MONITOR

Humanoids on the march

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Robotics: Humanoid robots are becoming ever more advanced. Are the firms making them just interested in publicity, or are they chasing a new market?

FIRST came Asimo, Honda's childlike robot, which was introduced to the world in 2000. Sony responded with QRIO (pronounced “curio”) in 2003. Now a competition has broken out between Japan's industrial firms to see which of them can produce the most advanced humanoid robot—and South Korean firms are getting involved, too. “They are serious about humanoids,” says Dan Kara of Robotics Trends, a consultancy. “They have made a conscious decision to head in that direction.” Corporate rivalry, advancing technology and a desire for publicity, together with a fascination for machines that resemble their human creators and the distant prospect of a vast new market, have conspired to create a fresh breed of robots.

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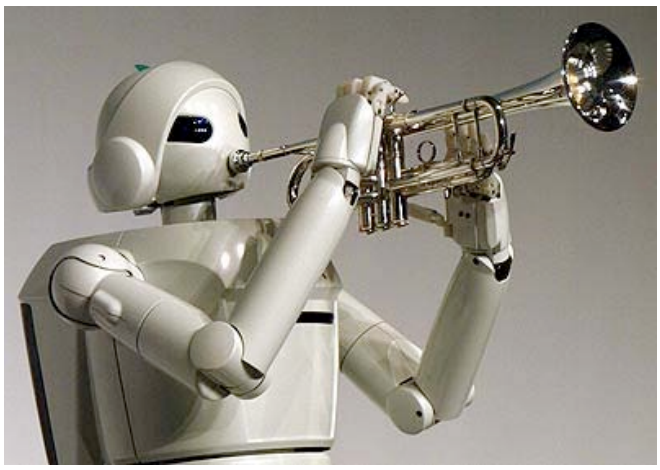


Fanfare for the increasingly common man-shaped robot

The idea of humanoid robots is not new, of course. They have been part of the imaginative landscape ever since Karl Capek, a Czech writer, first dreamed them up for his 1921 play “Rossum's Universal Robots”. (The word “robot” comes from the Czech word for drudgery, *robota*.) Since then, Hollywood has produced countless variations on the theme, from the sultry False Maria in Fritz Lang's silent masterpiece “Metropolis” to the wittering C-3PO in “Star Wars” and the ruthless assassin of “Terminator”. Humanoid robots have walked into our collective subconscious, colouring our views of the future.

But now Japan's industrial giants are spending billions of yen to make such robots a reality. Their new humanoids represent impressive feats of engineering: when Honda introduced Asimo, a four-foot robot that had been in development for some 15 years, it walked so fluidly that its white, articulated exterior seemed to conceal a human. Honda continues to make the machine faster, friendlier and more agile. Last October, when Asimo was inducted into the Robot Hall of Fame in Pittsburgh, it walked on to the stage and accepted its own plaque.

At two and a half feet tall, Sony's QRIO is smaller and more toy-like than Asimo. It walks, understands a small number of voice commands, and can navigate on its own. If it falls over, it gets up and resumes where it left off. It can even connect wirelessly to the internet and broadcast what its camera eyes can see. In 2003, Sony demonstrated an upgraded QRIO that could run. Honda responded last December with a version of

Asimo that runs at twice the speed.

In 2004, Toyota joined the fray with its own family of robots, called Partner, one of which is a four-foot humanoid that plays the trumpet. Its fingers work the instrument's valves, and it has mechanical lungs and artificial lips. Toyota hopes to offer a commercial version of the robot by 2010. This month, 50 Partner robots will act as guides at Expo 2005 in Aichi, Japan.

Other Japanese companies including Fujitsu, Sanyo, Hitachi, Mitsubishi and Epson have also built humanoid robots, most of which walk around and understand a few simple voice commands. Kawada Industries, a Japanese construction firm, has devised a five-foot robot called HRP-2 Promet with the ability to put one foot directly in front of the other, as if walking the plank. It is intended to help carry light loads on building sites. South Korea is also entering the game. The Advanced Institute of Science and Technology has created Hubo, a child-sized humanoid robot. And Samsung, a South Korean consumer-electronics giant, is rumoured to be working on a humanoid robot of its own as well.

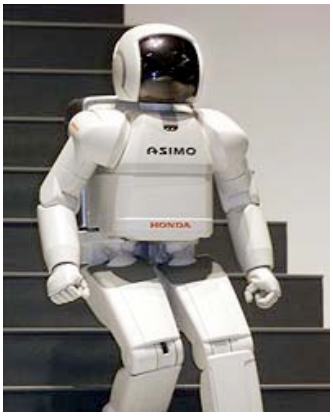
Despite their sudden proliferation, however, humanoids are still a mechanical minority. Most of the world's robots are faceless, footless and mute. They are bolted to the floors of factories, stamping out car parts or welding pieces of metal, machines making more machines. According to the United Nations, business orders for industrial robots jumped 18% in the first half of 2004. They may soon be outnumbered by domestic robots, such as self-navigating vacuum cleaners, lawn mowers and window washers, which are selling fast. But neither industrial nor domestic robots are humanoid.

And a good thing too, says Hans Moravec, a roboticist at Carnegie Mellon University. “The human shape is an evolutionary accident,” he says, “and slavishly imitating it is more about show business than good engineering.” Even though robotic technology has advanced rapidly, Dr Moravec says it is still far too early to pretend that any machine can truly emulate human capabilities. “A three-armed, wheeled cylinder that crawls up stairs and folds up like a houseplant when not in use may be a better configuration than a big mannequin,” he says. Takeo Kanade, another Carnegie Mellon roboticist who has academic ties to the field on both sides of the Pacific, agrees. “The human body itself is not necessarily the best design for a robot, contrary to most people's convictions that evolution has made us the perfect machine,” he says.

But while the humanoid form may not be perfect, there are some good reasons to emulate it. In the short term, humanoid robots generate huge amounts of publicity: as the gruelling tour schedules of the various humanoid robots attest, this is currently their main function. “The Asimo humanoid robot from Honda makes news wherever it goes,” says Honda's website, while Sony calls QRIO a “corporate ambassador”.

In the longer term, humanoid robots could be pressed into service as domestic helpers—and since homes are designed for use by people, humanoids might indeed be the best shape. “We human beings have engineered our environment to accommodate our physiology,” observes Jeffrey Smith of Honda. “So a very efficient shape for operating in that world is a humanoid one.”

Reuters



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In particular, robot-makers expect great demand for helper robots as millions of baby-boomers reach old age. “There will be far more people in the future in need of assistance in their homes than people willing to do those jobs,” says Mr Smith. “I think the first applications will be in assisted living environments, and once the cost has dropped to the price of a car, you may then see them in homes.” Hideki Komiyama of Sony agrees. “Robots are going to be a part of everyday life,” he says. “They'll be as common as cell phones.”

But even if a mass market for humanoid robots never materialises, there is a third and final justification for building them: because it is difficult. By developing humanoids, companies can both demonstrate their technological prowess and benefit from ancillary breakthroughs that emerge along the way. Just as the goal of putting a man on the moon resulted in unforeseen technological advances that were often applied outside the field of space travel, the robot-makers believe that tackling the seemingly impossible now could pay big dividends later. So expect the march of the humanoids to continue.