



LET THEM ROBOTAIN US

DIGITAL ENTERTAINMENT GETS SMARTER AND MORE PHYSICAL

A four-year-old boy sits happily on the floor playing with a small, cartoonish dinosaur made of soft plastic. The dinosaur turns slowly as the boy strokes its back, and they engage in a gentle tug-of-war when the boy feeds it a leaf. For \$200, you can pick from an entire menagerie of robot pets like this. These robots were built for human entertainment but represent an array of incredible breakthroughs in engineering, biology, computer science, and even human and animal psychology. A new breed of emotional, teachable, and hackable machines is gestating—and their role is to act as our embodied agents of fun.

UNDERSTANDING HUMANS: Relating to Pets and Playmates

What are the core attributes that a robot must have to entertain humans? Ever since the launch of Sony's pioneering AIBO robotic dog in 1999, researchers have studied how humans relate to robot pets and playmates. That research informs the engineers who are designing entertainment robots that act in ever more lifelike and nuanced ways in response to human triggers—or even proactively. “We will program them to want us,” says journalist David Levy.



Children relating to robots

In a recent scientific study, children treated robot dogs differently from both a toy and a real animal.

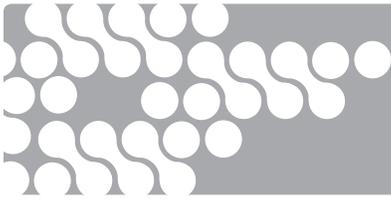
Source: <http://bps-research-digest.blogspot.com/2009/04/what-do-children-make-of-robot-dogs.html>



Animals relating to robots

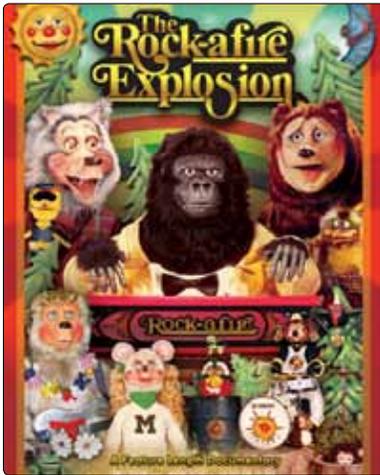
At Sony Computer Science Laboratory Paris, a real dog attacks a Sony AIBO over a piece of meat, implying that the real animal may think it is of the same species.

Source: <http://www.csl.sony.fr/research/developmentalrobotics/>



AUGMENTING HUMANS: Exhilarating Experiences

Robotic augmentation promises exhilarating new experiences. Entertainment robots in public places, from amusement parks to museums, could help humans engage in embodied robotic experiences or lead to entirely new kinds of machine performances. Meanwhile, in sports, individuals augmented with robot technology, such as exoskeletons that massively increase physical strength, may participate in hybrid sporting events where humans and machines collaborate as teammates or competitors to delight human crowds.



Source: <http://www.rockafiremovie.com/>

Robot band

The Rock-a-fire Explosion was a pioneering animatronic robot band that played in Showbiz Pizza Place establishments from 1980 to 1991, and is the subject of a new documentary.



Source: <http://www.aldebaran-robotics.com/en/node/1168>

Players in the RoboCup

The RoboCup, the world's largest robotic soccer competition, chose educational humanoid robot Nao as the official platform of its standard platform league.



Source: <http://www.cs.cmu.edu/~minerva/>

Robotic tour guide

Visitors to the Smithsonian's National Museum of American History can go on a tour guided by Minerva, an interactive robot with an array of expressions.

AUTOMATING TASKS: Emotions + Hardware = Low-Risk Fun

The more we understand about what engages human emotion—what makes us laugh, cry, love—the better equipped we will be to program robots to respond to and mimic these emotions. Combining that level of intelligence with the hardware that enables robots to safely and naturally interact with us and our environments will shift robots from being a novelty from the pages of science fiction into a form of media, or media-delivery system, that brings us joy, surprise, and happiness.



Source: <http://www.gizmag.com/roxxxy-us7000-sex-robot/14063/>

Sex robots

Sex robots feature soft silicone skin, speech synthesizers, programmable personalities, and an array of strategically placed sensors.



Source: <http://www.srl.org/>

Robotic spectacles

For more than three decades, the artist-engineers of Survival Research Laboratories have staged “the most dangerous shows on earth,” robotic spectacles that amplify the dark psyches of the operators.

FORECAST

In the next decade, the biggest advances in artificial intelligence, human-computer interaction, and even materials science may first play out in entertainment robots found in the rec room, amusement park, and sporting arena. New sensors will enable humans to interact with these robots in natural, intuitive ways. A deeper understanding of human psychology, emotions, and behavior will intersect with methods to program artificially intelligent systems, or at least software that provides the illusion of intelligence.

(1) A New category of being

As the capability of robots to entertain us on multiple levels increases, we will develop more powerful emotional connections to them. According to Purdue University researchers, this kind of connection could lead to the emergence of a “new ontological category, neither artifact nor living being.”

(2) Robot fetishism

ASFR, named for a defunct Internet newsgroup alt.sex.fetish.robots, is a fetishistic attraction to humanoid robots, or a predilection to fantasies about humans who have been transformed into robots. As humanoid sex robots become much more advanced, robot fetishism may become, well, perhaps not entirely mainstream, but not much weirder than more traditional adult toys.

(3) Elevating the uncanny valley

The “uncanny valley” is the theory that when robots look and act almost like real humans, but not quite, they are revolting to us. But as these near-humans increasingly provide us with pleasure and entertainment, we will become desensitized.



WHY IS THIS IMPORTANT?



Historically, the realm of entertainment has been fertile ground for high-tech innovation. Entertainment is often the first point of commercialization of novel technologies with a lot of “wow” factor. Robotics is also a new content delivery system for entertainment. Historically, advertising and entertainment have had a symbiotic relationship, with marketers sponsoring entertainment in order to reach desired audiences. The proliferation of entertainment robots, especially in the home, will provide marketers with a new media opportunity similar to radio, television, the Web, and video games, allowing a new form of embodied, even visceral, communication.

RESOURCES

- The RoboCup is an international robotic soccer competition to promote research and education in the field of artificial intelligence. <http://www.robocup.org/>
- RoboCommunity is a user community of individuals hacking and modding popular robots from the firm WowWee, such as Roboraptor and Robosapien. <http://www.robocommunity.com/>
- Kal Spelletich is a machine artist focused on “interfacing humans and robots with humans using technology to put people back in touch with intense real life experiences and to empower them.” <http://www.kaltek.org>
- *Emotional Design: Why We Love (or Hate) Everyday Things* by Donald A. Norman (Basic Books, 2005) explores the role emotion plays in consumer purchases and postulates theories about how robots (“emotional machines”) will interact with humans in the future. <http://www.jnd.org/books.html#42>



INSTITUTE FOR THE FUTURE

Technology Horizons Program
124 University Avenue
2nd Floor
Palo Alto, CA 94301
t 650.854.6322
f 650.854.7850
www.iff.org