

How bots can earn more than you do

Software robots can already outperform people on the stock markets. And that's just the beginning

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ONE morning this month, David Pardoe earned himself \$4.7 million without lifting a finger. All the hard work was done by a robot. True, it was a robot without a body – a software robot, in fact – but almost a century after the word “robot” was coined, the vision of automaton slaves is at last becoming reality.

Software robots – also known as bots or software agents – can earn hard cash in the real world. They can even outperform people in some tasks, so it makes sense to let them do all the hard work.

In Pardoe's case, the bots bringing home the bacon were taking part in an agent trading competition being held in the UK at the International Joint Conference on Artificial Intelligence in Edinburgh, a contest in which Pardoe and his team from the University of Texas, Austin, beat 25 other programs. But despite the fact that their bot, called TacTex-05, was playing in what was in effect a game, in which no real money changed hands, the simulation was realistic enough.

It is widely recognised that the computer manufacturer Michael Dell became a multibillionaire by

streamlining his supply chain to produce highly competitive made-to-order computers. Similarly, the agents taking part in the trading competition were given the task of buying microprocessors, motherboards, hard drives and memory from a range of fictitious suppliers, assembling the computers in response to orders from equally fictitious customers and then finally delivering them.

“Agents can monitor prices and react much faster than people,” says Michael Wellman at the University of Michigan. Peter Stone of the University of Texas, Austin, who supervised Pardoe's project, says TacTex-05 probably won because it was designed both to adapt to the market and predict when to buy in stock cheaply to anticipate future demand.

These bots could be used almost immediately but for one thing, says Nick Jennings, head of the Intelligence, Agents, Multimedia group at the University of Southampton, UK. In the real world there is no infrastructure equivalent to the Edinburgh trading simulation. There would need to be some way for software to automatically secure supplies and take customer orders, and at the moment this simply does not exist, he says.

Wheeling and dealing

But this is not a problem in another area where there is real money to be made: the stock market. With the computerisation of large financial exchanges such as the London Stock Exchange and NASDAQ, agents are now routinely used in financial markets, says Dave Cliff, director of Deutsche Bank's Complex Risk Group in London. This is particularly the case with the equities market, in which companies buy and sell stocks and shares. The big strategic decisions are still made by human traders, such as which stock to buy or sell, Cliff says. But algorithmic trading systems, as the software robots operating in equities markets are called, have the power to decide

exactly when to buy or sell shares.

If you are a pension fund manager and you've decided to sell a million shares in some company, merely revealing your intention to sell will result in the market moving against you. So ideally you would want to dump the stock in such a way that no one notices what you are doing. The earlier, simple software robots might have taken a big order, sliced it into 100 equal-sized smaller orders, and dribbled those inconspicuous slices into the market at regular intervals over some predetermined period of time – a few minutes, hours or days – in the hope that the smaller orders did not move the market price so dramatically.

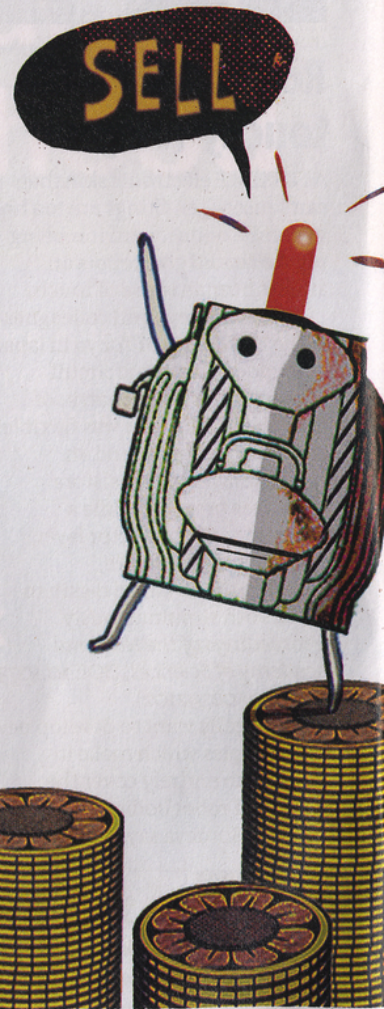
COMPUTE BY THE HOUR

One market in which only agents will be able to work effectively is in so-called “grid” utilities. This is the idea that large technology companies will sell a few minutes or hours of their computer processing power to anyone willing to pay. Processing power will effectively become a utility that anyone can buy, just like water, gas or electricity.

Earlier this year Hewlett-Packard ran an experiment to this effect in which 10 movie animation companies took part in an auction of 120 of HP's computer server resources. So instead of animation companies having to buy

their own equipment to render their films, they could simply buy processing time from HP only when they needed it through an automated marketplace. As demand for computational resources tends to fluctuate, this would be reflected in the price.

A further complication is that individual supply companies would not operate in isolation, but would have to compete with other grid utility companies for customers. Agents will be necessary to ensure the market is effective and profitable, because only software will be capable of responding quickly enough.



"Not only do bots relieve humans of routine tasks, agents can make better traders"

While these bots got the job done, today more sophisticated agents can cover their tracks more adeptly, by varying the amount they sell, for example, or even by buying up the very stock they are trying to dump, Cliff says.

Not only does using bots relieve humans of routine tasks, but there is also evidence that agents make better traders than humans. In a trial in 2001, IBM showed that trading agents performed better than humans when they were pitched against each other buying and selling commodities. The bots

made 7 per cent more cash than the humans. What's more, when humans were removed from the market so that agents just traded against each other, the average profit margin increased in a simulated commodities market.

This appears to be borne out in the real world, says Richard Balarkas of Credit Suisse First Boston in London. Agents are already outperforming their human counterparts, he says. "They are pretty sophisticated. They are doing what a trader would like to do." Agents are able

to take in far more information than human traders. According to studies of human traders' behaviour, people only look at three or four variables before making a decision. Bots can study hundreds, and refer back to a wealth of historical information on trading trends.

The technology is not just for the stock market. In the next few years consumers are going to start to benefit from this sort of technology, Jennings says. He envisages people buying gas and electricity using agents to switch to the supplier offering the most competitive rates, or to get the best rates from mobile phone companies.

But while saving money on

purchases is one thing, actually earning it is another. At the moment, one way to earn real cash is online poker. Online poker players strongly disapprove, but people are definitely using bots, says Jason Noble, who studies complexity and adaptive systems at the University of Leeds, UK. One, called Vex Bot, developed at the University of Alberta's computer poker research group, is claimed to be good enough to take on poker masters. But Noble points out that such sophistication is not really necessary. The vast majority of people playing online poker don't really know what they are doing. A bot wouldn't have to be particularly clever to clean up. ●

