ALREADY ROAMING WEB, BOTS ARE HEADING INTO A NEW DOMAIN

Some believe the cyberspace agents will handle personal tasks for Internet users in addition to gathering data.

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Every day at lunchtime, Friday asks Milind Tambe what he craves. A roasted chicken breast sandwich? A tandoori chicken pizza? Answer in hand, Friday dutifully orders the item for pickup or delivery.

Friday also keeps track of the University of Southern California professor's whereabouts, schedules his meetings, and warns colleagues if Tambe is running late.

Friday is no ordinary personal secretary, though. Friday isn't human at all.

It's a software robot, or "bot," alive entirely in cyberspace.

One day, some researchers believe, all Internet users will have personal bots to take care of daily tasks, including communicating with other people through their bots. Instead of phone tag, we could all be playing bot tag.

Simpler bots are already roaming the Internet, helping users find Web pages, compare prices, even monitor gossip.

"Things are getting more complicated, so we needed these assistants," Tambe said. "And since we have them, we can afford to let things get more complex."

But bots can be troublesome as well, and some have already caused problems.

"A robot could destroy data, violate copyright or strain resources on another site," said Ben Shneiderman, director of the Human-Computer Interaction Laboratory at the University of Maryland. "Who's responsible for failures?"

One particular bot visits the lab's Web site every 15 minutes and downloads the same software - for no apparent reason, he said.

Software robots date back to the 1950s and '60s, but they didn't begin to appear en masse until the '90s. Today's bots are smarter, more autonomous and more adaptive to their environment.

Early bots crawled the Net for information. One widely used bot named Archie looked for software available through the Net's file-transfer protocol. The World Wide Web Wanderer and its successors scoured the Web for sites to list on search engines.

These days, shopping bots gather prices on books, compact discs and other items at hundreds of e-commerce sites, allowing would-be shoppers to get price and availability information from a single site.

Of course, some bots simply annoy. Spam bots collect e-mail addresses from online newsgroups for marketing pitches. Some chatter bots do little but visit chat rooms, poorly pretending to be humans.

But others can be enjoyable. A bot named Digital frequents a chat room at Observers.net to give the latest weather and explain technical terms. Participant Kelly Hallissey observes: "What a hoot it was."

Like them or not, bots have become essential in many respects. Imagine surfing for information without access to search engines. Though a few directories, such as Yahoo's, are compiled by humans, those only track a sliver of what a bot can gather.

Bots scan Web pages for links to discover even more pages. They look for links until they reach a dead end, at which point they hit the equivalent of a "back" button to find yet another path to follow. At each stop, the bots gather relevant data for indexing.

"Try to imagine any subject, however bizarre, and they will come up with something," said Alan Emtage, who developed the search bot for Archie. "It's practically impossible to navigate your way without these resources."

Instead of simply creating indexes, future bots may automatically deliver Web pages to you based on your personal preferences, said Larry Page, chief executive for search engine Google, whose bots now visit 2,000 Web pages per second.

Future bots also promise to automatically order items for you, instead of simply bringing back prices. They may buy groceries based on your eating habits or automatically arrange flights and hotel rooms based on your appointment calendar.

Bots have already been developed for corporate information-gathering and espionage. They can quietly scan newsgroup postings and other online resources for mentions of you, your company or your competitors.

On Jan. 31, a Swiss company called Agence Virtuelle announced RumorBot, a tool that promises to "track customers' views and rectify any grievances before serious damage."

Such bots may raise privacy issues, but the company said RumorBot would only check public forums that any human could already visit. Stephane Perino, the company's founder and chief executive, said the Internet is too large for humans to efficiently monitor, yet rumors in one corner of cyberspace could potentially affect stock prices or do other damage.

But bots will need to become more reliable before most humans will give them more control.

Danny Sullivan, editor of SearchEngineWatch.com, says that while bots are crucial for searching, they are inherently dumb because they are software and can't think for themselves.

Web crawlers have been caught in endless loops - "spider traps" - when Web pages link back to each other.

When the Sony PlayStation 2 went on sale late last year, BlueLight.com and other shopping sites faced an onslaught of bots checking for availability.

BlueLight spokesman Dave Karraker said the site slowed by 50 percent until engineers figured out how to block the offending bots.

EBay Inc. and Register.com Inc. have filed lawsuits to stop software robots, claiming trespassing, and federal judges have issued preliminary injunctions against bots created by Bidder's Edge Inc. and Verio Inc.

"If there were no rules against this, [you could have] tons and tons of individuals on the Internet having tons and tons of bots running, hitting any site," said Robert Gardos, Register.com's chief technology officer.

If enough bots did this at once, he said, sites would crash.

Bots could also compound problems by acting more quickly and in unison based on uniform programming rules, said Michael Kearns, head of artificial intelligence research at AT&T Labs.

For example, the stock market is already prone to fluctuation as investors buy and sell in droves based on the news of the moment. But it takes at least a few minutes for humans to execute decisions, and reason may prevail in some instances.

If robots take over trading, Kearns said, those checks and balances could disappear.

Tambe, who helped develop Friday and is still testing it, has experienced problems firsthand.

Friday once canceled an important meeting with one of Tambe's supervisors. The meeting was kind of important: The professor was to discuss funding for his lab.

"My agent figured out that since I wasn't here in themorning, I was most likely going to cancel the meeting," he said.

For now, the professor has no plans to share his credit card number with Friday. Tambe figures that "tomorrow it could go out and order 100 books for me based on my interests."