

Best Bot, You Bet

Some publications make an annual event of presenting the richest, the most available, even the dumbest (Darwin Awards) people in America. Offering a different take on hero worship, the editors at *Wired* magazine recently announced in print their own list of the 50 Best Bots Ever, replacing movie stars and moguls with automatons and androids.

There are a few finalists from Hollywood on the list (HAL, R2-D2, the Terminator), but most are from the more conventional centers of research—MIT, Carnegie Mellon, NASA, and Honda. Some of the toys are familiar: Aibo, Sony's shiny pooch (#38), for instance, would make an apt companion for the company's new Qrio (#6), a robot that can kick a soccer ball around the room as it sings a song. But the products of serious research are more like the two rovers (#3) still wandering around the Martian valleys; the Dante II (#9), an explorer designed to take readings in the throats of volcanoes; and T-52 Enryu (#12), an 11-foot-tall, two-armed robot that can dig through debris to rescue earthquake survivors.

And then there's number one. Not humanoid in shape, not a scuttling cart, not a toy—*Wired's* Best Bot Ever is Stanford University Racing Team's Stanley, a 2004 Volkswagen Toureg. Yes, it's a car—a car with about \$500,000 worth of innovative engineering that allows Stanley to drive himself, or, rather, itself.

Stanley was Stanford's official entry in DARPA's (Defense Advanced Research Projects Agency) \$2 million Grand Challenge II—a race across the Mojave Desert by unmanned robot racing cars. Stanford's artificial intelligence laboratory modified the SUV with four "seeing" systems and the mechanical systems needed to respond to the five onboard computers.



Sebastian Thrun headed up a team of five who mounted on the VW's rooftop a GPS system, a laser range-finder that can look 30 meters ahead while scanning side to side, and a video camera that sends data back from down the road so the car can see 80 meters ahead. Photo sensors in a wheel well monitor how far the car has traveled.

At the end of the 128-mile desert course, Stanley was first in a finishing field of four, including two multimillion dollar Humvees modified by the Carnegie Mellon Red Team. Nineteen other entries couldn't manage the terrain and didn't finish.

Intel's R&D director, Justin Rattner, characterized the race as very significant. He was quoted in *Wired* declaring, "This is a watershed moment—much more so than Deep Blue versus Kasparov. Deep Blue was just processing power. It didn't think. Stanley thinks. We've moved away from rule-based thinking in artificial intelligence. The new paradigm is based on probabilities. It's based on statistical analysis of patterns. It is a better reflection of how our minds work." Others compared Thrun's team to the Wright Brothers.

And as to whether humans will be willing to hand over the steering to a robot anytime soon, one commentator pointed out that there usually isn't a panic on board when, in mid-flight, your pilot turns the controls over to the bot systems on his flight panel.

To see *Wired's* entire list, go to <http://www.wired.com/wired/archive/14.01>, and then read Joshua Davis's story about Stanley, "The Robot Race Car Champion." ■