

How could Santa know if you've been good or bad?

December 21 2009



The leader of CSIRO's facial expression recognition technology research team, Dr Simon Lucey, welcoming Santa to the team's research facilities in Sydney. (CSIRO)

(PhysOrg.com) -- By using technology to detect guilty expressions, of course. CSIRO is using automated expression recognition technology to tell whether someone is in pain and, according to computer scientist, CSIRO's Dr Simon Lucey, there's no reason why Santa couldn't train the system to find out who's been naughty or nice.

“Each facial expression is made up of many different components - a twitch of the mouth here, a widening of the eyes there - some lasting only a fraction of a second,” Dr Lucey said.

“Our [computer program](#) looks at these components, matches them against a list drawn up by expert psychologists and decides what

expression just flitted across a face.”

It turns out that most human expressions are the same regardless of background.

And, as anyone who has been naughty knows, it’s also very hard to fake an expression.

While a guilty person might fool a human with their look of pure innocence, it’s very hard to fool Dr Lucey’s computer.

“There are always some micro expressions that we are unable to control and some of these are associated with deception. It is these tiny facial expression components that the computer can spot.”

The system uses a technique called machine learning. After being programmed with what to look for and what it means, each observation taken or analysis performed is used to refine the computer’s technique so it gets better at its assigned task over time.

Dr Lucey’s system uses a webcam and will work against any background, providing there’s enough light.

“Our expression work is still mostly from front-on, but we’re teaching the system to do what we do and recognise expressions when only one side of the face is visible.

“When it comes to finding out who’s been naughty or nice, we show the computer what expressions are associated with good behaviour and it watches for a departure from that,” Dr Lucey said.

One of the applications for Dr Lucey’s research is in detecting whether someone who cannot communicate is in pain and how intense that pain

is.

Another is in making ‘telecollaboration’ between people using video and computers in different locations more natural by recognising gestures such as someone pointing at an object.

Provided by CSIRO

Citation: How could Santa know if you've been good or bad? (2009, December 21) retrieved 18 April 2024 from <https://phys.org/news/2009-12-santa-youve-good-bad.html>

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