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## Can Computers Read Your Mind?

**Networked cameras could help machines interpret users' emotions. Find out more, Wednesday 5/29 at 8:30 p.m. Eastern on 'Tech Live.'**

Also airs 5/29 at 11:30 p.m. and 5/30 at 2:30 a.m., 9:30 a.m., and 4 p.m. Eastern.

By Brandon Mercer, Tech Live  
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When you encounter strangers, you can probably sense their emotional moods without a word being uttered. An eyes-down frown probably means she's having a bad day. Bright, wide-open eyes and upturned lips probably mean he's happy and feeling good.

These visual clues are usually easy for a human to see and interpret. As "Tech Live" reports tonight, soon computers might be capable of making the same judgment calls.

### ATMs that discern emotions

"We're teaching the computers to be more like human beings," said Dave Schrader, an engineer with Teradata, a division of automatic teller machine manufacturer NCR. In an attempt to give consumers a better banking experience, Schrader is teaching ATMs to discern emotions.

"The value of the tech is we're taking the ATM one stage closer to behaving like a good, perceptive teller might so that interactive dialog can start beginning," Schrader said. "The ATM can adapt itself to you instead of you adapting yourself to the technology."

ATMs are the perfect match for this new technology being developed by NCR and the University of Southern California's Integrated Media Systems Center. The machines already have cameras, powerful computers, and fast Internet connections. Engineers simply take an image from the camera, use software to pinpoint facial features (such as the measurement from the corner of your eye to your lip), and create a map of your probable emotional state. Those points are then compared to Teradata's massive catalog of emotions in an attempt to decipher your emotional state.

"Then," Schrader said, the computers "direct that ATM to do something smart."

Forgot your glasses and can't see the numbers? The computer can detect this and automatically increase the font size or change the contrast of the display. Hate annoying advertisements? Emotion-sensing ATMs could help ease your irritation.

"When you interact with an ATM it's all about convenience," Schrader said. "It's also all about not having a lot of clutter advertising coming your way or one-size-fits-all kind of advertising. The bank can be much smarter and treat you special."

### Customizing ads

The machine can track which ads you frown at and change those pitches. Maybe a cute, humorous ad pops up that causes you to chuckle. The database remembers your reaction and you'll likely see the advertisement again.

And maybe all those annoying ATM fees will go down.

"The real reason [for implementing the new technology] is cost reduction," Schrader said. "If you can interface with an ATM instead of standing in line for the bank teller, it's good for you, it's faster, more convenient for you, and it's cheaper for the bank, less labor cost."

### **Beyond ATMs**

But Schrader said implementation in ATMs is just the beginning for this emotion-mapping technology. It could be used at information kiosks, displaying information about city events or advertisements for a new restaurant or automobile. It could then track people's emotional responses to the spots to see what type of person appears interested and entertained by the spots.

"Technology is always in front of the actual uses, but we're beginning to see a lot of potential uses of how facial reactions occur, like in the medical area -- maybe even in the terrorism area," Schrader said.

How many times have you answered security questions at an airport and wondered, "Why in the world would a terrorist answer them truthfully?" Schrader said the emotion-scanning technology could act like an instant lie detector, tracking whether people become nervous or afraid as they answer the questions.

"Identifying people's reactions when they're asked questions -- their nonverbal clues that skilled detectives might pick up on -- we can train the computer to pick up on those, too," Schrader said.

### **A therapist's friend?**

A more likely scenario is the technology's use by psychologists and counselors.

Dr. Skip Rizzo, a clinical psychologist from the University of Southern California, said he thinks the cameras and software could be a tool for therapists.

"We still have a long way to go with this, but we believe by tracking facial expressions it gives us added information that a therapist can use to get a better insight into a patient," Rizzo said.

"Humans are fallible," he said, "and there are times when I might not be... paying attention to the facial expressions, and I might miss something, so the computer can supplement the perceptual skills of the therapist."

This could be especially critical to detect a phenomenon known to psychologists as "suicide face," a blank expression that has been documented the day before patients kill themselves.

"A person may have a certain characteristic facial expression that indicates they have a sense of hopelessness besides depression that will put them at risk for suicide, so perhaps those are the kinds of things that we can start to look at," Rizzo said.

### **Privacy matters**

With such powerful information being available in an instant, there are obviously privacy concerns.

"Businesses would need to keep this information private just like they would with any other kinds of records," Schrader said. But Sonia Arrison, from the Center for Freedom and Technology at the Pacific Research Institute, said she wants more restrictions.

Arrison said she wants to know whether people can remain anonymous if the technology is employed.

"If they know who I am, that gives me a different perspective... what are they really going to do with this data?" Arrison asked. "The other [concern] is, is there consent, and do I know about it?" She also pointed out that people might react differently if they knew they were being scanned, undermining the technology's accuracy.

### **Cost of convenience**

Arrison also cautioned that while the technology could be convenient for consumers, there could be a backlash.

"A lot of folks don't like to feel like they're being watched," Arrison said. "It's not so much a privacy issue as it is a dignity issue or a comfort issue. Companies have to be aware of this."

Schrader suggests that banks and other institutions using the scanning technology could put up signs or use a red light to indicate the system is in use. Ultimately, he said, that will be up to the managers of the machines to decide. He is quick to point out that when you go in to see a bank teller, or to buy a soda or a T-shirt, the teller or the store clerk also performs emotional scanning on you, looking at whether you're happy or displeased with your banking or shopping experience.

"I think the privacy expectations would be exactly equivalent for the same reasons the tellers don't go running around talking about the people's emotions," Schrader said.

The other concern for the scanning technology is how accurate it can be -- especially if the government relies on it to boost airport security or therapists trust it to track patients' progress.

### **Getting it right**

"One of the interesting research problems I gave the University of Southern California is whether they can distinguish between confusion and frustration," Schrader said. "Your facial reactions there are fairly close."

Another issue is detecting depression.

"It's not hard to build a database with people who are happy, frustrated, or confused, but it's hard to make a database with people who are genuinely sad," Schrader said. "That's maybe the weakest area of the database."

Schrader recalled one experiment where people from the USC psychology department showed people pictures of other people being killed, and the experiment participants actually laughed.

"They were jaded by watching too many Hollywood movies," Schrader said. "Sadness is an emotion that will be tough for us to come up with, but I don't expect it to frequently come up in the day in the life of an ATM."

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