Dream-reading machine in the works?

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Scientists have applied computer processing to brain scans to find out with some accuracy what images pop up in sleeping people's heads, according to a new report.

The researchers, at the ATR Computational Neuroscience Laboratories in Kyoto, Japan, arranged for volunteers to report their sleep imagery during brief awakenings. The scientists then compiled large lists of image types and their accompanying brain activity, as read by a brain scanner.

The investigators next checked whether the same brain activity occurred when people were viewing images from the same categories while awake. It turned out this was largely true, they reported.

Next, the scientists "trained" a computer using machine-learning technology to match brain activity to image categories, using the data from the awake volunteers. The computer learning was custom-tailored to each participant.

Finally, the investigators trained the machine on sleeping subjects again, and found out that they could predict what the people had seen with 60 percent accuracy.

The findings provide "a means to uncover subjective contents of dreaming using objective neural measurement," the scientists wrote, reporting their findings in the April 5 issue of the journal *Science*.

The brain scanning technology used was functional Magnetic Resonance Imaging, which measures and maps blood flow in the brain.

Strictly speaking, the researchers didn't study true dreaming. They instead studied dream-like visual images that occur during the earliest stage of sleep, because this was easier to investigate for practical reasons: "it allowed us to collect many observations by repeating awakenings," they wrote. This type of dreamlike imagery is called hypnagogic hallucination.

Still, "this is probably the first real demonstration of the brain basis of dream content," said Robert Stickgold, a neuroscientist and dream expert at Harvard Medical School who was not involved with the study but made the comments in an accompanying article in the journal. He also called the findings "incredibly robust."

Moreover, "it's nice to hear that what people report seeing when they're asleep is at least somewhat accurate," Stickgold added in the article. "Up until this moment, there were no grounds on which to say we don't just make up our dreams when we wake up."