

HUMAN-MACHINE COLLABORATION TRANSFORMS THE WORKPLACE

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Cognitive computer technologies are accelerating so rapidly that soon the workplace will be irrevocably changed. Corporate leaders are now viewing machines as talent to be fostered for continuous innovation and effectiveness.

Human-machine collaboration allows humans and machines to combine their strengths and compensate for each other's limitations, leading to better outcomes.¹ Intelligent machines can be partners that learn and improve their skills and abilities as they work alongside human workers. Meanwhile, advanced technology is extending human capabilities through artificial intelligence, machine learning and data analytics.

COMPUTERS, CATS AND CALL CENTERS

Developments in speech recognition, computer vision and machine learning are converging to produce computers that can talk, see, listen, read and learn. Just a few years ago, Google researchers challenged computers to learn to recognize cat faces — and they did so quickly and without direction.² Today, teaming computers with people in human-machine collaboration is leading to breakthroughs in manufacturing, medical research and other fields.

Robots have been used for years to perform repetitive tasks in manufacturing, but now work processes are being re-imagined to engage human-machine collaboration. Machines are learning to accomplish human processes and problem-solve, enabling workers to handle more discerning tasks.

Examples abound across many industries:

- Smart robots deliver medicines and supplies in hospitals and nursing homes.
- Warehouse employees use smart watches and smart glasses to improve navigation and productivity.
- Surgeons perform telesurgery with computer-assisted technology that can see and respond remotely.
- Call centers align virtual agents with their human co-workers for improved problem-solving.³

The synergy between humans and machines is critical to these collaborations. Foldit is an online puzzle game that solicits human participation via the Internet and analyzes player results through computer models. Created at the University of Washington, Foldit engages human players to come up with new ways to fold a protein molecule, which is the source of many diseases and a key to finding new drug therapies.⁴ Foldit players are working to cure diseases, develop vaccines and find new biofuels.⁵

CHALLENGES FOR MANAGERS

While human-machine collaboration is viewed as a way to produce better outcomes and improve efficiencies, many managers feel unprepared to deal with a rapidly transforming workplace. The prospect of human-machine collaboration is exciting, but corporate leaders and managers are concerned about how quickly this brave new world is arriving.



In a study on cognitive computing in the workplace, Accenture found that the vast majority of managers surveyed viewed machines as helping them be effective and making their work more interesting. Yet more than half the managers felt they didn't have the skills to address the challenges of tomorrow's high-tech workplace.⁶ Senior executives were more trusting of the power of advanced technology, and most realize the value of converging various technologies to provide better results than workers or machines could deliver on their own.⁷

A Deloitte study found that human-machine collaboration is stimulating companies to re-think how work is performed and what skills and capabilities are needed for employees to succeed.⁸ The study noted that as human-machine collaboration grows in the workplace, it will drive significant changes in job descriptions, work teams, organizational structure and management practices.

Oxford Economics found that changes in the nature of work will require managers and employees to further develop "right-brain" skills that are deeply human. Attributes such as relationship building, teaming, co-creativity, brainstorming, cultural sensitivity, and the ability to manage a diverse workforce will grow in importance,⁹ as will empathy, communications, flexibility, resilience and curiosity. Cultivating these traits will help workers and managers effectively navigate the uncharted waters of human-machine collaboration.

To discuss these topics in more detail, please contact your PNC Relationship Manager.

¹ "Intelligent Human-Machine Collaboration: Summary of a Workshop," held June 12-14, 2012, by the Board on Global Science and Technology, National Academy of Sciences. Download of the workshop summary is available at: <http://www.nap.edu/catalog/13479/intelligent-human-machine-collaboration-summary-of-a-workshop>

² "In Artificial Intelligence Breakthrough, Google Computers Teach Themselves to Spot Cats on YouTube," by Will Oremus, *Slate*, June 27, 2012. Available at: http://www.slate.com/blogs/future_tense/2012/06/27/google_computers_learn_to_identify_cats_on_youtube_in_artificial_intelligence_study.html

³ "Instrumenting the human and socializing the machine," by Nick Evans, *Computerworld*, August 12, 2015. Available at: <http://www.computerworld.com/article/2970083/emerging-technology/the-convergence-of-human-machine-work-processes.html>

⁴ Foldit Overview, Center for Game Science, University of Washington, at: <http://centerforgamescience.org/portfolio/foldit/>

⁵ Foldit Overview, Center for Game Science, University of Washington, at: <http://centerforgamescience.org/portfolio/foldit/>

⁶ "Managers and machines, unite!" Accenture study issued November 1, 2015. Available at: <https://www.accenture.com/us-en/insight-intelligent-machines-workforce-of-the-future>

⁷ "Managers and machines, unite!" Accenture study issued November 1, 2015. Available at: <https://www.accenture.com/us-en/insight-intelligent-machines-workforce-of-the-future>

⁸ "Leading in the new world of work," "Deloitte Global Human Capital Trends 2015," page 95. Available at: <http://www2.deloitte.com/us/en/pages/human-capital/articles/introduction-human-capital-trends.html>

⁹ "Humans are underrated," by Geoff Colvin, *Fortune*, July 23, 2015. Available at: <http://fortune.com/2015/07/23/humans-are-underrated/>

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