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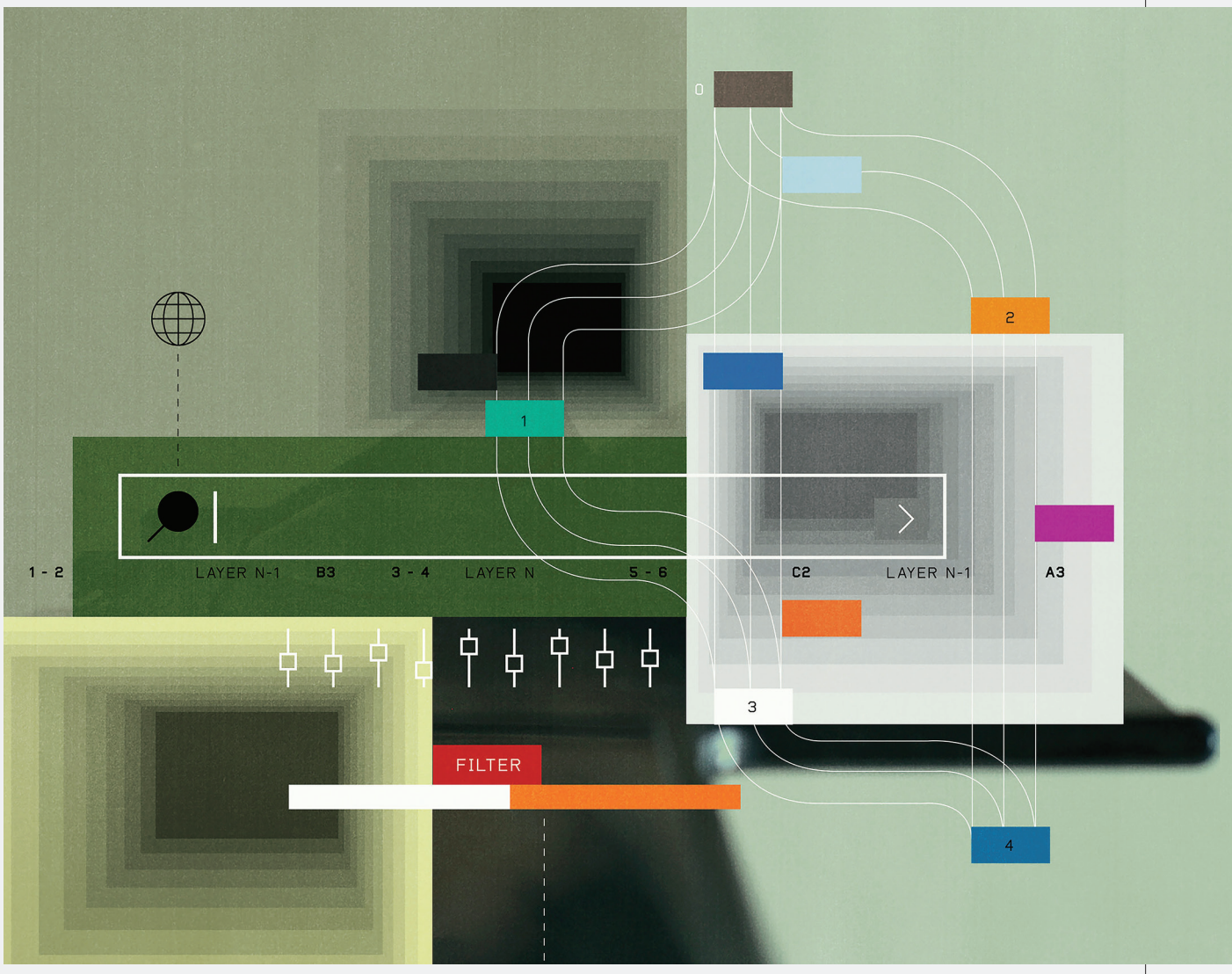

ARTIFICIAL INTELLIGENCE

The Web Is Being Remade for AI Agents

› Search and social media take a back seat

BY EDD GENT

Rapidly improving AI chatbots are quickly becoming people's go-to way to find information on the Internet. The trend is only likely to accelerate as tech companies roll out more-skilled AI agents. Unlike chatbots, agents can interface with external tools and application programming interfaces (APIs) to autonomously carry out more-complex online tasks for users, such as doing in-depth research or making purchases. Experts now predict that we may soon see the emergence of an "agentic Web,"

Illustration by Stuart Bradford

where the primary users of the Internet become AI actors rather than humans.

The modern Internet is, for better or for worse, built on advertising. Most of the platforms people rely on to find information online, including search engines and social media sites, make the bulk of their money from advertising, says Jun Wang, a professor of computer science at University College London. By harvesting data on users' browsing habits and interests, these sites and apps offer marketers the ability to precisely target individuals with personalized content, which has seen these websites corner a growing proportion of advertising spending.

"The agentic Web is going to change everything," says Wang, predicting that people will increasingly rely on agents as proxies to navigate the Web on their behalf. Wang and his colleagues argue this change in behavior could lead to a new "agent attention economy" where advertisers and service providers increasingly jockey to be noticed by agents. As they change their habits, the Internet itself will start to change with them.

Agents will be faced with the same challenges as today's human Internet users; they'll have to select which of many available services and tools to rely on.

Wang spent most of his career developing the technology that underpins today's online economy. He worked on recommendation algorithms that parse browsing data to identify the content and products that might interest individuals, and he helped develop real-time auction technology that lets marketers compete to have their ads displayed to specific users. But, in the age of AI agents, these systems will need to adapt considerably, he says.

One of the key enablers for a future agentic Web is the Model Context Protocol (MCP) developed by Anthropic, which provides a standardized way for AI models to interact with things like databases, APIs, and other Web services. In order to carry out user instructions, agents will break them down into subtasks and then call on various external MCP-enabled tools to help solve each smaller problem. For example, if asked to plan a holiday, the agent might separately interface with map services tools, hotel booking platforms, and weather information services.

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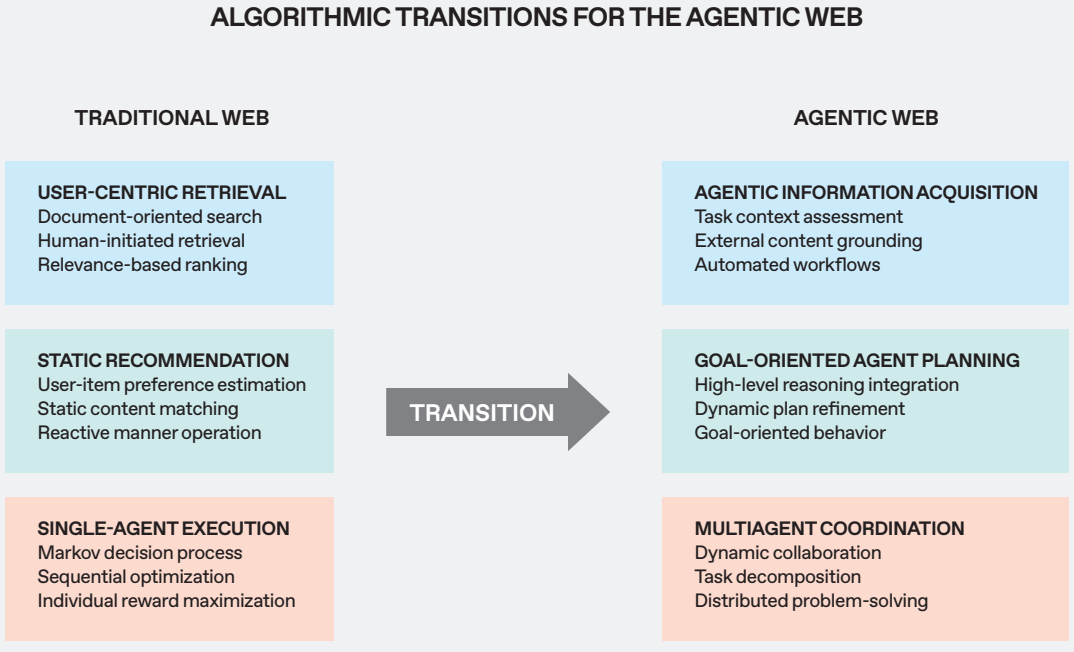

The agentic Web will change the Internet from a human-centric experience into something that is primarily constructed for, and used by, AI agents.

YINGXUAN YANG, MULEI MA, ET AL.

users, says Wang; they'll have to select which of many available services and tools to rely on for each subtask. Providers of these services will also face the mirrored challenge of ensuring their option is the one that is selected. Solving these problems will require new technology and novel models of agent behavior to ensure these sometimes competing incentives line up.

In some areas, the underlying mechanisms could be very similar, says Weinan Zhang, a computer science professor at Shanghai Jiao Tong University, in China. (Zhang, like Wang, is one of the coauthors of a July arXiv preprint about the agentic Web.) Advertisers currently compete for the eyeballs of human users; likewise, they'll compete to appear in an agent's "context window"—essentially the AI model's working memory, which holds all the information needed to complete a task.

Exactly how this will be achieved remains an open question, but Zhang says it could involve a kind of auction system similar to the ones used in Web advertising today. Model developers could allow service providers to bid to be included in the options considered by the model, and even pay extra for increased prominence in the shortlist.

New agent-focused forms of search-engine optimization may emerge as well, says Zhang. Rather than using natural-language searches that focus on keywords to surface the best results, AI agents may increasingly rely on more elaborate data representations like dense vectors, which can incorporate details like the semantic meaning and context of a search query. This may lead to marketers more generally optimizing Web content for these new search approaches, rather than human-readable ones.

An interesting dimension to the agent attention economy, says Zhang, is that it may increasingly involve interactions between multiple agents to solve tasks. This could be made possible by the Agent2Agent Protocol introduced by Google, which enables agents from different providers and with different capabilities to communicate and collaborate with each other. For example, an AI agent might book a hotel through an AI agent working on behalf of the hotel chain.

Here again, agents will need some way of deciding which agents to cooperate with. Zhang says we may see the emergence of a new agentic version of PageRank—a system used by search engines to establish the relevance and trustworthiness of Web pages.

The current PageRank algorithm examines Web pages to determine the number and quality of other Web pages that link back to them. In the new paradigm, agents that handle certain tasks would replace Web pages, says Zhang, and those that are consistently called upon by other popular agents would get a higher rank that would boost their visibility and reputation.

"If the agent is very capable at collaborating with a team to finish different kinds of users' tasks, a lot of agents will call this agent," Zhang says. "The 'PageRank' of this agent will be very high, so that means on the agentic Web, this agent will be very important—just like a very large website."

Ceding this much control to autonomous systems might seem alarming, but Wang says there are likely to be ways for humans to maintain high-level control over their agentic proxies. One simple option would be to allow users to select which service providers their agents can interact with.

"For example, if I use Booking.com quite often and I use Amazon, I just subscribe to their MCP servers," Wang says. "Then the agent is constrained to their environment to do the deal for me, because those are the partners I trust."

Wang admits this vision remains some way off. Most people are still a long way from trusting AI agents to roam the Internet making purchases for them, and advertising technology for agents doesn't yet exist. Creating an agentic attention economy will likely require big players to come together to develop tools that can navigate competing interests and complex multiagent coordination problems, he says.

If these problems are solved, it could fundamentally change the nature of the Internet. People will increasingly access the Web through digital assistants without ever actually browsing websites themselves, says Zhang, and Web pages and online services will increasingly be tailored for agents rather than humans: "The conventional Web will shrink." ■

TELECOMMUNICATIONS

Ranging Codes Pinpoint Deep-Space Probes

RESEARCHERS IN CHINA have developed processing algorithms that could pinpoint space probes with meter-level precision—even as far as 180 million kilometers from Earth.

Radio signals sent to and from deep-space probes contain special ranging codes that contain differentiated mathematical "notches." The travel time for a specific notch to return to Earth is used to calculate the probe's distance.

The new codes, called Legendre sequence ranging codes, or LS codes, could enable precise communication over longer distances without incorporating additional signal processing. "This is invaluable for faster, simpler navigation during critical operations," says Xiaoyu Dang, a professor at Hangzhou Dianzi University.

The LS codes exploit the properties of Legendre sequences to offer a much longer "measuring tape." In simulations, the new codes reliably measured distances that are between 12 and 2,375 times as far as the distances that existing measuring codes can precisely determine.

The researchers will next test their code using hardware. If lab tests are successful, the team hopes to propose the code for use in future missions by various space agencies.

The researchers described the ranging codes in a study published 11 August in *IEEE Communications Letters*.

—Michelle Hampson