

## Trust me, I'm a robot

In 1981 Kenji Urada, a 37-year-old Japanese factory worker, climbed over a safety fence at a Kawasaki plant to carry out some maintenance work on a robot. In his haste,<sup>1</sup> he failed to switch the robot off properly. Unable to sense him, the robot's powerful hydraulic arm kept on working and accidentally pushed the engineer into a grinding machine. His death made Urada the first recorded victim to die at the hands of a robot.

This gruesome<sup>2</sup> industrial accident would not have happened in a world in which robot behaviour was governed by the **Three Laws of Robotics** drawn up<sup>3</sup> by Isaac Asimov, a science-fiction writer. The laws appeared in *I, Robot*, a book of short stories published in 1950 that inspired a recent Hollywood film. But decades later the laws, designed to prevent robots from harming<sup>4</sup> people either through action or inaction, remain in the realm of fiction.

Indeed, despite the introduction of improved safety mechanisms, robots have claimed<sup>5</sup> many more victims since 1981. Over the years people have been crushed, hit on the head, welded and even had molten aluminium poured over them by robots.

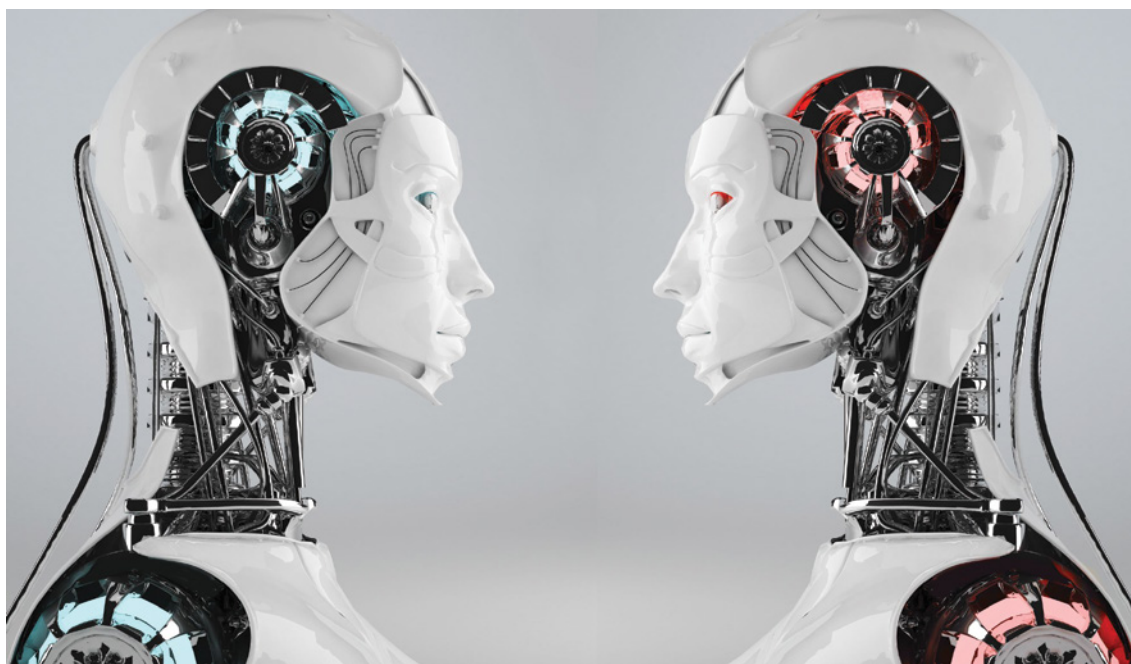
With robots now poised<sup>6</sup> to emerge from their industrial cages and to move into homes and workplaces, roboticists are concerned about the safety implications beyond the factory floor. To address these concerns, leading robot experts have come together to try to find ways to prevent robots from harming people.

"Security and safety are the big concerns," says Henrik Christensen, chairman of the European Robotics Network at the Swedish Royal Institute of Technology in Stockholm, and one of the organisers of the new robo-ethics group. Should robots that are strong enough or heavy enough to crush people be allowed into homes?

According to the United Nations Economic Commission for Europe's World Robotics Survey, in 2002 the number of domestic and service robots more than tripled, nearly outstripping their industrial counterparts. By the end of 2003 there were more than 600,000 robot vacuum cleaners and lawn mowers. Japanese industrial firms are racing to build humanoid robots to act as domestic helpers for the elderly, and South Korea has set a goal that 100% of households should have domestic robots by 2020. So what exactly is being done to protect us from these mechanical menaces? "Not enough," says Blay Whitby, an artificial-intelligence expert at the University of Sussex in England. One approach, which sounds simple enough, is try to program them to avoid contact with people altogether. But this is much harder than it sounds. Getting a robot to navigate across a cluttered<sup>7</sup> room is difficult enough without having to take into account what its various limbs or appendages<sup>8</sup> might bump into along the way.

### GLOSSARY

- 1** great speed in doing something because you don't have time
- 2** shocking
- 3** written
- 4** injuring
- 5** caused the death of
- 6** ready
- 7** full of too many things
- 8** something that is connected to a larger thing





Regulating the behaviour of robots is going to become more difficult in the future, since they will increasingly have self-learning mechanisms built into them, says Gianmarco Veruggio, a roboticist at the Institute of Intelligent Systems for Automation in Genoa, Italy. As a result, their behaviour will become impossible to predict fully, he says, since they will not be behaving in predefined ways but will learn new behaviour as they go.

Then there is the question of unpredictable failures. What happens if a robot's motors stop working, or it suffers a system failure just as it is performing heart surgery or handing you a cup of hot coffee? According to Hirochika Inoue, a veteran roboticist at the University of Tokyo, "one hundred per cent safety is impossible through technology". This is because ultimately no matter how thorough you are, you cannot anticipate the unpredictable nature of human behaviour, he says. Or to put it another way, no matter how sophisticated your robot is at avoiding people, people might not always manage to avoid it, and could end up tripping<sup>9</sup> over it and falling down the stairs.

"Making sure robots are safe will be critical," says Colin Angle of iRobot, which has sold over 2m "Roomba" household-vacuuming robots. But he argues that his firm's robots are, in fact, much safer than some popular toys. "A radio-controlled car controlled by a six-year old is far more dangerous than a Roomba," he says.

(Adapted from *The Economist*)



Ilaria Piccioli  
Take  
the Wheel  
Again  
New Edition

## GLOSSARY

9 stumbling

## ACTIVITIES

1 Answer the following questions.

- 1 Who was Kenji Urada?
- 2 Why did he become famous?
- 3 Who is Isaac Asimov?
- 4 Why is safety the major concern among roboticists today?
- 5 What are the most common domestic robots?
- 6 Why is it difficult to control the behaviour of a robot?

2 Explain in your own words the meaning of the following terms and expressions.

- 1 Plant .....
- 2 Laws .....
- 3 Victims .....
- 4 Chairman .....
- 5 Humanoid .....
- 6 Sophisticated .....

3 What are the Three Laws of Robotics? Do some research and report to the class.