Artificial incompetence

Will robots take over the world? Nah, says **Douglas Heaven**

WE ALL know how it ends: the machines rise up to enslave their puny masters. Robots and artificial intelligences may so far have confined themselves to blameless pursuits such as vacuum cleaning, beating us at board games and recommending products we might also like. But as they continue their inexorable rise, entering a "singularity" of runaway self-improvement, they will inevitably turn their attention to robopocalypse. Stephen Hawking says AI could spell the end for humanity. Elon Musk thinks it could lead to world war three. Vladimir Putin says whoever controls AI will control the world.

Maybe so. But as comic strip author Randall Munroe – himself formerly a roboticist – puts it in his book *What If? Serious scientific answers to absurd hypothetical questions*: "What people don't appreciate, when they picture Terminator-style automatons striding triumphantly across a mountain of human skulls, is how hard it is to keep your footing on something as unstable as a mountain of human skulls."

Far from being a steady march to greatness, the past and present of robotics and AI are littered with examples of banal practicalities tying machines down. If you want to look at what the future of AI really holds, it's not the highlight reels that matter – it's the out-takes.

Boston Dynamics in Waltham, Massachusetts, makes some of the most advanced robots in the world. In a TED talk earlier this year, founder Marc Raibert showed off his firm's range of machines. There is BigDog, a four-legged metal pack mule that can cope with stairs and rough terrain; WildCat, which can run at more than 30 kilometres an hour; and SpotMini, a dog-like robot designed for homes and offices that has an arm for a head.

Impressive, or terrifying, depending on your point of view. But Raibert also played a video that showed the humanoid Atlas robot missing some shelves where it was supposed to deposit a carton, then tripping over the shelves and finally falling flat on its face.

The fact is, moving is hard. So is not moving: when we stand still, our brains have to tell our muscles to make tiny adjustments all the time just to keep us upright. Robots are terrible at it. They aren't very good at opening doors either. And for all BigDog's abilities, don't even talk about stairs.

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First casualty in the robot wars

Judging by the awkward ascents of most robots, to avoid the rise of the machines we only need to retreat to the mezzanine.

Robots that aren't quite as good as they seem have a glorious lineage. At the 1939 World's Fair in New York, the Westinghouse Electric Corporation paraded Elektro the Moto-Man, a "talking", cigarette-smoking robot. It could move a little, count its fingers and utter lines such as "I am Elektro" and "My brain is bigger than yours". Standing more than 2 metres tall, the golden humanoid wowed crowds. Westinghouse even built it with a hole in its chest lest people think there were human operators inside.

Actually, Wizard-of-Oz-like, they were behind a curtain. A light bulb would flash to signal that a voice command had been received, so they could press a button to play a recording. Elektro went on tour again in 1950 and appeared as campus computer Thinko in the 1960 comedy romp *Sex Kittens Go to College*, proving that, in common with their human creators, robots have no shame.

In fairness, Elektro was more publicity stunt than the stuff of serious research. Not so NASA's hydraulic, spacesuit-testing robot of the early 1960s. Built by Joe Slowik, an engineer at the Illinois Institute of Technology in Chicago, the idea was to kit the robot out in the latest experimental suit and suspend it from the ceiling to mimic the effects of zero gravity. An operator would guide it through a repertoire of lifelike movements using a network of small tubes carrying high-pressure oil under the robot's aluminium skin.

But the tubes weren't strong enough to contain the pressurised oil and leaked. Crippled by incontinence, the robot ended its days wearing a nappy, a wetsuit used to contain the fluid. It never graduated to a spacesuit.

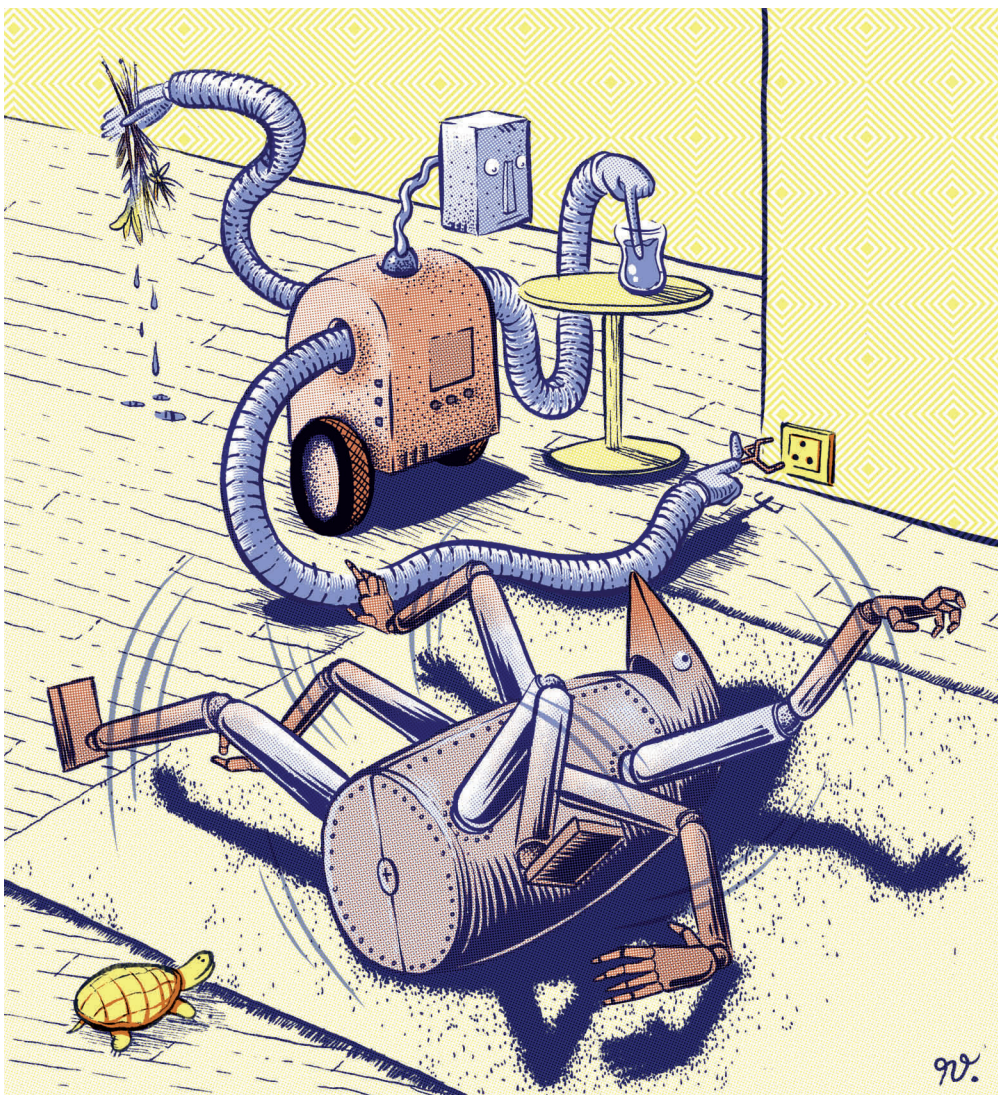
Most robotics researchers have their favourite bad robot story. For Alan Winfield at the Bristol Robotics Lab in the UK, it involves an assembly-line robot rigged to open a fridge and pass out cans of Coke to passers-by at a trade show. The fridge door stopped working, so the robot arm punched its way through, grabbed a can and then lifted the entire fridge as it tried to remove ›

the drink. If that's back in the realm of the unnerving, Winfield does note that although he has heard the story many times, it might be apocryphal.

Roomba, the robotic vacuum cleaner, is very real. When Jesse Newton's example encountered puppy mess in the middle of its nightly clean, it simply continued its cycle, smearing it over the entire floor. Never mind robopocalypse, this was "poocalypse", in Newton's words. According to a spokesperson for iRobot, the company that makes Roomba, it wasn't an isolated incident.

The popularity of YouTube videos celebrating robotic epic fails is proof of our schadenfreude when robots go wrong. "Watching things fail is always funny and with robots you avoid the need to feel bad," says the founder of the "Shitty Robots" forum on the web discussion site Reddit, who goes by the name mr_bag. "I also quite enjoy how the robots in question often manage to come across as being quite proud of their achievement."

But Winfield thinks out-take videos serve a more serious purpose. Greater familiarity with dead ends and failed experiments would help counter the Hawking-Musk narrative that a superintelligence will take over the world, he says. It shows AI and robotics for what they are: very human endeavours whose products are limited by human flaws and foibles. "They are a great reality check that real-world robots fall well short of the hype," he says.



RENAUD VIGOURT

DUMB AND DUMBER

If machines aren't all they are cracked up to be (see main story), some were never meant to be any good in the first place.

There is something cathartic about a useless machine. Perhaps it comes from our unease about our perceived diminishing place in the scheme of things, but a machine that clearly does nothing – or even defeats itself – makes us feel better for a moment.

Take AI pioneer Marvin Minsky's mechanised box. Its sole action when switched on was to extend a hand to turn itself off again. Minsky also invented a machine that would ring a bell if it sensed that the gravitational constant had changed.

The Unplugger robot, created by "sculptor of the useless and absurd" Nik Ramage, is a more recent variant on this theme. Plugged into a power socket by a short cable, this steampunk contraption trundles forwards until it pulls out its own plug.

Occasionally, tech nihilism takes on a darker flavour. Artist Matt Kenyon has built a small, wheeled robot that searches for and sucks up puddles of Coca-Cola from the floor through a straw, before spraying the drink over itself. The acidic liquid slowly eats through the robot's skin until it reaches the circuitry, causing a breakdown.

Simone Giertz, YouTube's "queen of shitty robots", has become synonymous with the form. Starting with an idea for a machine that she would actually like to have, Giertz builds something so over the top that it is ridiculous. "It's funny in the same way as a well-trained show dog suddenly stopping to poop on the arena floor," she says. Highlights include a breakfast-making robot that hurls Cheerios and milk over a table, a lipstick applicator that smears make-up across her cheeks and a wake-up device that slaps her repeatedly before getting tangled in her hair. In her videos, Giertz sits blithely by – a picture of the human serenity we should adopt in the midst of mechanical meltdown.