Hall of Fame

AI's Hall of Fame

In 2010, as the part of the celebration of the 25th anniversary of *IEEE Intelligent Systems* magazine, our editorial and advisory boards decided to launch the *IEEE Intelligent Systems* Hall of Fame to express our appreciation and respect for the trailblazers who have made significant contributions to the field of AI and intelligent systems and to honor them for their notable impact and influence on our field and our society.

When we first began our search for candidates, we did not think we would be so overwhelmed. It quickly became clear that there was an immense number of amazing, talented individuals conducting relevant and innovative research in the AI and intelligent systems field across the globe. The task of selecting from such an accomplished list was an extremely difficult process, and we proceeded with great care and consideration. I would like to express my sincere thanks to all the members of our editorial and advisory boards for their great effort in this endeavor.

It is always exciting to see that there are people with such passion in a field, and we hope that our Hall of Fame will be a way to recognize and promote creative work and progress in AI and intelligent systems.

Now, I proudly present the inaugural induction of the *IEEE Intelligent Systems* Hall of Fame. Congratulations to our first ever Hall of Fame recipients!

—Fei-Yue Wang, Editor in Chief

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HALL OF FAME

Judea Pearl

Judea Pearl is a computer scientist and philosopher, best known for introducing the probabilistic approach to AI and developing Bayesian networks as a tool of inference. He is also credited with developing a computational theory of causal and counterfactual reasoning applicable in several sciences. Pearl has a BS in electrical engineering from the Technion, Israel, an MS in physics from Rutgers University, and a PhD in electrical engineering from the Polytechnic Institute of Brooklyn. After graduation, he worked at RCA Research Laboratories on superconductive phenomena and on advanced memory systems at Electronic Memories. In 1970, he joined the University of California, Los Angeles, where he is currently a professor of computer science and statistics and the director of the Cognitive Systems Laboratory. Pearl was one of the first to mathematize causal modeling in the empirical sciences. His work is also intended as a high-level cognitive model and has contributed to knowledge representation, the philosophy of science, nonstandard logics, and machine learning. He received the ACM Allen Newell Award, IJCAI Award for Research Excellence in Artificial Intelligence, LSE Lakatos Prize in Philosophy of Science, Benjamin Franklin Medal in Computers and Cognitive Science, and David Rumelhart Prize in Cognitive Science. Pearl is a fellow of IEEE and a member of the National Academy of Engineering. He is also president of the Daniel Pearl Foundation (named after his son) and writes frequently on the Middle East peace process.

Probability, Causality, and Intelligence

By Eric Horvitz

Methods for machine learning, reasoning, and decision making under uncertainty with probabilistic graphical models lay at the heart of a 25-year rolling revolution in AI—and Judea Pearl has been a scholar and visionary at the forefront of this revolution. Pearl has pursued principles of intelligent reasoning by elucidating foundational representations and inferential machinery for reasoning under uncertainty. His research played a critical role in catalyzing a paradigm shift in computer science, resulting in an effective and fruitful coupling of Bayesian statistics and computer science.

In the mid-1980s, Pearl and his students were a fount of results on probabilistic graphical models. Pearl and colleagues specified with clarity important proofs and procedures on the representation and manipulation of probabilistic independence within Bayesian networks. Pearl also developed useful algorithms for performing probabilistic inference within these graphical representations. Such inference includes diagnostic reasoning, where certain variables are specified (observations such as patient symptoms) and probabilistic updates are desired for sets of unobserved or hidden variables of interest (hypotheses such as the potential diseases afflicting a patient). Beyond quantitative methods, Pearl's work included efforts to understand qualitative patterns of inference such as intercausal reasoning, capturing how beliefs may change in the face of evidence favoring alternative hypotheses.

Pearl provided an influential synthesis of important results and methods in his 1988 book *Probabilistic Reasoning in Intelligent Systems: Networks of Plausible Inference*. The book was a revolutionary compendium of ideas and vision when it was published and it remains a classic treatise on representation and reasoning under uncertainty.

Building on his studies of inference and learning from data, in the 1990s, Pearl turned his attention to the foundations of science, exploring standing challenges with understanding causality and causal inference. His work at the intersection of computer science, statistics, and the philosophy of science shed new light on causality and statistical inference. In a series of papers, Pearl introduced clarity on topics that had long been rife with challenge and confusion. His 2000 book *Causality: Models, Reasoning, and Inference* has grown to become yet another classic treatise.

Pearl has been a veritable pioneer in pursuing a scientific understanding of the mechanisms underlying thought and intelligent behavior and their embodiment in computational representations and procedures. He has provided the computer science and statistics communities with a precious cache of results, algorithms, and insights, and has mentored several generations of students along the way.

Eric Horvitz is a distinguished scientist at Microsoft Research, past president of AAAI, and a fellow of the AAAI and of the American Academy of Arts and Sciences.