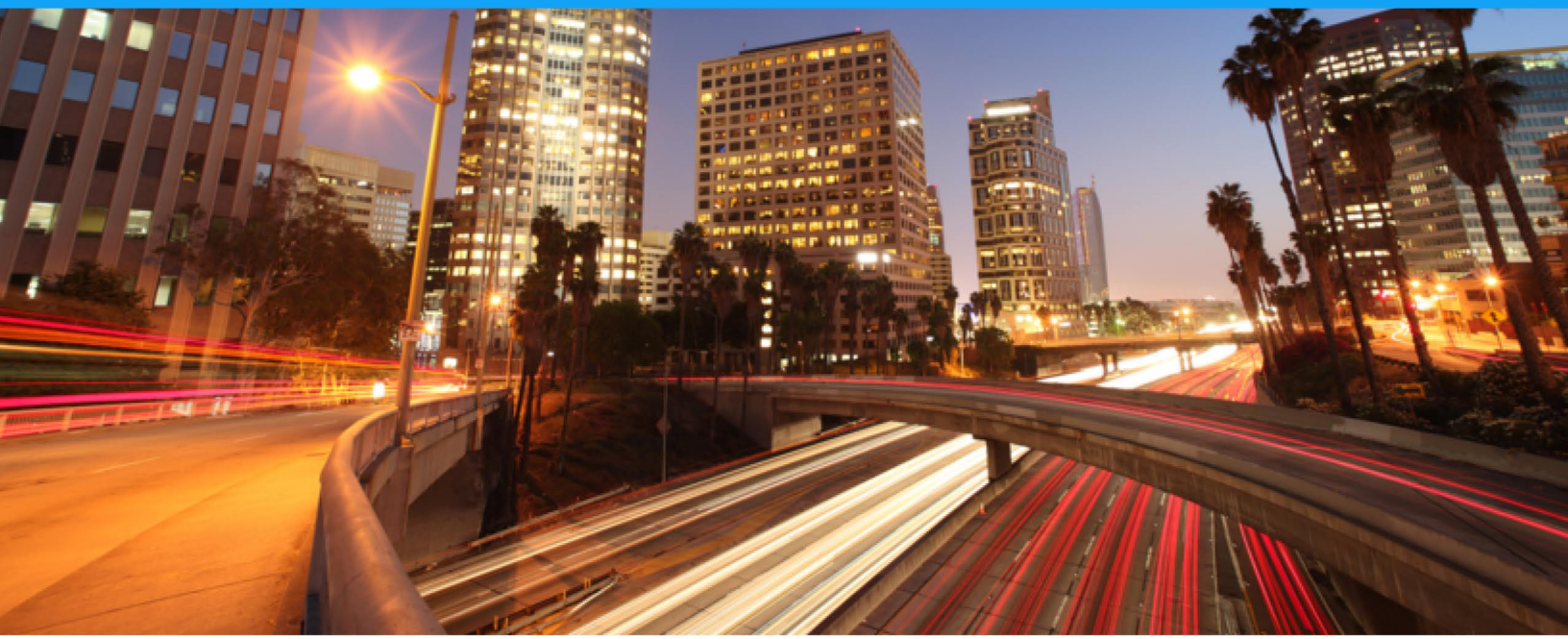

The Future of the Future: Cognitive Artificial Intelligence

Imagination brought to life

Artificial intelligence (AI) has a lot of people talking. The fact that those people no longer hail primarily from the world of science fiction is representative of just how far the ideas driving this technology have come. AI has entered the main stream, and it has the technology world buzzing with excitement.

The potential applications of AI are as vast and varied as any complex technology vision that has ever been brought to life. And in truth, that is where the real excitement lies—in finding out just how far we can take AI and in turn, how far it can take us.

In this paper, we'll take a look at the many exciting applications taking shape for AI today; what ideas are on the horizon; and importantly, what the potential impact on the B2B world might be.

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Defining AI

Despite (and perhaps because of) the fairly distinct images that many of us have for AI, it's useful to begin with some definitions. A recent article from CNBC points out that the concept of AI is far from new. The following explanation dates back to 1956:

"Every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." [1]
—John McCarthy, Professor, Dartmouth College

It's fascinating to note how similar a more modern definition, offered by Accenture, is to the original vision for AI:

"Accenture views AI as a constellation of technologies that allow smart machines to extend human capabilities by sensing, comprehending, acting and learning—thereby allowing people to achieve much more." [2]

Opinions on just what technologies fall under the AI umbrella vary widely; however, AI is generally described as a core set of capabilities that includes chat bots, voice recognition, language processing, machine learning, and analytics. While AI can be enabled by applying these technologies independently, the greater opportunity lies in making them work together. The increasing ease of doing so, combined with the vast amounts of data now available and a growing ability to develop software that can learn over time, are accelerating the pace of AI and creating a "race to the top" environment, with vendors jockeying for leadership positions.

The here and now

This increased interest in AI has already resulted in some significant accomplishments:

- Ke Jie, the top human player of the ancient Chinese board game Go, was recently defeated by a virtual player known as AlphaGo, developed by Alphabet's DeepMind AI research group.[3]
- The autonomous driving features of a Tesla were credited with helping a man suffering from a blood clot reach the hospital.[4]
- Researchers from Penn State University and École Polytechnique Fédérale de Lausanne in Switzerland used facial recognition concepts to train a computer to recognize plant diseases, giving anyone with a smartphone the same abilities as an expert. The goal is to help small-scale farming operations minimize the effects of crop disease, which can wipe out entire crops and lead to localized or widespread famine.[5]

However, these examples represent more of what we can expect in the future, rather than what most of us experience today. At present, the most accessible forms of AI are primarily transactional, with systems relying on algorithms to adapt to our likes and dislikes. Humans "teach" systems all the data they have access to so the systems can provide quick insights in return. Most people are familiar with transactional AI applications through their personal/consumer worlds. Familiar examples include having Siri® help you find a restaurant, asking Alexa® or Google Home how long it will take to get to the airport, or letting Nest® automatically adjust the temperature in your home based on your living patterns.

Although these concepts are still relativley nascent the B2B world, applications for them are proliferating rapidly. Chat bots that serve as gateways into enterprise systems, like ERP or human capital management (HCM), are using AI to automate tasks via voice or chat functions. These tasks can range from the fairly simple, like asking an HCM system to enter a vacation request or telling Microsoft® Outlook

to activate an out of office message, to the more advanced, like asking for server capacity to be added in a certain location or requesting a customer's buying history over the last 30 days.

The advantages are clear. The speed with which information can be accessed is dramatically increased. Productivity can improve when employees no longer have to log in and out of multiple systems many times a day to get their jobs done. Training and on-boarding times can be reduced. And in physical work environments like warehouses or factories, the hands-free potential of AI could be a game-changer.

Some will argue that the examples above are not "true AI" but rather a fairly pedestrian form of machine learning. However, regardless of how current iterations of AI are viewed, nearly everyone agrees that this is just the tip of the iceberg.

Thinking—not just learning

So if what we have access to today isn't the real thing when it comes to AI, what does "true AI" look like? A recent Forbes article defined it as follows:

"*True A.I. can improve on past iterations, getting smarter and more aware, allowing it to enhance its capabilities and its knowledge*." [6]

The difference comes down to the ability of systems to learn—by themselves; to the ability to create knowledge, rather than simply regurgitate data. In the examples covered above, humans are the teachers. With the next generation of AI, the system creates new channels of knowledge on its own.

As amazing as the AI technologies we're using today might seem, they are, in truth, fairly limited. Systems can only respond to the questions we know to ask and are constrained by the data we feed into them. With Cognitive AI, systems are able to take action based on pure learning and rationale, making deductions and augmenting their knowledge so they can proactively deliver information, detect and prevent potential problems, identify data patterns, and more.

The AI capabilities we're now getting to know will expand over time. The technology we might call "traditional AI" offers:

- Natural language processing
- Responsive interaction
- Listening and consuming
- Skill execution
- Process automation
- Education and training

The next phase, "cognitive AI" will expand to support:

- Contextual natural language understanding
- Proactive engagement
- Data interpretation
- Evolving skills
- Process development
- Analytical and interpretive
- Self-service design
- Science-driven insights

Let's take a look at some possible applications:

- A company managing a large vehicle fleet uses AI to optimize usage. Asset management systems predict problems, order parts, schedule maintenance, and run quality tests to ensure the equipment is up to standard—all without the need for human intervention.
- A hospital uses a cloud-based radiology application to recognize and identify normal results, allowing human radiologists to focus on scans that show potential abnormalities (this idea is, in fact, **already under development** [7]).
- A chemical manufacturer goes green and uses Cognitive AI to monitor emissions, automatically adjusting manufacturing processing and materials ordering without reducing output or efficiency while decreaing CO2 waste.
- AI is used to monitor an HR department's staffing trends, automatically comparing them against departmental efficiencies and sales trends. A staffing plan is then executed to support the business's goals and objectives.

At this stage of AI's development, the questions are much less about if these types of advancements can be achieved and much more about when. The answer will again vary dramatically based upon whom you ask.

Transactional AI is here and getting more advanced all the time, and businesses are ready to invest. Research from Accenture shows that up to 85% of business and IT executives anticipate making extensive investments in one or more AI-related technologies over the next three years.[8] On the Cognitive AI side, it is also currently a reality in some forms, but applicability at scale is likely to be a few years (but not decades) down the road.

Areas to watch

Everyone betting on AI wants to know where the greatest opportunities lie. While predictions at this stage are still somewhat tenuous, there are a few areas that most experts agree hold significant potential. The following are some of the biggest opportunities to watch:

- **Big data + AI + data visualization and voice control**—The business world has been awash in data for some years now, with companies salivating over all the potential that information holds. Progress has definitely been made in terms of harnessing this embarrassment of riches, but AI has the potential to take the use of big data into the stratosphere. By combining processing capacity with cognitive learning capabilities, AI will be able to quickly identify patterns in data that would be difficult or impossible for humans to see independently. And when humans can access that information via voice control or with easy to understand and manipulate data visualizations, its value grows exponentially. AI systems will also eventually be able to make decisions on their own based on the analysis of big data.
- **Asset management**—Asset management is an area where the Internet of Things is already having a significant positive impact. Information from sensors that monitor everything from oil pressure to humidity is being integrated with systems designed to optimize equipment usage, allowing companies to prevent problems and increase the return on their investments. Other data input sources—like reports from drones being used for inspections—are making information even more accessible and reducing the need for human intervention. Add Cognitive AI to this mix, and you have the potential to largely eliminate humans from a previously time-consuming and highly manual process. Imagine a world with equipment that is virtually "self-maintaining". AI could make it possible.
- **Plain old productivity**—This opportunity lacks the sizzle of some of the others that AI has to offer, but it may actually have the greatest impact. The concept is straightforward—when machines can be used to automate routine tasks, humans can spend more time on work that matters.

These are just a few examples. Which vendors and ideas will end up at the front of the pack remains to be seen, but the race will be an exciting one to watch.

What now?

For executives focused on managing the day-to-day requirements of their businesses, AI may seem like an interesting concept that they can worry about at some undetermined date in the future. With so many unknowns, that view is understandable. It's also risky. AI has the potential to create a seismic shift in the business world, on par with the industrial revolution and the Internet. Yes, there is some time to determine how best to leverage technologies on the horizon; however, the time to start figuring it out is now.

Here are a few things you can do to ensure you're ready when the time comes:

- **Get cloud-ready—**Cloud deployment is a critical underpinning of AI and is essential for companies to be able to take advantage of innovations in the pipeline—AI-related and otherwise. If you haven't yet made a move to the cloud, it's time to take a fresh look at your organization's reasons for not doing so. As time goes on, software deployed on-premise will become increasingly rigid and limited in its ability to keep pace with cloud-based options.
- **Be open to ideas—**Often when people discuss evaluating new technologies, they advise being practical, starting small, keeping it simple, and so on. None of that advice is necessarily wrong as it relates to AI, but this is an instance where an abundance of caution could prove to be a liability in the end. AI is more than technology—it's a movement. Those who have the vision to make it work for their businesses stand to realize unprecedented gains. So temper skepticism with a healthy degree of curiosity and openness to ideas. Doing so will put you in a better position to evaluate what has the most potential to change the game for your business or industry.
- **Bet on the right vendor—**Your chances of choosing the right AI vendor at this stage of the game might seem as realistic as accurately predicting the winner of next year's Kentucky Derby (which, by the way, an "AI swarm" **attempted**[9] and failed to do in 2017). While a given vendor's future success with AI may be difficult to assess, you can judge a potential partner's commitment to innovation, willingness to collaborate with customers on new ideas, and overall vision for the future. Working with companies that have both the commitment and backing to bring AI to life is a smart long-term play.

Friend or foe

No discussion of AI would be complete without at least a mention of the very real risks that some believe this technology holds. Stephen Hawking famously predicted that AI could spell the end of the human race.[10] There is also growing discussion of establishing a "universal basic income", a debate that is being driven, in part, by job losses that result from automation—a trend that AI will only exacerbate.

On the opposite side of the spectrum, AI is also expected to drive a lot of job opportunities. Accenture predicts that by 2035, AI can double economic growth rates in 12 developed countries, and boost labor productivity by up to 40 percent.[11] IDC predicts that the cognitive systems, content analytics, and discovery software market will grow significantly through 2020, exceeding $10 billion in revenue, with a CAGR exceeding 17%.[12] The glass-half-full view is that AI holds such tremendous potential to benefit all areas of human life—from healthcare to education and daily living—that the upside outweighs risks that we, as a society, will just have to figure out how to manage.

As with so much related to AI, there is no definitive answer; however, one thing is certain. Companies will continue to invest and push the boundaries of what's possible.

The future of the future

For anyone who enjoys being scared and excited at the same time, AI is shaping up to be the roller coaster of choice for some years to come. Parsing what is real and what is not—what is cool for the sake of being cool versus what can offer genuine business benefit—will take some time. However, executives will be wise to "watch this space" and look for partners equipped to turn the AI vision into reality. As the saying goes, just because you can't see it, doesn't mean it's not there.

End notes

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