Get ready for AI

Cover Story

by Lauren Anderson

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In the fall of 2016, Oliver Buechse, a Green Bay-based strategy consultant, attended a conference in Silicon Valley with a focus on disruption in the financial industry.

Interacting with the artificial intelligence and fintech community, Buechse noticed something different about the discussions there. Concepts like artificial intelligence and machine learning weren't theoretical, far-off possibilities, but rather present realities. AI, clearly, had already arrived on the West Coast.

"All of California was abuzz about AI," Buechse said. "I thought, why aren't we talking about this in Wisconsin?"

Wisconsin's apparent tardiness to the conversation concerned Buechse and he left compelled to spread the word.

"Then I thought, 'Well, what am I going to do about it now that I know?'" he said.

What is AI?

Eliciting fear or optimism, hype or indifference, artificial intelligence can be an elusive concept to pin down.

Leading thinkers in the tech industry diverge on the subject. Entrepreneur Elon Musk has made headlines with near-apocalyptic predictions that the race for artificial intelligence will ignite World War III and that AI poses an existential threat to humans. Microsoft co-founder Bill Gates, meanwhile, has dismissed such concerns. Facebook co-founder Mark Zuckerberg has struck a more optimistic tone, saying AI has the potential to "make the world better."

So, what is this concept that could threaten humanity, improve the world or, at the very least, stir up such a spirited debate?

The digital disruption of technological capabilities like AI, the Internet of Things and blockchain – the technology underpinning cryptocurrencies like Bitcoin – is considered by some to represent the latest industrial revolution. The first industrial revolution introduced mechanization in the late 18th century; the second brought mass production the following century. Automation and motion control introduced in manufacturing in the late 20th century, some argue, marked the third industrial revolution.

Now underway, the so-called fourth industrial revolution has brought advancements as machines perform increasingly complex tasks that begin to approach the flexibility of human labor.

The rise of computing capability has enabled the harnessing of vast amounts of data, which has propelled forward computer systems' ability to perform tasks that once were thought to require human intelligence.

AI is changing business operations in several ways: the ability to read and understand unstructured information and pull insights based on patterns that can inform business decisions; enhancing customer engagement with increasingly humanlike chatbots (think Alexa and Siri); and optimizing business outcomes with capabilities like machine learning, voice-to-text translation and visual recognition.

What exactly AI will mean in terms of job displacement and reshaping labor remains to be seen, but research firm Forrester forecasts that 25 percent of all job tasks across the globe will be performed by AI by 2019.

Chicago-based global management consulting firm A.T. Kearney estimates that 13 percent of jobs in the U.S. – 19 million total – will be replaced by AI by 2024.

Forrester offers a more conservative projection, forecasting that 7 percent of U.S. jobs will be replaced by robots, AI, machine learning and automation by 2025 – a figure that takes into account the number of jobs expected to be both replaced and created thanks to those technologies.

Heralding AI's arrival

Buechse left Silicon Valley convinced that Wisconsin, on the whole, was lagging in its preparation for AI's impending impact.

The whole game is going to be changed," he said. "And if we want to play in the game in Wisconsin, we have to get in the game. Otherwise this revolution will happen to us. We're going to be on the receiving end of productivity enhancements rather than participating in it."

RokkinCat, a software contracting company in downtown Milwaukee, has seen an increase in demand for machine learning and AI projects over the past year.

It wasn't feasible for him to send Wisconsin's business executives out to California, but Buechse figured the message could be brought to them.

He began connecting with others who shared his sense of urgency and spreading the message to those who were unaware – representatives from the banking and finance industries, technologists, educators and elected officials.

Those grassroots conversations materialized earlier this year into a formalized initiative, called ACTION Wisconsin, aimed at creating awareness of disruptive technologies and their impact on the state's businesses, workforce needs and educational system. The group is ad hoc, it isn't looking for funding, and its members hope to dissolve it once its message spreads more widely.

Kenneth Kortas, a partner at Wauwatosa-based accounting firm Wipfli LLP, signed on to the initiative, recognizing the coming transformation of his industry.

"From our perspective, this is going to dramatically change our industry in the next three to five to seven years," Kortas said during a recent conversation among ACTION Wisconsin representatives in a Wipfli conference room. "What we do in accounting and taxes is going to be dramatically changed. I think every industry is asking that same question: What's this going to mean relative to our workforce, to how we serve our customers, our clients?"

The accounting industry has already seen the shift begin, as IBM Watson – the question-answering computer that famously beat out human competitors in a game of "Jeopardy!" six years ago – recently began aiding H&R Block in the tax filing process.

"Watson is studying how H&R Block is interacting with consumers," Kortas said. "It's studying conversations – how do you interact with a tax filer so that the person doesn't need to be there? Is that going to impact higher-end business tax work? We could stick our head in the sand and say it will never happen, but the reality is it's going to be there."

Preparing for and applying AI

These conversations aren't just happening in a Wipfli conference room.

Timothy Schaefer, executive vice president of client and digital experience at Milwaukee-based Northwestern Mutual Life Insurance Co., said the company is exploring AI applications that could affect the business on several fronts.
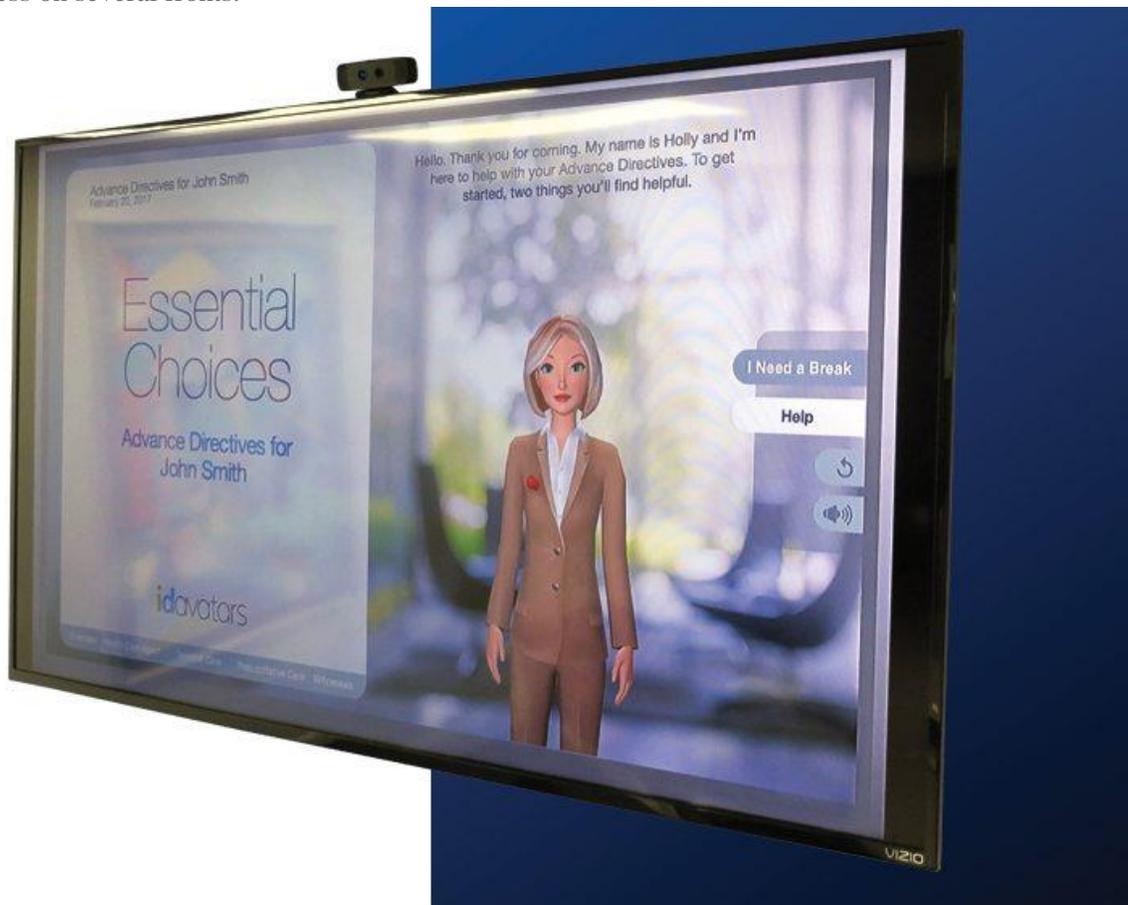
Intelligent Digital Avatars (iDAvatars), based in Mequon, develops avatars that are used for customer service purposes. One of the company's avatars, Holly, can answer questions about advance directives.

"It's grown out of our work on innovation and particularly in the space of more advanced analytics work," Schaefer said. "We see a number of potential applications of the technology, from personalizing

the experience our clients have to adding more sophisticated elements to financial planning, all the way into what I would say are less client-facing applications that look at optimizing things in our investments portfolio and automating back end service processes and operational work."

Using machine learning to optimize risk analysis and underwriting decisions is a natural next step, he said. The underwriting process currently requires gathering lots of data regarding a client's health – a process that can involve collecting fluids or performing an electrocardiogram.

Instead, he said, clients could permit access to data through alternative sources, allowing for a less intrusive information-gathering process.

With the adoption of any new technologies, Schaefer said, the goal is to deploy them in a way that consumers won't feel the change.

"If we do AI right, I don't think people should notice a drastic change," he said. "They should just notice a better experience, they should notice that things are more seamless, maybe more personalized. Our goal with these technologies isn't to create a real drastic shift in how people experience the company, but rather to experience a continuous improvement in their relationship with the company."

The region's health care industry is also preparing itself. Froedtert & the Medical College of Wisconsin's cancer network next year is slated to introduce IBM Watson Health's computing software, which is designed to improve the clinical trial matching process with cognitive computing. The tool digests structured and unstructured data about patients, including pathology reports and physician notes, and matches that against possible cancer clinical trials – of which there are more than a human can analyze efficiently – with the goal of finding the most personalized treatment option.

Mike Rogers, director of strategic innovations at Aurora Health Care, said he envisions machine learning and AI affecting health care broadly, particularly in helping with the treatment plan process. Rogers expects doctors will be using AI-powered technologies to optimize treatment plans within three years. On the consumer side, he said, there is plenty of opportunity for AI to change the patient experience, including with image recognition and chatbots, but providers are cautious when it comes to rolling out new technologies that affect the clinical experience.

"We want to have rigor around that," he said. "There is not a lot of room for error."

Holly the avatar

"Hello, thank you for coming. My name is Holly and I'm here to help with your advance directives," says Holly, the blue-eyed, blonde-haired, tan-suited avatar, brushing her hair aside as she speaks.

Holly is not a human, but she can field questions about the process of completing the legal documents related to end-of-life care decisions like a human could.

Norrie Daroga, CEO of iDAvatars

She's the product of Mequon-based Intelligent Digital Avatars Inc., a startup that develops avatars used in various industries for customer service purposes. The avatars are useful for several applications – insurance companies using the avatar to guide clients through the enrollment process, for example; or a university using the avatars to field students' questions about credit requirements.

More than a bot that simply spits out answers, these avatars, which are built on IBM Watson's framework, use advanced technology, including natural language processing, and can demonstrate human characteristics like empathy.

What sets iDAvatars' products apart is their ability to respond to a user with verbal acknowledgements and physical gestures, making the user feel heard, said Norrie Daroga, chief executive officer of iDAvatars.

Finding the right aesthetic for the avatars was important, Daroga said, citing the "uncanny valley" hypothesis – that humans find robots with human characteristics appealing until they become too similar, at which point that likeness becomes off-putting. iDAvatar's characters are cartoon-like, but the animation allows them to do more than just blink their eyes and stiffly move their arms. They move in a more natural way, emulating human movements – Holly's hair gesture, for example.

"We're providing an experience so that you can interact with a device and feel it could help you," Daroga said.

"Alexa is (like) listening to a football game on the radio," he added. "And using our virtual characters is like watching it on TV."

And while the ability to lend a listening ear to someone may seem like a uniquely human function, Daroga said, machines might be better at it.

"The ability to listen or make somebody feel like they were heard – a machine can actually do a better job," Daroga said. "The reason is a machine doesn't make you feel like it judges you and that's the No. 1 reason you might shut down, if you feel like your opinion doesn't count or what you're trying to express doesn't matter."

iDAvatar's advancements in developing emotionally-astute, communicative avatars place it in rare company in the AI world, Daroga said, which makes the company's headquarters in an unassuming, nondescript Mequon office notable. The decision to be in the suburb, Daroga said, was one of convenience – he lives there and didn't want to move, despite suggestions that he should.

While noting the Midwest's cautious proclivities when it comes to adopting new technologies, Daroga said it's also wrong to assume the region can't make its own contributions. Still, he said, it's challenging to find the right development and design skills in this area.

"There's a fallacy that this can't be built here," he said. "But, when I'm told it's impossible, then I have to do it."

At RokkinCat, a software contracting company in downtown Milwaukee, software architect Mitchell Henke said the firm has seen an increase in demand for machine learning and AI projects over the past year, particularly on how to improve operations with those capabilities.

Recently, the company built a recommender system that makes suggestions for new users to follow within an app. The company has also worked on internal protoyping of image recognition, image manipulation and recognizing an article's author based on text.

"We're exploring and playing around with these types of projects to understand it better, and be able to see if we can solve a given client's problems with machine learning or AI," Henke said.

Over the summer, Henke started a group for people interested in machine learning and AI after noting a lack of venues to discuss those topics. The group, which has drawn about 50 attendees at each monthly meeting, highlights local people who are working on AI and machine learning applications.

"There wasn't a lot of sharing of that kind of information before, at least in the software world," he said. "We wanted to let people see what they can do, so we try to find people who are doing it and can talk about it … And it's been going well. There has been a lot of interest."

History lessons

If AI inspires alarm in some and excitement in others, Thomas Kaczmarek, director of Marquette University's master of science in computing program, can be found somewhere in the middle – the result, in part, of having seen the successes and letdowns of the last big wave of AI enthusiasm.

Kaczmarek recalls the excitement related to AI in 1990.
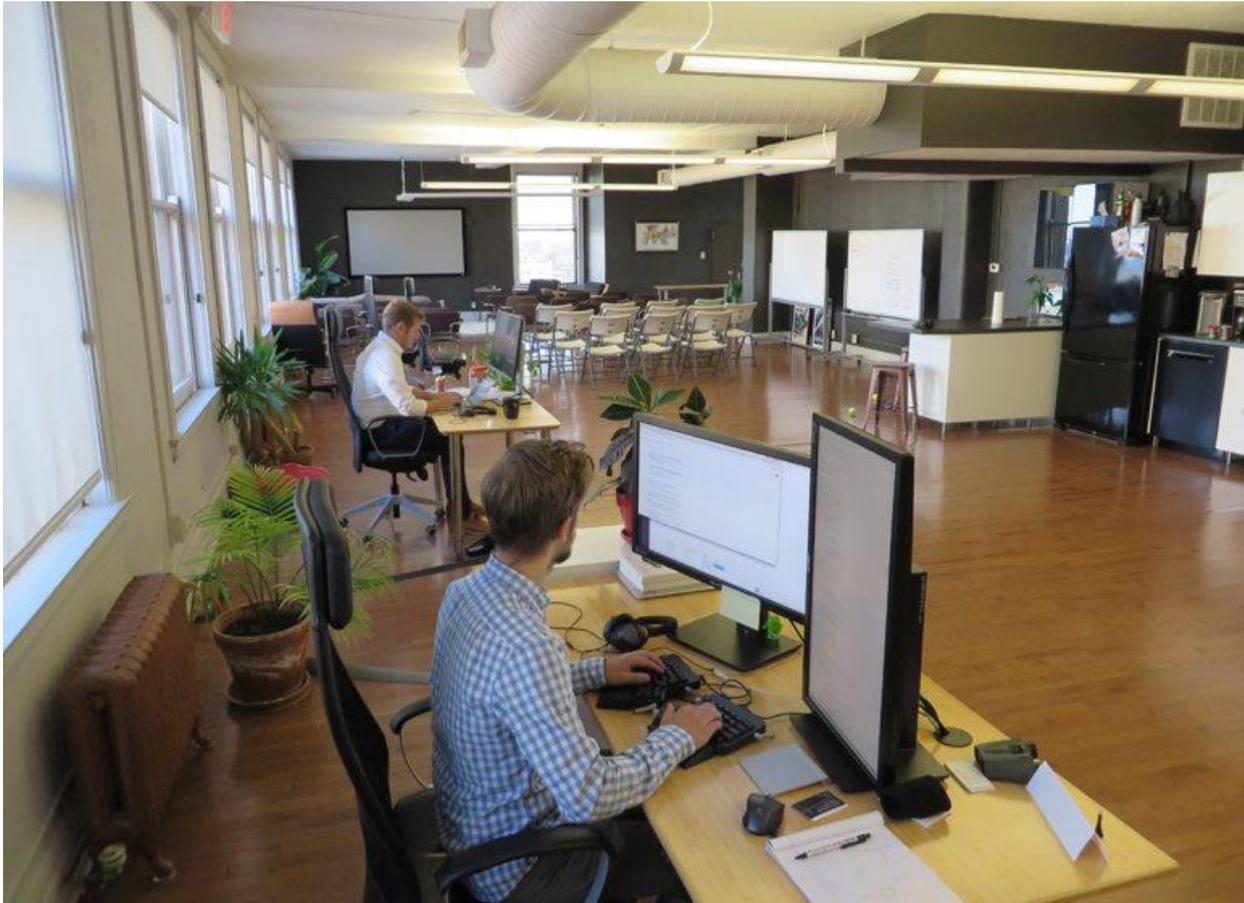
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"There was tremendous enthusiasm about the ability to build expert systems – to build a computer that would take the expertise of one person and make it available to many others," Kaczmarek said. "The expectation was that you would have all these really smart systems that everyone could use. There was a huge investment at the time in both hardware and software and it was expected that all of that was going to radically change business."

A "tremendous amount of venture capital" spent on AI technologies in the '90s didn't reap lasting rewards, Kaczmarek said. He was involved in an AI startup called Inference Corp. that enjoyed the backing of Ford Motor Co., where he led expert systems projects. It was one of three AI companies at the time that obtained significant equity investments from major companies, he said. Inference operated for about a decade before dissolving.

"There were huge expos, meetings and conferences with wild aspirations about what could be accomplished, but none of those three companies survived. The companies that built the hardware we were using – none of them survived or were even absorbed. There is very little left of all the investment that was made."

Kaczmarek said lofty aspirations were stunted by a limitation of human resources. There simply weren't enough engineers to build the systems.

"And we quickly used up all the power that the new computers gave us," he said.

When considering AI today, he says the most significant improvements have been in pattern recognition capabilities. He sees its potential impact on a host of industries: marketing, health care, finance.

Predicting stock prices? Not so much.

"Good luck," he said. "People tried to do that with expert systems and it didn't work then either."

But for all of the projections of increased efficiency and improved processes, Kaczmarek is quick to note the limitations of AI.

Fraud detection in the financial industry is a good use of the technology, Kaczmarek said. But, once detected, fraud still requires human intervention to do something about it.

Manufacturing, he said, stands to become more efficient with increasingly intelligent robots. But they are still expensive, require an engineer to build them, and aren't immune to the susceptibilities of any physical system.

"As humans, we learn to be productive," he said. "And we will be more productive and we will do more and better things as a result. Will we run out of things to do? I don't think so."