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A Question for AAAI: Does AI Need a Reboot?

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This year marks the 25th anniversary of the Association for the Advancement of Artificial Intelligence (AAAI, formerly the American Association for Artificial Intelligence) Conference, which will be held on 7–11 August in San Francisco, California. AAAI is an important and strategic partner of *IEEE Intelligent Systems*, and our magazine will have its first in-person editorial meeting in five years at the AAAI Conference. I wish our associate editors and advisors, and every conference participant, an exciting time with a full taste of San Francisco's colorful cultural and natural beauty!

Unthinkable Machines?

In a timely “gift” for the 25th AAAI Conference, according to MIT's *Technology Review* published on 5 May 2011, during a panel discussion that kicked off MIT's Brains, Minds, and Machines Symposium, “Some of the founders and leading lights in the fields of artificial intelligence and cognitive science gave a harsh assessment” of “the lack of progress in AI over the last few decades” and called “for a return to the style of research that marked the early years of the field, one driven more by curiosity rather than narrow applications.” Marvin Minsky, Patrick Winston, Noam Chomsky, Barbara Partee, Emilio Bizzi, Sydney Brenner, and others were presented at the workshop and offered their critique of “unthinkable machines” developed by AI and robotics so far.

Winston considered the decline in funding after the Cold War and early attempts to commercialize AI only part of the reasons for AI's stagnation. He cited “mechanistic balkanization” of the field, with research focusing on ever-narrower specialties such as neural networks or genetic algorithms, as the biggest culprit. “When you dedicate your conferences to mechanisms, there's a tendency to not work on fundamental problems, but rather [just] those problems that the mechanisms can deal with,” said Winston. His suggestion? “Researchers should instead focus on those things that make humans distinct from other primates, or even what made them distinct from Neanderthals.”

Both Chomsky and Partee emphasized that understanding human language was the key to creating genuine thinking machines. Chomsky derided some machine learning researchers “who use purely statistical methods to produce behavior that mimics something in the world, but who don't try to understand the meaning of that behavior.”

Brenner agreed and worried that researchers in both AI and neuroscience might be getting overwhelmed or become “overzealous” with surface details

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New Editorial Board Member



Hiroaki Kitano is the director of the Sony Computer Science Laboratories, Tokyo, the president of the Systems Biology Institute, Tokyo, and a principal investigator at the Okinawa Institute of Science and Technology. He has also been a visiting researcher at the Center for Machine Translation at Carnegie Mellon University since 1988. In addition, Kitano is the president of the International Joint Conferences on AI (IJCAI), a visiting professor at Keio University, a manager of the Systems Biology Division at the Cancer Institute, Japanese Foundation for Cancer Research, and the founding president of the RoboCup

Federation. His research career includes serving as a project director at Kitano Symbiotic Systems Project, ERATO, Japan Science and Technology Corporation, as well as a project director at Kitano Symbiotic Systems Project, ERATO-SORST, Japan Science and Technology Agency. Kitano has a BA in physics from the International Christian University, Tokyo, and a PhD in computer science from Kyoto University. He received the IJCAI Computers and Thought Award in 1993, Prix Ars Electronica 2000, Japan Design Culture Award 2001, Good Design Award 2001, and *Nature's* 2009 Japan Mid-career Award for Creative Mentoring in Science. He was also an invited artist for Biennale di Venezia 2000 and the New York Museum of Modern Art (MoMA) in 2001. Contact him at kitano@sbi.jp.

rather than seeking the bigger questions underneath. “They should refocus on higher level problems instead,” he said.

Déjà Vu: Neats versus Scruffies

You can find all kinds of responses and comments to those pioneers’ assessment of AI development on the Web. As for my own reaction, I immediately thought of Yogi Berra’s baseball: “This is like déjà vu all over again.” Well not exactly, perhaps more complicated than simply a repetition of the past.

When China’s *Science and Technology Review*, a flagship magazine of the Chinese Association for Science and Technology, interviewed me for a contribution to its Technology Review’s report on whether AI needs a reboot, I told them that it seems that the same debate had already occurred some 30 years before. Roger Schank had termed it “neats vs. scruffies.” Actually, disputes between *neats* (who believe AI solutions should be elegant, clear, and provably correct) and *scruffies* (who believe that intelligence is too complicated to be solved with homogeneous, formal methods) have never ceased in the history of AI development, but this time there seems to be a reversal of roles taking place: with scruffies becoming

neats and neats becoming scruffies. Of course, you can argue that it is actually a different debate, that it is more of a fundamental versus applied or general versus specific. For me, both variations are only superficially unique—same head, different hats.

About 25 years ago, I published a book review on *Logical Foundations of Artificial Intelligence* authored by Michael R. Genesereth and Nils J. Nilsson.¹ I admit that at the time I was a faithful follower of neats and spent a significant amount of effort on logic and other formal methods in AI. After a few years of working experience with creating real intelligent systems for real-world problems, I came to the conclusion that real and meaningful success of AI must rely on an integration of both neats and scruffies. As I have often told my students, I felt that my brain was with the neats, but my heart went with the scruffies. To my heart and mind, the current assessment of AI development is a bit overly critical and too harsh.

In the *Science and Technology Review* interview, I shared an old Chinese saying: “Thirty years east of the river, thirty years west of the river.” Roughly speaking, the first 30 years of AI history was the age of neats, and the second 30 years was that of scruffies. So if Chinese wisdom gets it right this time, maybe,

just maybe, it is the turn of neats again, but in what sense?

Web Surrogates: A New Frontier for AI in Cyberspace

Does AI need a reboot? Yes, but in cyberspace, not physical space.

For me, the Internet and Web era actually implies the coming of a golden age for AI research and development. The vast waves of Web data have flooded past your doorway and are now lapping at your bedside. AI seems to be the only available approach to prevent an information overload. Thus, at this point, it is urgent that we develop more effective data-driven methods in AI for cyberspace, rather than a reboot of AI in the physical space.

In my first EIC letter this year,² I described my thoughts on movie surrogates and the idea of creating software or Web surrogates. These entities would exist in cyberspace and serve as the new robots. They would assume various societal activities and roles for humans, crawling beneath the Internet—gathering information, making friends, social networking, organizing our lives, improving our studies, and conducting our business. Ultimately, these Web surrogates would enhance our abilities and make our lives and societies

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Figure 1. A Reunion of IEEE Intelligent Systems Editors in Chief James Hendler, Fei-Yue Wang, and Nigel Shadbolt in Shenzhen, China.

safer and more comfortable, leading to the creation of a “smart world” and a “smart lifestyle,” or at least so in cyberspace. Why not consider this a new possibility for AI and robotics research? It would be a great and powerful new direction!

Welcome to Beijing for IJCAI 2013

As the chair of the Local Arrangement Committee, and also on the behalf of the executive committee of the International Joint Conferences on Artificial Intelligence, I would also like to take this opportunity to invite and welcome you all to join us in Beijing for IJCAI 2013 and its first International Summer School in AI in 2012. (For detailed information, see www.ijcai-2013.org). This will be the first time that China hosts the IJCAI since its debut in 1969. I am confident that you will find your experience there both interesting and rewarding.

Back to *IS* magazine and my own trip, last May, I had a happy reunion with my two predecessors, Nigel Shadbolt (2001–2004) and James Hendler (2005–2008). We met in Shenzhen, China, at the China-HK Joint Workshop on Web Science (see

Figure 1). A few days later, at the IEEE International Conference on Robotics and Automation (ICRA 2011) in Shanghai, I had another reunion with many old and new friends, where I was invited to talk about agent technology and Web surrogates in social computing, transportation, control, and robotics.

Last but not least, I would like to welcome Hiroaki Kitano of Sony Computer Science Laboratories and president of IJCAI Board of Trustees as a new editorial board member of *IEEE Intelligent Systems*. His great experience and leadership in AI, will greatly benefit and serve our magazine. Thank you! ■

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1. M.R. Genesereth and N.J. Nilsson, *Logical Foundations of Artificial Intelligence*, Morgan Kaufmann, 1987.
2. F.-Y. Wang, “Back to the Future: Surrogates, Mirror Worlds, and Parallel Universes,” *IEEE Intelligent Systems*, vol. 26, no. 1, 2011, pp. 2–4.