

September 2011

arts & sciences for kids



# *What's in a Face?*



From the publisher  
of Cricket®



# Should Robots

Several years ago a computer scientist named Maja Matarić had an idea for a new robot to help her in her work with autistic children. How should it look? The robot would have arms to be able to lift things. And if it was going to interact with people, it was also going to need a face.

But what kind?

interact with it as an intelligent machine—and makes them more likely to pay attention to it.

But Maja Matarić wanted to make sure that her new robot didn't look *too* much like a human. She wanted it to have just enough human features that



He might look like a trash can, but he knows some great jokes.



## Hello, Machine

Scientists know that we're attracted to human faces.

In fact, a huge portion of our brainpower goes into seeing faces, recognizing them, and responding to all the subtle information that they contain.

Giving a robot a face helps people




text © 2011 by  
Cynthia Graber



# Have Faces?

by Cynthia Graber



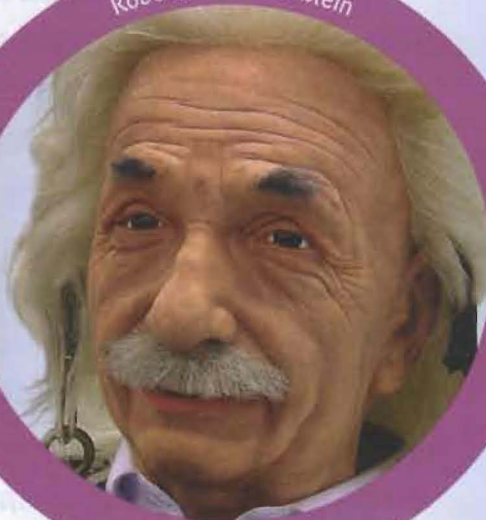
The movie robot Wall-E doesn't have a nose, mouth, or chin—yet, somehow, he has a face.

people would treat it as a machine-person. But if it looked too realistic, she thought it might scare users.

Why is that? Some scientists believe that if robots look almost exactly, *but not quite*, human, we find them kind of creepy. Maybe their skin doesn't move the way it's supposed to.

Or their eyes don't light up when they laugh, and their smiles look fake. This can make them seem like zombies—almost, but not quite, alive. This unsettling effect is called the “uncanny valley.” If a face falls in-between absolutely real and obviously fake, it can feel spooky.

Robotic Albert Einstein



Strange?

Strange or strangely familiar?

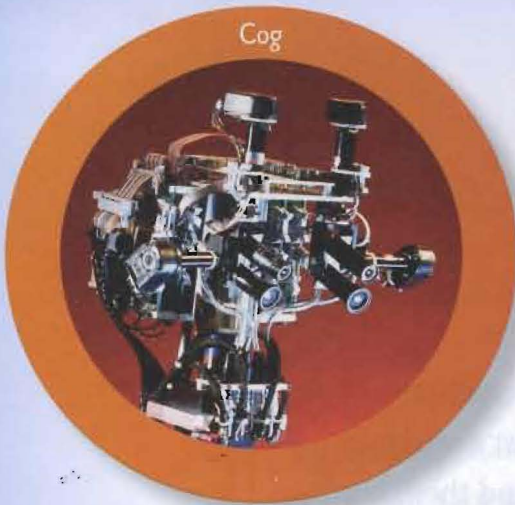


## Put Your Best Face On

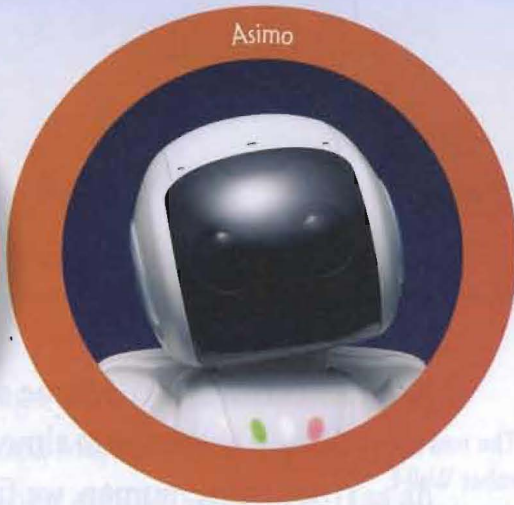
Dave Hanson feels differently—he likes his robots to look as much like real people as possible. He's even built a robotic Albert Einstein. His company, Hanson



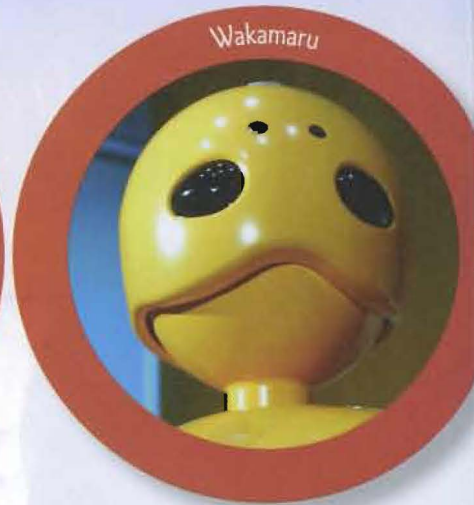
Cog



Asimo



Wakamaru



Robot faces can look like machine parts or almost human, and everything in between.

Robotics, designs robots with faces made of a special rubbery fake skin he calls Frubber. The fake skin wrinkles and creases much like human skin. It's attached to 28 tiny motors underneath that pull at it, much like our own muscles do, to move it into expressions that we recognize, like smiles and frowns.

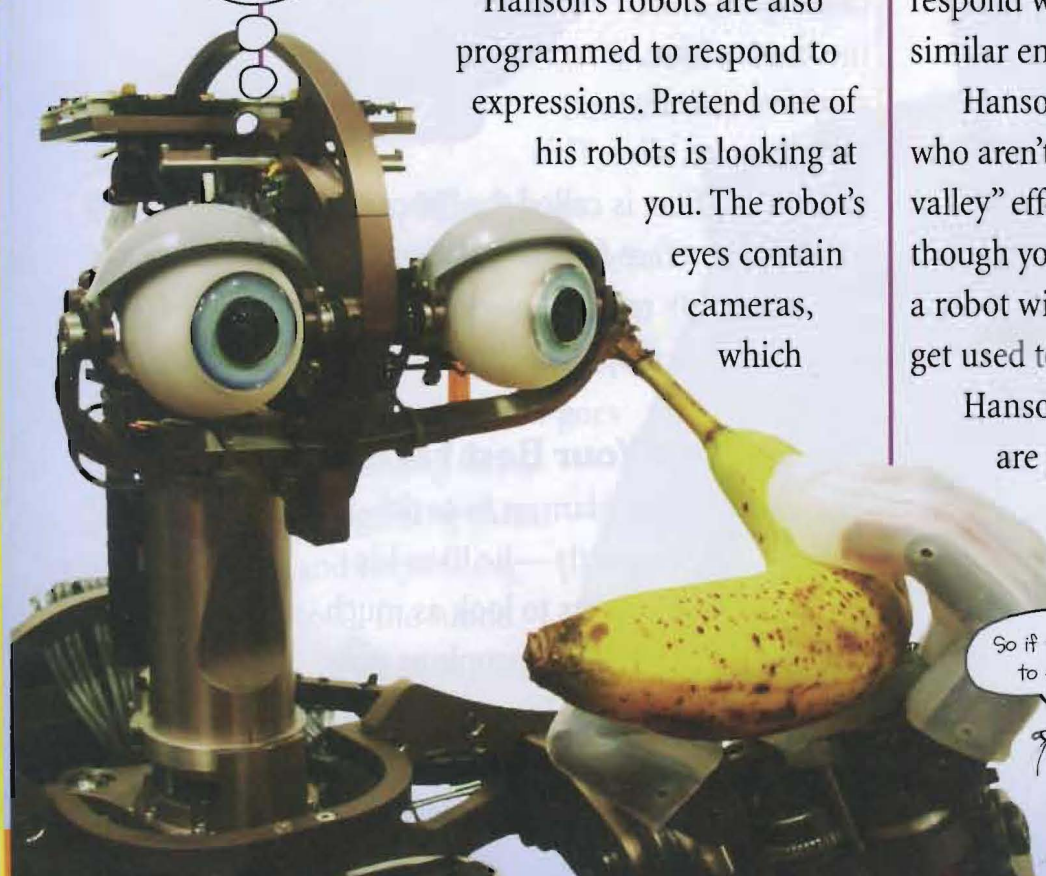
Wait! They forgot to give me a mouth!

Hanson's robots are also programmed to respond to expressions. Pretend one of his robots is looking at you. The robot's eyes contain cameras, which

send images of your face to the robot's central computer. The computer analyzes the pictures to see what your face is expressing. If the robot sees your mouth curving up, it might guess that you are happy. If it spots a crease in your forehead, that might mean you're angry. Once the robot has analyzed your expression, it is programmed to respond with facial features that convey similar emotions.

Hanson is one of many scientists who aren't sure whether the "uncanny valley" effect is real. He thinks that though you might be initially startled by a robot with a lifelike face, you may soon get used to it.

Hanson believes that if robots are going to work closely with humans, they should look as much like us as possible.



So if you're not going to eat that . . .



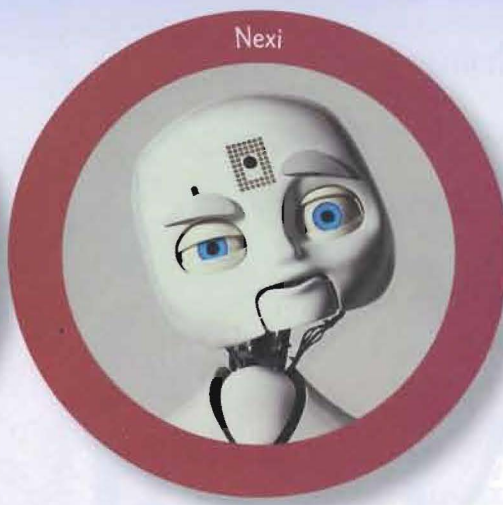
After all, our faces are an important part of the way we communicate.



Kismet



Nexi



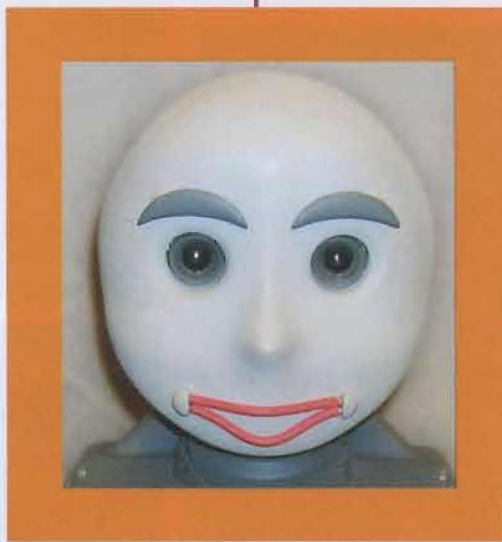
Saya



## More than a Friendly Face

Maja Matarić believes that robot faces don't need to look a lot like us. If a realistic robot face is just a little bit off, she says, we spend too much time trying to figure out what's wrong. Her research shows that people can enjoy interacting with robots whether or not they look human. Because our brains are programmed to seek out faces, we tend to find them anywhere—put any circle on top of a robot's body, and we will see a face.

Still, having some recognizable features can help a robot communicate. For instance, turning the face or moving the eyes gives humans a clue that the machine is about to move in that direction.



Just a few features—eyebrows that move, lips that can smile or frown—give robots like Bandit a variety of expressions to help them communicate.

Matarić and her coworkers gave their robot, Bandit, as simple a face as possible. They created a gray, child-like shape first. It has big eyes, with eyebrows that can wiggle up and down and in and out. The bright red lips,

which look as if they're made of clay, can make different shapes. Moving just the eyebrows and lips lets Bandit convey many emotions: surprise, calm, happiness, even anger.

Matarić believes we're just beginning to understand how we respond to robot faces. One thing is certain—these questions will become even more important in the future, as helpful robots play a bigger role in our lives. What face will you give your robot? 🛠️

Which of these is the best face for a robot? Or does that depend on the job it does?

