacy of someone's mind," Greely said.

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