UBIQUITOUS AND COGNITIVE AI WILL REDEFINE OUR EVERYDAY EXPERIENCES

Enterprises are using Artificial Intelligence (AI) to craft solutions that make smart decisions, amplify human creativity, complete high-precision operations, optimize costs, and much more. This article explores what AI is doing for the world, and how it will transform the future.

Is artificial intelligence (AI) finally ready for prime time? I don't see a day go by where I don't hear of AI and its profound impact — part beneficial and part detrimental — to humans. To be sure, AI isn't new — ask anyone who has flown an airplane if they haven't turned on the 'autopilot' function during long flights. As it exists today, AI detects patterns and guides enterprises in making optimal decisions for workers, management, and shareholders alike.

I like to think of AI as the result of a knowledge worker's relentless pursuit of automating mundane tasks, exponentially improving productivity, and capturing and disseminating knowledge effectively, such that machines can amplify the worker's creativity and sustain competitiveness. Competition is key here. In the Knowledge Economy, we live in a global village where practically everyone can communicate and collaborate with each other. So in every industry, the use and sophistication of AI is what gives an enterprise a distinct advantage to amplify business services and products.

In the near future, AI will be available

In the near future, AI will be available everywhere — even if we're unaware of its existence while performing tasks on the floor of a retail outlet, or in the operating room of a hospital, such as this minimally invasive robot-assisted surgery with the da Vinci surgical system.

everywhere — even if we're unaware of its existence while performing tasks on the floor of a retail outlet, or in the operating room of a hospital. Predictive analytics, for example, is helping retailers make extremely targeted promotions and advertisements based on a customer's buying behavior. We've all heard of (and maybe used) products like Google Assistant or Siri that constantly learn more about our desires and expectations. Software is learning about human behavior and predicting what our next actions will be. To this end, computers ask for permission sometimes, before making the next move; other times, they don't.

Have you heard about a program called 'DeepText' coming out of Facebook's laboratories? It is a type of AI that can detect subtleties in human communication and actually display a level of common sense otherwise thought to be unachievable. For a social network, a platform like DeepText can anticipate what a consumer wants by analyzing their communications. It can perform tasks proactively rather than when told what to do, because it learns 'with near-human accuracy,' according to Facebook. We are now at a point where enterprises are writing algorithms so sophisticated, so advanced, that they can mimic human cognitive tasks.

An American company called Agilent Technologies has developed an electrocardiograph that can estimate the probability of a patient experiencing acute cardiac ischemia, using its ability to learn more about the condition after every diagnosis. Better still, this smart device is 'time-insensitive,' meaning it has the power to predict whether the patient could develop ACI down the road and not necessarily during the moment of the test. Also, with nearly one billion people being either diabetic or prone to diabetes, AI-powered mobile devices will monitor glucose levels in the blood, and should they be too high, recommend courses of action with virtual physicians.

Another medical breakthrough that is proof of such progress comes from ATL Ultrasound Inc. in Seattle. The company has developed a range of diagnostic ultrasound systems for imaging and monitoring cardiac tissue structures and their activity. How? By leveraging a machine-learning algorithm that studies millions of parameters during an examination and eliminates frequencies that the doctor deems irrelevant. The patient's visit is thus far more efficient than it was before ultrasound systems could accumulate data and learn from each parameter.

Thanks to strides in the field of artificial intelligence, computers now accumulate data and learn from us. Indeed, the act of building upon each day's accumulated experiences is the key to success in the Knowledge Economy, where growth is now dependent on the quantity, quality, and accessibility of available information. It is an economy in which artificial intelligence helps us leverage all that information in order to amplify whatever product or service an enterprise offers to consumers.

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A sixth sense like no other

AI is a tool that is becoming so useful and ubiquitous that it will soon become a kind of sixth sense. According to the creator of the 'SixthSense' technology — the scientist, Pranav Mistry — this latest incarnation of AI is a wearable, gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information.

"Although the miniaturization of computing devices allows us to carry computers in our pockets, keeping us continually connected to the digital world, there is no link between our digital devices and our interactions with the physical world," writes Professor Mistry, who works out of the Massachusetts Institute of Technology. He observes, "Information is confined traditionally on paper or digitally on a screen. SixthSense bridges this gap, bringing intangible, digital information out into the tangible world, and allowing us to interact with this information via natural hand gestures. SixthSense frees information from its

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confines by seamlessly integrating it with reality, thus making the entire world your computer."

Unbolting robots from the factory floor

A significant change in how we view AI-enabled devices is evident in how they are now being 'unbolted' from the factory assembly line. Machines equipped with AI software can serve as roving healthcare companions for elderly people, delivering medications in their correct dosages, and reminding them about their daily schedules. As a sixth sense, AI can simplify business processes and amplify the best in the human spirit. From deterministic automation to cognitive machine learning and software code corrections, today's businesses can use AI to identify new experiences as well as new products or services.

A closer examination of the world of healthcare and transportation demonstrates just how profoundly AI is transforming the world around us. In both industries, AI is quickly evolving from 'machine learning' to 'deep learning.' Machine learning is the method by which a computer is programmed to detect patterns, and as a result, is able to predict actions. It requires human guidance to help it learn the rules and the information that it is expected to know. However, it is limited by a finite number of possibilities. Remember the computer that took on a chess champion around 20 years ago? Human programmers had the arduous task of programming every possible chess move and consequence into the computer. It couldn't learn chess on its own, and by all accounts, it took the programmers an unbelievable amount of time to prepare the computer.

From the factory floor to the operating room

Today, AI is becoming so smart that it even plays a role in decision-making. In the field of image interpretation, a doctor can receive scores of different medical images that can be simultaneously identified by a single AI-enabled scanner. What used to take hours and even days in front of expensive X-ray devices, can now be accomplished within minutes. Think about how useful a complete assessment of a patient can be if a doctor receives everything from angiograms to MRI scans. This is certainly a situation where technology is amplifying human potential.

Context-aware intelligence is ubiquitous and getting better with every passing day. A study, cited by Morgan Stanley, reports that 47 percent of jobs in America alone could be automated over the next two decades. It then goes on to state that at 98 percent, bank loan officers have the highest probability of seeing their job automated (which is really ironic, given that Morgan Stanley helped to disseminate the paper). The lowest? Elementary school teachers and doctors — both with a probability of 0.4 percent. Whatever the industry, AI-enabled cognitive machine learning is making its presence known.

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Just think of a medical school student, studying to be a surgeon. Although the study predicts that there exists only a 0.4 percent chance that AI-enabled cognitive machine learning will completely replace her job in 20 years, my opinion is that there is a 100 percent chance that the technology will amplify her professional talent. Even for a student, AI can anticipate the progression of skills a would-be surgeon needs. That's what we call 'deterministic automation' — technology that learns from (in this case) a medical student's academic progress and helps with both the physical and mental aspects of the training.

Surgeons, for instance, must know how to access and repair the human body. There's no reason why they can't be aided by computers that get smarter with every operation — not unlike how a student first becomes a resident in surgery and then advances to become a full-fledged surgeon after years of assisting in the operating room. Just think of the efficiencies gained by a complex operation requiring only one human surgeon instead of a team of four. The other three medical experts can thus be freed up to operate on other patients.

The journal, Science Translational Medicine, reported how researchers programmed a robot surgeon to carry out a procedure called 'intestinal anastomosis.' This is a remarkable feat because the robotic arms that we've known for decades typically weld metal together on assembly lines. This medical robot, however, took a piece of intestine that had been cut open and stitched it back together with the utmost precision.

Driving smarter cars

Transportation is another industry perfectly suited for machine learning and purposeful automation. Just about every automotive company in recent times has announced a self-driving car development program. While some companies have arranged joint ventures with technology companies, others are confident of their own technological capabilities (alongside knowledge of what car buyers want and their extensive dealer networks) and have decided to go it alone. Google remains one of the non-car companies with longstanding intentions to build and market an AI-powered vehicle, with no steering wheel, accelerator, or brake pedal.

The reason that it could build a vehicle with such a spare dashboard is because of its confidence in its deep learning technology — the same technology that helped Google's AlphaGo program beat the world champion in the complex game of Go. That computer never required constant human input when it played the human Go Master, which is vastly different from past computers of other companies, which had to be programmed

with information in order to compete in chess or on game shows. The advantage of a neural network is that it's not unlike the human brain — becoming smarter and learning what it needs to as it continues to play a game or drive a car.

Other self-driving programs take a different approach, outfitting cars with dozens of sensors that help a human behind the wheel. These are more like advanced cruise control features, rather than deep-learning neural networks. Car makers also know something that technology companies can't seem to grasp — people love getting behind the wheel of their cars and driving. It's a fun activity that allows for independence and escape from an otherwise ultra-connected world.

What's certain is that when it comes to AI, everyone seems to be making strategic moves. According to the research firm CB Insights, large companies have purchased 31 AI start-ups since 2011.

The consultancy, PricewaterhouseCoopers, has determined in a study with different metrics that companies have bought 29 AI start-ups this year alone, a trend that will eventually eclipse the 37 such deals that took place in 2015. Even Intel is moving away from its decades-long microchip specialty in order to focus its energies more on building data centers. In fact, the company recently acquired an AI start-up called Nervana Systems. The Intel executive who is spearheading its data center development wrote in a corporate blog post: "[Nervana's] IP and expertise in accelerating deep learning algorithms will expand Intel's capabilities in the field of AI." Not to be outmaneuvered, Apple, too, has acquired Turi Incorporated — another AI company.

In a seminal work by two Oxford University researchers, — a paper titled 'The Future of Employment: How Susceptible are Jobs to Computerisation?' — the very pace of cognitive machine learning's advancement is presented as an issue that all industries must address. For example, the paper cites another study from 2004 that makes the case for the makers of driverless cars having difficulties mimicking human reactions and thought processes. According to the 2004 paper, "A left turn against oncoming traffic involves so many factors that it is hard to imagine discovering the set of rules that can replace a [human] driver's behavior...." Today, however, many companies pursuing driverless cars

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have developed fully autonomous vehicles that do indeed learn much like how humans learn to drive.

When the computer brain of a driverless car is indistinguishable from the actions and reactions of a human, we have the software engineer to thank. In the past, if the computer were a 'contestant' vying against humans on a televised game show, an engineer had to program a mainframe with every potential question and every correct answer. Now, AI itself possesses the cognitive talent of identifying and fixing software code; so, engineers can use their intelligence to identify new experiences and new products or services. AI is, incontrovertibly, on its way to become an incredibly useful tool that will amplify human potential.

Commercial success

Finally, let's not forget that AI has serious commercial applications. While the technology is the stuff of Oxford dons, it also helps enterprises of all stripes make money. I can think of nowhere AI has more potential than in the world of retail. In every facet of merchandising — from a pair of jeans in a showroom to a container ship crossing the Pacific Ocean with tons of the latest fashion apparel — AI can see the smallest detail and the biggest picture simultaneously and roll all that data into simple, easy-to-use instructions about how to keep stores filled with just the right amount of merchandise as well as information about what merchandise will sell the best next season.

For centuries, merchants have attempted to perfect the supply chain, but it is a complex affair! The world of fashion depends on the ever-changing tastes of consumers, alongside fuel costs to transport the merchandise, labor costs to sew garments together, and raw material costs involved in manufacturing apparel. AI has all these steps covered so that a human can be a warm and helpful greeter in a brick-and-mortar store. When it comes to online commerce, shoppers won't even know that they aren't dealing with humans. 'Life-like' is the goal of every software engineer as well as every retail client.

AI needs governance

There will come a time when cognitive machine learning becomes so advanced that computers will become more than tools — they will, as experts have said, indeed become our sixth sense. They will be a part of us, of our daily existence. That is why, we will see

communities coming to a consensus about how AI progresses. After all, humans have had rules for living together in a society for tens of thousands of years.

We will, likewise, make regulations that govern the behavior of AI, spelling out what types of consequences there will be if those regulations are broken. The CEO of the Google-owned AI research lab DeepMind, recently said that the global community should have control over AI-powered machines that learn for themselves. I completely agree because setting up protocols for any new and increasingly advanced technology is a smart move for everyone involved.

The establishment of guidelines is what we humans do when we want to focus and advance ourselves and our technologies even further. Artificial intelligence is going to amplify our talents and abilities in ways we haven't even imagined yet — much to the delight of a growing enterprise.

About the Author

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Vijay has over 22 years of experience in the IT industry and manages some of the largest clients of Infosys. As a thought leader in the retail, CPG, and logistics sectors, he understands how technology trends and digital consumers reshape the business landscape, blur the lines between industries, alter the way people work / live, and redefine business partnerships. Through his valuable experience and leadership that is result-oriented, inclusive, and content-driven, he navigates enterprises through the challenges of the digital era.

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