



HUMAN ROBOT INTERACTION
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SciVestor robotics

PREMIUM RESEARCH FOR THE SCIENCE-BUSINESS
AND SCIENCE-INVESTING COMMUNITIES

Robot builders are beginning to adopt design techniques from the Human Computer Interaction world —resulting in robots that consumers can embrace.

briefing Human-Robot Interaction is Coming of Age

Human-Robot Interaction (HRI) is an emerging discipline focused on the study and design of how humans interact with robots. Effective HRI requires a multi-disciplinary set of competencies including human computer interaction (HCI), human factors engineering, and natural speech understanding among other areas.

Researchers at MIT have been

studying this phenomenon under the [Sociable Machines Project](#) with the robot [Kismet](#) being the primary research platform. Kismet is an extreme example of a robot that tries to mimic complex human emotive behaviors. His substantial array of sensors and actuators allow him to react to verbal intonations be they disciplinary or complimentary.

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Kismet is an autonomous robot designed for social interactions with humans. Here, he expresses 'surprise' one of 14 discrete facial expressions



My First Robot A empirical study in Human Robot Interaction

My first robot was an MC68HC11-based RugWarrior Pro I named "Beto." When I opened the box he came in, I found a couple of motors, tires, a small board, tons of little things to solder, and a few other bits and pieces of robo-guts. Over the next week or so, my kids observed me putting him together on our dinner table. At the end of the week, I put some batteries into him, uploaded some sample code, and watched him make some noises and move around on the floor. The kids giggled and clapped and tried with all their might to get him to come to them as if they were calling a small dog. "Come here Beto! Come here!" Without ever having touched a mouse, keyboard, or joystick, the girls were able to make Beto go where they wanted him to. This was a primitive human-robot interaction that some researchers are now (and probably were then, too) spending their lives trying to understand and develop.

Another source of interesting HRI development is occurring within Japan's NiCT—The National Institute of Information and Communications Technology. NiCT is chartered with creating and promoting new and novel technologies for the advancement of Japanese society.

The [Infanoid Project](#) has recently spawned a small celebrity that's bringing some attention to its project. [Keepon](#) is squishy little yellow "creature" robot that has the appearance of two tennis balls stacked one atop the other. Keepon is part of a study that aims to "relate robotics to human sciences in order to understand the underlying mechanism of social communication specific to humans and some species of primates."

Keepon represents end of the spectrum opposite to Kismet in regards to complexity. Although his implementation model is mechanically complex, his manifest model is profoundly simple. He is a physical caricature with just enough features that it's easy for humans to project a face onto him.

Good robot builders are finally discovering what good application developers know:

1. **No matter how cool the interface is, less of it is better.** A robot with visible cameras, wires, actuators, and other robo-guts that are not necessary for his purpose is less likely to be adopted or to connect with his users. Superfluous stuff just gets in the way.
1. **The Manifest Model should closely match the user's Mental Model.** The complexity of how the robot is implemented should be abstracted or hidden from the user so the robot's interface can apply his mental model to its usage. For example, the mental model kids and most users project onto Keepon is that he's a squishy little guy that doesn't talk .

RECOMMENDED STRATEGIES

As personal robotics platforms make their way towards mainstream, consider the implications of the relationship between the device and the user. Vendors that adopt a "less is more" approach to this interaction will have greater success in proliferating their designs, than will visually complex configurations.

Assuming no supply-chain challenges, SciVestor predicts that a simple to interact with and visually elegant robot like Pleo, from Ugobe will outsell the more complex remote-control robot, Spykee from Erector in 2008, though both are priced in the \$300 range.

Sources

[Rug Warrior Pro Robot, Alan McDonley](#)
[Insights from User Interface Literature](#)

About Face, Alan Cooper

Analysis by Ray Renteria

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Some of the New Faces of Social Robotics



Keepon from NiCT



Pleo from Ugobe



Spykee from Erector