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120 AI Predictions For 2019

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Me: “Alexa, tell me what will happen in 2019.”

Amazon AI: “Do you want to open ‘this day in history'?"

Me: “Alexa, give me a prediction for 2019.”

Amazon AI: “The crystal ball is clouded, I can’t tell.”

My conversation with Amazon’s “smart speaker” or “intelligent voice assistant” just about sums up the present state of “artificial intelligence” (AI) at home, the

office, and the factory: Try a few times and sooner or later you will probably get the correct action the human intelligence behind it programmed it to perform.

What will be the state of AI in 2019?

The following list features 120 senior executives involved with AI, all peering into their not-so-clouded crystal ball, and promising less hype and more practical, precise, and narrow AI.

"Self-Driving Finance is a practical implementation of AI that is already used in one form or another by millions of bank customers around the globe and will only get better in the coming years. Based on projects that are currently underway with banks at different parts of the world, *I see a big uptake in the number of customers that will rely on AI to 'drive' their finances and take automated actions to help them reach their financial goals*. To deliver effective Self-Driving Finance, financial institutions will require specialized forms of AI for each of their customer segments such as retail, small business, and wealth—moving away from more generic forms of AI towards domain-specific solutions that embed subject matter knowledge and expertise"—David Sosna, Co-founder and CEO, Personetics

"*2019 will be the year of specialized AI systems built by organizations based on their own data*. Given the realization that organizations sometimes have only limited amounts of data, but also require specialized data, organizations will come to realize that they need tools to easily create quality AI data internally. This quality over quantity approach will require organizations to take stock of the data they have and ask themselves key questions: is this data representative of what I'm looking for, and does it match my goal? Will the production data match this

training data? Did I strike a balance between repeatability of images and variation? Is my dataset diverse? Taking new approaches to data strategy will be make-or-break for overcoming the challenges of AI's data problem, to develop AI that works in the real world"—Max Versace, PhD, CEO and co-founder, Neurala

"*AI will enable greater process discovery*. Process discovery is like a sensor embedded in the application that learns all of the user journeys, using AI to predict the optimal path for interacting with a system. Similar to using a GPS such as Waze when you're driving to unlock optimal routes depending on the time of day, AI will unlock how each employee can best use a system, providing a range of possibilities based on what the individual needs to do"—Rephael Sweary, Co-founder and President, WalkMe

"In 2019, we will start to see technology that will allow designers to talk to computer programs powered by AI to redesign, optimize and lightweight parts made by 3D printers in real time. *The designer will simply articulate the design goals and material parameters and the AI will do the rest*—exploring nearly infinite design permutations based on existing design concepts. More power will be put into the hands of designers who will be better able to test and experiment with alterations to create optimal designs much faster than before"—Avi Reichental, Founder and CEO, XponentialWorks

"Because of cloud and the pervasiveness of APIs, *in 2019 we'll begin to see AI deliver meaningful value to the enterprise and get us closer to the Holy Grail of AI*, which is helping people at all levels of an organization do what they do more effectively and efficiently, while uncovering new opportunities and new ways to work"—Josh James, Founder and CEO, Domo

"While B2B providers have been slow to adapt to the high standard of personalized digital experiences set by Amazon and Google, the industry has at least acknowledged the value of personalized home and landing pages. As customer expectations increase, *enterprises will need to keep pace by using machine learning and AI to offer a personalized experience beyond the first impression*, which extends to other assets such as technical documentation, community portals, and chatbots"—Gal Oron, CEO, Zoomin

"In 2018 we saw a great deal of hype around AI in healthcare but we also saw it become a reality—in everything from predictive analytics for chronic disease management, to workflow enhancement in radiology as well as administrative and financial use cases that bring operational efficiency. In 2019 we are going to see voice and video, coupled with AI, being used to help accelerate the shift of the point of care from the hospital, to the patient, wherever they are. *The convergence of AI with 5G will also accelerate the development of digital therapeutics that are more personalized, adaptive and take advantage of AR and VR*. Mental health and substance abuse treatment will be where we see early adoption. Clinicians that embrace AI as an augmenter or assistant, not as a threat of replacement or obsolescence, will be able to differentiate themselves both to their patients and their peers"—Jennifer Esposito, General Manager, Health & Life Sciences, Intel

"AI plays an increasing critical role in several industries from translating text and powering industrial drones to patient diagnosis. In 2019, *we expect AI, and more precisely image recognition, to be integrated into everyday life tasks* such as helping those with disabilities and automating cars. AI will also become part of the everyday shopping experience as existing stores will become automated, driving supply chain processes, delivering seamless checkout and enhancing customer engagement"—Michael Gabay, CEO, Trigo Vision

"AI will accelerate the end of ownership." Today, we don't own movies or music anymore—we subscribe to Netflix or Spotify. Tomorrow, we won't own *products* anymore—we'll subscribe to them. AI platforms are in the midst of turning every manufactured product on the planet into a connected 'smart' product. Today you can see that trend happening in transportation and consumer electronics—cars, scooters, washing machines, coffee makers, thermostats, etc. But soon you'll start seeing it happen everywhere—tables, chairs, floors, walls, clothes. As a result, we won't need to own anything. We'll simply subscribe to services: housing services, food services, transportation services, furniture services, clothing services. We'll be living in a true Subscription Economy"– Tien Tzuo, CEO & Founder, Zuora

"Automation plays into the hands of a cyber attacker, allowing him to use simpler tools to gain access and infiltrate networks. However, automation used in defense is not creating anywhere near the same impact. Two core factors can be attributed to this, namely a very limited talent pool and that the technology only works as well as the reliability of the data. Until the false positive problem is resolved, automation is not full-proof. Instead, *automation should primarily be leveraged pre-breach, serving as a proactive defense mechanism to help organizations outmaneuver the attacker at the earliest stage and minimize the potential damage*"—Nadav Zafrir, CEO, Team8

"Robotics and AI are increasingly used hand-in-hand to inspect and ensure the proper functioning of critical infrastructure that our society is built on—power lines, railroad tracks, flare stacks etc. Next year, the convergence of these two technologies is poised to accelerate, *with 2019 serving as a breakout year for Distributed AI*, in which intelligence will decentralize and be embedded closer to the assets and devices carrying out the inspections. Today's cloud systems that remotely control Industrial IoT and AI - often at significant distances from inspection sites - will begin transitioning to distributed and autonomous systems closer to the source of inspections, making inspection data collection more efficient and safer"—Ashish Jain, Managing Director of Data Sciences, GE Ventures

"Artificial Intelligence (AI) and Machine Learning have been hot topics for a while, but that will begin to decline in 2019. With many enterprises once having built an 'AI strategy,' today we're already finding that more and more are moving away from the hype and into solving real-world problems. *We will see the focus shift from AI to 'AI-driven' results* as companies look for real business impact from AI tools. The technology will be less important than the business insights it delivers"—Sean Byrnes, CEO and co-founder, Outlier

"The consumer's understanding around AI will shift dramatically. *We will no longer associate AI with futuristic robots and self-driving cars*, but rather productivity tools and predictions to help everyday menial tasks"—Josh Poduska, Chief Data Scientist, Domino Data Lab

"*2019 will be the year of the death of the data scientist*. In 2019, everybody is going to start learning Artificial Intelligence (AI) and the domain of data science will no longer be a purist data scientist. There are only about 5,000 folks who are data scientists and we can't rely on them to lead an industrial revolution. Everyone within an organization needs to have AI skills, from product managers to business analysts. The death of the data scientist is the pinnacle of this revolution"—Aman Naimat, CTO, Demandbase

"Some of our AI emperors have no clothes. For years, hot AI startups raised, scaled, and raced to build powerful algorithms in nearly every vertical—law, medicine, fintech—the list goes on. These AI solutions were framed as replacements for your most menial tasks. *A new wave is on the horizon—AI startups that generate proprietary data every time they're used*. These startups, which leverage what we call Coaching Networks, are powered by algorithms that forever improve because they're fueled by the creative inputs and successes of millions of workers. These focused networks will be very hard for companies that leverage static data sets and commodity APIs to compete with"—Gordon Ritter, General Partner, Emergence

"AI is already outperforming humans in many domain-specific tasks; now comes the age of real-world applications. In 2019, AI will fundamentally disrupt diabetes management, thereby improving the lives of millions. Moreover, *AI will help bring to life the ample information gathered from wearables, transforming it into actionable insights that will help people lead healthier lives*. In addition, there will be a big leap in unsupervised machine learning in the near future. Finally, I we will see companies using AI to train AI. Instead of data scientists trying to experiment on which AI models work better for real world problems, companies will let AI do the work for them. This will help AI outperform humans in many new tasks"—Yaron Hadad, Chief Scientist and Co-Founder, Nutrino

"If we want to create AI which is actually adopted by humans, it will have to be less and less 'artificial,' and more and more 'intelligent,' meaning it will have to take on human traits. For people to feel a connection to AI-powered services and be willing to adopt them into every aspect of their lives, these services will have to

become more and more anthropomorphized. And just as the human body is able to heal itself, we will also *expect these systems to self-diagnose problems in their code and self-heal, correcting software issues on their own*"—Zohar Fox, CEO and Co-Founder, Aurora Labs

"We believe AI as an all-purpose buzzword in healthcare will be slowly retired in 2019. As digitization of the industry matures, *the idea of the all-knowing machine replacing doctors is clearly being debunked*. The challenges of IBM Watson's healthcare efforts, for example, illustrate that powerful computational tools alone are ineffective in the face of unstructured medical data and the complex realities of patient care. For 2019 we are skeptical about broad, systems-based uses of artificial intelligence promising unspecified insights"—Yonatan Adiri, Founder and CEO, Healthy.io

"In 2019, not only will developing more robust and sophisticated AI algorithms take center stage, but as these AI algorithms become more unique and effective, they will also grow in value and owners will have to protect their substantial investment. Companies are spending millions to develop AI, and they are often at the heart of business growth, yet new security challenges have emerged around protecting these AI models—securing their intellectual property from being stolen while also ensuring that no one is tampering with the model. *In 2019, we will have to be deeply intelligent about protecting our Artificial Intelligence*"—Alon Kaufman, Co-founder and CEO, Duality Technologies

"Until now, the use of AI has been focused on making our lives more automated and our industries smarter. *In 2019, we are going to see a shift toward utilizing AI for social good* and making our lives more sustainable. AI is going to be used to make our cities and industries more environmentally friendly and our world a better place. From agritech and crop optimization to utilities and alternative energy, the big data analytics and machine learning behind AI will be leveraged to completely change the way consumers interact with their surroundings"—Natan Barak, CEO and Founder, mPrest

"*In 2019, the global lending sector will see an uptick in AI that can predict financial eligibility and funding opportunities*. With AI, lenders can

foresee which of today's unviable applicants will become creditworthy in the future, thus open funding opportunities to businesses previously locked behind low-tech assessment processes. The dynamic and real-time nature of AI will provide continuous and automatic access to and updates about new financing opportunities that arise throughout a business's lifespan, as it grows and improves. This same AI application will eventually change the mortgage and student loan industry as well"—Eden Amirav, CEO and Co-founder, Lending Express

"*The AI that supports prediction in self-driving cars will be 'remodeled' to access and analyze predictionary data differently*. The Autonomous Vehicle industry will move away from object fusion and towards raw data fusion, which enables AVs to better interpret movement, speed, angle, and trajectory, and provides rich data to predict the direction and future movement of an object, pedestrian, or vehicle"—Ronny Cohen, CEO and Co-founder, VAYAVISION

"Multi-trillion-dollar markets such as commercial real estate are comprised of an intricate web of interactions that affect every decision, and AI technology is now mature enough to tackle these highly complex transactions. As industry leaders are opening up to the potential of integrating advanced technology into core operations, *AI is making its impact felt across new industries that were previously off limits*. We see asset managers looking to develop new investment vehicles defined by AI that will enable enhanced performance in uncertain economic conditions, adding value throughout the entire investment lifecycle"—Guy Zipori, CEO, Skyline AI

"*Even though level 4 and 5 autonomous vehicles (AVs) still aren't commercially available, 2019 will be the year that they take a giant leap forward*. The data that AI relies on will become more readily accessible thanks to data-sharing alliances that must become a reality in order for automotive AI to improve to a level suitable for all road conditions. Simultaneously, the types of data collected for AI will be broadened to include non-visual data. Better data means better AI and safer AVs"—Boaz Mizrachi, Founder & CTO, Tactile Mobility

"As more businesses rely on AI to fuel their own products, services and data-driven marketing innovations, bad actors across the digital ecosystem will utilize similar capabilities to increase their efforts and execute massive fraud schemes, resulting in hundreds of millions of dollars in losses for brands and marketers. With that, *companies that invest smartly in AI and machine learning-based fraud protection tools will be able to clearly 'see' the entire ecosystem and protect themselves from fraud and the polluted data that impacts business decisions*—leading to a significant competitive advantage"—Ran Avrahamy, VP, Global Marketing, AppsFlyer

"AI research and applications are proving increasingly important in healthcare, improving patient outcomes through a more personalized, data-driven approach. Just as big data is used to curate more satisfying user experiences, more granular 'small data'—information generated by each individual and analyzed by AI tools, turning smartphones and consumer wearables into powerful at-home diagnostic and treatment tools—will be used to drive digital health users to action based on their real-world behavior, capabilities and needs, and to boost population health by making disease prediction and prevention scalable. *In 2019, AI will be the linchpin of digital health's application to the prevention and treatment of disease*, specifically chronic illnesses, connecting the dots between the small data that can optimize an individual's personal care and the big data that can uncover solutions with a global impact"—Dana Chanan, CEO and Co-Founder, Sweetch

"*2019 will be a pivotal year in the way cities understand their urban mobility ecosystems in order to build much more efficient transportation systems throughout urban areas*. If today's cities are primarily focused on severe challenges such as traffic, pollution and lack of parking space, in 2019 they will have far better visibility into the root cause—inefficiency of movement in urban areas. Understanding how people are moving in urban areas, from where to where, when, with which means of transportation, and understanding why—that's the core that will allow cities to build more efficient mobility, reducing our need to move around, encouraging people to move together, and creating multimodality. In order to get there, cities will need visibility into such data, and AI is precisely the tool that will enable such visibility, fostering prediction

capabilities and action points to significantly improve the way we move"—Liad Itzhak, SVP Head, HERE Mobility

"There is no shortage of angst when it comes to the impact of AI on jobs, especially within the agricultural industry. However, the future of precision agriculture and the key to growing a better crop will rely on AI, imagery and sensors that will be able to learn from collecting information cultivated from 1000-acre farms. Agronomists and farmers are facing a major labor shortage and lack of expertise. The demand for food is increasing, yet farming is not valued as an attractive or profitable career, particularly in commodity crops. Due to the size and diversity of farming operation demands, farmers need to pay close attention to labor initiatives and employee management. *Farms across the world are moving to fill the labor gap—not replace jobs—with AI technology*"—Ofir Schlam, CEO and Cofounder, Taranis

"Brick-and-Mortar retail businesses are turning their attention to AI to significantly improve customer experience, profitability and remain competitive. *In 2019, we will see emergence of new data sources (surveillance cameras, on-the-shelf-cameras, robots) and AI models for inventory management, better customer retail experiences, targeted marketing, and adding new capabilities such as self-checkout*. The key challenge, however, is to develop and scale AI operations to thousands of retail stores that differ in planograms, camera models, and network infrastructure capabilities"—Atif Kureishy, Vice President Global Emerging Practices, Teradata

"I expect we'll see AI-based attribution tools hitting their stride in 2019. In today's digital environment, attribution continues to be a challenge—businesses are still piecing together data points from different platforms and many are still struggling to understand the full path to purchase—which marketing channels are driving revenue? What kinds of content help retain customers and at which stage of the customer journey? Where are customers falling out of the funnel? *AI can sequence the customer journey together and identify when a customer comes to a company's site and leaves without converting*. It's the businesses that adopt

AI-powered attribution tools that will have a leg up on the competition"—Carl Schmidt, CTO and co-founder, Unbounce

"The future of third-party data is critical for marketers to stay actionable and competitive in a fast-moving technology landscape. The culmination of high-profile corporate privacy scandals and new wide-sweeping data legislation has forced consumers to get to grips with their digital footprints and has caused them to be more critical over how they are targeted. *Moving forward, third party data will help marketers gather more insights surrounding how consumers use emerging technologies such as voice, location-based search and AI, so they can target them in a way that is compliant and drives ROI*. This data will remain key to informing the bulk of marketing strategy for years to come"—Chase Buckle, Senior Trends Analyst, GlobalWebIndex

"The hype around AI technologies that match human intelligence in some abstract form is drowning out the fact that today, there is real value in AI tools that collect, organize and make actionable the collective human experience. AI is not HAL 9000 from Space Odyssey. In 2019, AI will be about making people smarter, more effective, and more productive. It will also make people happier in their jobs – especially IT professionals. *For enterprise IT, 2019 will be the year that AI will enable teams to move beyond simple task automation, to empower the robotization of entire processes*. By tapping the applied collective knowledge of thousands of users and millions of process executions with AI, IT teams will be able to preemptively streamline application development, troubleshooting and even one-off daily requests. AI will bring them much needed help, backed by more knowledge and experience than any single human could bring to bear"—Neil Kinson, Chief of Staff, Redwood Software

"We are still far from having a bonafide 'smart home' and the primary roadblock is the lack of the essential link between sensing and action. Currently, we have a variety of technologies that offer a compelling vision of the future, but that vision is impeded by the fact that the devices are isolated, lacking context, and are thus unable to act autonomously: the consumer must still supply the intelligence for the 'smart home.' *The mating of RF sensing technology with mesh and other*

networking schemes will amplify the value of network hardware, enabling them to provide powerful communications infrastructure and sensory feedback—the necessary convergence of control and communications needed to create cognitive systems. We will see this convergence entering the market in 2019, led by forward-thinking tech players who will build out this visionary ecosystem to satisfy the demands of consumers who want to see a Jetson—esqe future, now."—Nebu Mathai, EVP Product Engineering, Cognitive Systems Corp.

"As AI increasingly takes on roles in the workplace, it will be judged not only on its IQ, but EQ—emotional intelligence—and ability to perceive and understand all things human. *The ability to understand human emotions and cognitive states will become part of the criteria for evaluating AI*, as companies make decisions on which AI solution to select for their workplace, and even as consumers decide between systems like virtual assistants or smart speakers to have in their homes"—Rana el Kaliouby, PhD, CEO and co-founder, Affectiva

"The focus of AI will shift from intelligence to empathy—we're moving beyond the point where basic intelligence suffices for consumer-facing AI, as customers want to know that they are being viewed as individuals and not just as customer data records. *In 2019, vendors will focus more on increasingly humanizing AI with empathy*—including picking up on clues on customer motivation, how they feel in the moment, how they act in certain situations, and even what is happening around them"—Dr. Rob Walker, Vice President, Decision Management and Analytics, Pegasystems

"As businesses increase their use of AI to extract greater value from their digital assets, *metadata tagging will become an even more critical element of enterprise storage*. This will bring more attention to object storage, which is centered on metadata, and the key will be integrating well with AI tools"—Jon Toor, CMO, Cloudian

"*Centralized data will be replaced by a single view of all data*. Data is coming at us from different directions, at different speeds, and in different formats, and controlling this tsunami is one of the key markers of empowerment and success in the information age. Two massive trends are changing the landscape. First,

different vendors are coming together to standardize data models. Second, and more important, is the emergence of enterprise data catalogs. These catalogs are accessible in a hub, with one view of the entire federated data estate, and deliver a shop-for-data marketplace experience. The more you share, collaborate, and use the hub, the more valuable it becomes to the business. Furthermore, it links your analytics strategy with your enterprise data management strategy, as the data becomes analysis-ready"—Dan Sommer, Senior Director, Qlik

"The modern enterprise will continue to edge out technologies like Hadoop. *The merger of Hortonworks and Cloudera was a first look into the projected value for Hadoop in 2019*. Technology that was designed twenty years ago in an era of 'small' data will no longer support the modern, global, and dynamic enterprise. Data will still require management tools, but the complexity will be eliminated with the rise of Artificial Intelligence and machine learning"—Roman Stanek, CEO, GoodData

"High-profile breaches this past year have thrust the application layer under the security spotlight. As applications become increasingly sophisticated, their development also opens up increased vulnerabilities. While DevOps is racing to keep up with accelerated application development, it is becoming increasingly impossible to manually keep up with, much less anticipate, threats. *Machine learning and AI will continue to be used to mitigate vulnerabilities much more efficiently and with more accurate results*"—Ivan Novikov, CEO, Wallarm

"*2019 is going to be the year of open source AI*. We're already seeing companies begin to open source their internal AI projects and stacks, and I expect to see this accelerate in the coming year. The impetus for this is the same as in other industries such as the cloud that have moved strongly to open source—increased innovation, faster time to market and lower costs. The cost of building a platform is high, and organizations are realizing the real value is in the models, training data and applications. We're going to see harmonization around a set of critical projects creating a comprehensive open source stack for AI, machine learning, and deep learning"—Ibrahim Haddad, Director of Research, The Linux Foundation

"AI will help elevate in-store customer experiences. AI will be used to help stores elevate customer experiences and build loyalty in ways that were previously impossible. When customers shop online, they often receive personalized recommendations and offers. Retailers have tried in the past to use beacon technology to enable the same level of personalization, but beacons are largely considered a failure because they require specific app downloads, Bluetooth connections or other factors that vastly limit their usability. This problem will be solved by AI-trained face recognition algorithms. *In 2019, customers that opt-into face recognition programs will gain numerous in-store benefits including personalized discounts, white glove service and shorter wait times*. Retailers will finally be able to offer customers the same level of personalization in stores as online"—Peter Trepp, CEO, FaceFirst

"AI will start to become embedded in many more enterprise applications, in particular in applications for knowledge workers where AI and data analytics will play an increasing role in supporting and even making decisions. At the same time, *the current misconception about all data analytics being AI will be more widely discussed, particularly with regards to the availability of sufficient, relevant and specific data to train algorithms and keep them 'learning.'* This will lead to an increased focus on more advanced methodologies that can learn and adapt based on actual real-time data"—Mikael Johnsson, Co-founder, Oxx

"*Because companies are recognizing that AI cannot be built without high-quality data, they will increasingly turn to specialized providers that sit on crucial data resources to help them understand their unstructured data*. For example, Bloomberg is building NLP libraries that are specific to the financial domain"—Gideon Mann, Head of Data Science, Office of CTO, Bloomberg

"*In 2019 we expect a significant move forward with frameworks and standards for measuring and testing bias in AI*. We will see an increase in need for human judgement and, consequently, an increase in these types of jobs, standards, and protocols. My prediction is that momentum behind this will build as a result of enterprises seeking to mitigate risk in the wake of high-profile scenarios of things going wrong"—Jake Tyler, CEO, Finn AI

"The traditional 'break-fix' approach to maintaining network quality of service (QoS) is no longer enough. End customers are now so dependent upon always-on connectivity and so sensitive to service outages that even short service interruptions are now deal-breakers. Moving forward, *we're going to see artificial intelligence (AI) emerge as the role of a fixer and optimizer to enhance IT operations*. Initial applications will tend to focus on security functions, like DDoS attack mitigation and real-time automated path selection. Eventually, uses will include AI-defined network topologies and basic operations, which will help us forge a network that runs on auto-pilot"—Kailem Anderson, Vice President of Software and Services, Ciena

"*The explosion of artificial intelligence (AI) within IT is poised to provide many benefits and time-saving opportunities in 2019 but will require IT decision-makers (ITDMs) to evolve into strategic consultants* rather than serving in reactive roles. AI will not replace the entire IT team overnight, nor will it get close any time soon due to the current applications of the technology. However, as AI starts to erode the need for humans in the IT helpdesk, we will see those ITDMs that wish to survive do what they should be doing anyway—grow, expand into higher value areas and maintain a close relationship with the business. Failing to evolve into this strategic leadership position will lead to ITDM's extinction"—Ian Pitt, Chief Information Officer, LogMeIn

"*AI-powered bank 'tellers' will become the norm*. Bank branch consolidation will give way to the next big trend—interactive kiosks. Using AI and data analytics, these 'tellers' will deliver personalized experiences matching users with the appropriate teller based on life-stage, transaction history and more. Many banks have already seen success with virtual assistants in their mobile apps. In 2019 we predict AI-technology will extend beyond the mobile app and 15 percent of banks will launch interactive kiosks"—Mike Diamond, GM of Payments, Mitek

"AI will get down to work beyond the hype and headlines. Practical AI will rule and be focused on making shopping easier, patient engagement better, lawyers smarter and cybersecurity stronger. *We won't see autonomous cars that never*

crash but AI will augment workplace productivity in new and interesting ways in 2019"—Ram Menon, Founder and CEO, Avaamo

"*2018 was the year of bots, and over the next year we'll see pervasive analytics and intent-based AI take this a leap further*, highlighting the importance of specialized service desks that streamline IT support management and allow for instant knowledge delivery"—Phani Nagarjuna, Chief Analytics Officer, Sutherland

"AI and machine learning (ML) have been the 'silver bullets' of the security industry for the past few years. Malicious actors are taking note. For instance, just like security vendors can train their ML models on malware samples to detect them, malware writers can 'train' or tune their malware to avoid detection using the same exact algorithms. Attackers can also poison the data that ML models use in training. Because algorithms need massive amounts of data to work, it can be difficult to weed out efforts to poison your learning set with false information. *We believe a significant attack or strain of malware will leverage AI in 2019*"—Nir Gaist, CTO, Nyotron

"AI has the potential to impact the retail sector in a number of ways, but most notably in 2019, *we can anticipate increased product innovation in the supply chain*. As AI product innovations in the supply chain reduce overall costs through risk mitigation, improved forecasting, sped up deliveries and customer service capabilities, we can expect more and more companies to implement such solutions, changing the face of retail in 2019"—Brad Taylor, Senior Director, Engineering and Facilities, Radial

"Deep Learning models have been shown to be vulnerable to imperceptible perturbations in data, that dupe models into making wrong predictions or classifications. With the growing reliance on large datasets, AI systems will need to guard against such attacks data, and *the savviest advertisers will increasingly look into Adversarial ML techniques to train models to be robust against such attacks*"—Prasad Chalasani, Chief Scientist, MediaMath

"AI will add an extra layer of predictability, allowing organizations to see patterns and gain insights from IoT devices and past customer behaviors—ultimately making supply chains smarter, leading to faster, more efficient production and fulfillment, and happier customers. *In 2019 and beyond, we can expect AI to take supply chains from reactive in nature to prescriptive levels, helping companies get one step ahead of consumers' rising expectations*"—Hala Zeine, President of Digital Supply Chain, SAP

"*In 2019 AI will 'cross the chasm' in healthcare* as mainstream non-pioneering institutions apply AI-fueled clinical decision support tools to everyday work, including radiologic analysis in the U.S. and oncology drug selection in Africa and South America. Additionally, as advances in molecular biology demonstrate that many 'common' diseases are actually clusters of rare sub-forms, AI will find the high-value pockets of *small* data (such as unusual genetic signatures) hidden in vast reams of *big* data"—Frank Ingari, Board Member, Quest Analytics

"AI for customer self-service isn't as successful (yet) as the hype would indicate. *Many organizations in 2019 will take a split approach—more aggressive use of AI to automate repetitive agent after-call work and a more targeted approach with simple and high-volume self-service use cases*"—Chris Bauserman, VP of Segment and Product Marketing, NICE inContact

"The key word is cognitive load and how do companies reduce it by providing better guidance and overall automation that helps make it easier to use—RPA (Robotic process automation) is a great example of this and continues to heat up. As we move into 2019, RPA will become even more disruptive in how industries like retail, manufacturing, supply chain and even finance operate from the ground up. In 2019, we can expect to see more widespread introduction of software robots and artificial intelligence (AI) workers as organizations look to leverage automation to enhance their overall commerce ecosystem"—Rob Maille, Head of Strategy and Customer Experience, CommerceCX

"As artificial intelligence applications grow in popularity, one key enabling technology will be the ability to process larger data sets constantly being updated with operational data. Fast access to not just historical data but also current

transactions and real-time inputs will be critical to delivering more value to the enterprise. *With the right data currency and quality, AI will move from special projects into production*"—Raghu Chakravarthi, SVP of R&D and Support Services, Actian

"A major hurdle in the customer experience space is users are still wary of how brands collect, store, secure and use their information. *Heading into 2019, businesses should be looking to security in AI*, using emerging technologies as a way to protect their customers—both from a purchasing standpoint and from potential digital threats that seek to steal the information customers are sharing with brands"—Dan Kiely, CEO, Voxpro

"*Intelligent robotic process automation will emerge as business critical,* as companies will require the high automation level necessary to become intelligent enterprises in 2019. Additionally, conversational AI will take automation a step further to automate businesses' customer support with more intelligent chatbots. These two technologies combined are the next big milestones to achieve faster, more effective and more intelligent AI"—Markus Noga, SVP Machine Learning, SAP

"Artificial intelligence (AI) will make it possible to remotely monitor our health and automatically suggest lifestyle changes that could help prevent diseases or spot them at the onset when they are much more treatable. We're already starting to see this with FitBits reminding us to hit our daily steps or diabetes technologies monitoring our blood sugar, but this is just the beginning. *In 2019 we'll see an increase in health wearables hitting the market that use AI to track a vast number of conditions like blood pressure, painting a more holistic picture of a person's health, as it changes in real-time*"—Kevin Hrusovsky, CEO, President and Chairman, Quanterix

"Many AI-enabled automation projects in 2018 failed because they were targeting the wrong processes to automate. In 2019, companies must assess what parameters should be taken into consideration—things such as the number of users for any given process, handle time and complexity (i.e. number of apps involved, type of actions conducted etc.). If these elements are factored in, this

will help ensure that the processes being automated will yield a significant ROI for the company. *Automating the wrong processes will only lead to frustration and halt an organization's journey to successful automation*"—Oded Karev, VP, Head of Robotic Process Automation, NICE

"As we move into 2019, every telco operator in the US will have a strategy defined, and budget allocated, toward monetizing machine learning in operations. However, there is a shortage in talent that will affect everyone and strain companies' ability to deliver, unless they have strong scaling strategies. There is a large pool of junior data scientists that will be the key to addressing these shortages and will do so in the coming years, but the learning curve will be felt in 2019. As a result of the current knowledge gap, *applications democratizing AI and ML will see a large increase in demand but will likely fall short on their ROI due to misinterpretation of data*"—Johnny Ghibril, VP of Data Science & Solution Architecture, B.Yond

"*Machine learning will continue to work pretty well but will suffer the occasional ridiculous failure as the underlying statistical nature of many learning algorithms becomes clear*. A number of risks surrounding representation, sensor tampering, state manipulation, priming, and catastrophic forgetting will come (back) to light. Associated security issues will be fun to explore. On the societal side, some inherent social norms exposed by AI/ML will continue to shock. When machines learn from humans, they can pick up some bad habits and some morally suspect habits. Who knew we were so terrible as a species?"—Gary McGraw, VP of Security Technology, Synopsys

"*Look out for ontology-based data science projects to complement existing bots and machine learning programs to round out the data science and AI approaches for business in 2019,* and to set the standard for how these tools can drive the performance of workers in both efficiency and effectiveness. Ontologies add an additional tool to the set of approaches that companies can now deploy off the shelf and ontologies ability to link together diverse sets of data and draw conclusions from them, make an ontology-based system an easy start for

enterprise and business organizations in 2019"—David Keane, Co-founder and CEO, Bigtincan

"Enterprises have been so focused on the potential benefits of AI, that it's become more buzz phrase than reality. *Rather than focus on the buzz in 2019, businesses must focus on adopting AI applications and projects that offer near-term value to their organizations*. To ensure success, they will need to put a plan in place, including identifying the groups and tools that can actually pilot or incubate new AI technologies to allow adoption enterprise wide. Gradual rollout after testing will help mitigate any major disruptions to everyday business, while enhancing the organization's future technology footprint"—John Samuel, Senior Vice President, Global Chief Information Officer, CGS

"We will see a huge spike in the exploration and adoption of ML/AI tools that can help develop mobile and web test scenarios without coding (codeless testing), to speed up the process of code validation and to provide a greater stability for the test code. These tools enable smart test recording with high degree of stability that is a huge boost to organizational productivity and agility. On the front of smart decision making and quality analysis, *we will see ML/AI solutions that can automate the slicing and dicing of data, and quickly provide root-cause analysis for issues that were detected during the DevOps pipeline testing activities*"—Eran Kinsbruner, Director, Lead Software Evangelist, Perfecto

"2019 will see an exponential increase in the number of research projects and companies building solutions that leverage AI to increase developer productivity. We expect that by 2020, *all development will be assisted by AI co-developers that understand developer intent, suggest next best patterns and detect problems before applications go into production*. This will enable companies to continuously improve their digital experiences and respond to market needs at a pace that was impossible before"—Antonio Alegria, Head of AI, OutSystems

"Artificial Intelligence will increasingly be used to detect bad actors targeting employees' and consumers' inboxes (e.g. spam, phishing, etc.). As the technology advances in the coming year, it will work pretty well for the most part. However, its occasional mistakes will cause significant issues, like financial and

reputational damage, for businesses. Most users will find slips in security utterly incomprehensible and security companies will have an especially hard time explaining the matter to customers"—Nathaniel Borenstein, Chief Scientist, Mimecast

"*Enterprises will focus seriously on data privacy initiatives to comply with EU laws (GDPR) or state laws (e.g., CCPA) in 2019*, but probably for less obvious reasons. It is not so much the fines per se which can range up to 4% of global sales, since it's uncertain whether such hefty fines will be levied so early; rather, top management and board directors are concerned about their fiduciary responsibility to ensure that proper measures are taken to prevent such severe fines, which could produce significant financial distress or reputational damage. Separately, it should be noted that the usual risk-deflection method of buying insurance against fines is not yet available in most countries"—Kon Leong, CEO and Co-founder, ZL Technologies

"In 2019, the value statement of every vendor that builds AI systems should focus on BOTH the value they wish to create AND the underlying moral foundation of their service. How they collect data, with whom they share that data, and what they end up doing with that data will increasingly need a litmus test for what is acceptable and not. That litmus test needs to be part of the culture of the vendor —it needs to come from the inside out. While this will feel too 'touchy-feely' and constraining to some vendors, it is absolutely necessary for long-term business viability to establish trust credibly across their user communities. *Without transparency, there is no trust. Without trust, there is no data. Without data, there is no AI*"—Ojas Rege, Chief Strategy Officer, MobileIron

"*2019 is the year that AI unlocks the tremendous value of productivity in the industrial world*. More companies are coming to market with vertical solutions that require little know-how in training models or interpreting results. This focused approach can be used by anyone, and enables very quick time-to-value at large scale. This shift will increase productivity and safety and will open the doors for new business models throughout the industry, like Outcome-as-a-Service"—Saar Yoskovitz, Co-Founder and CEO, Augury

"The biggest benefit of AI will turn out to be something that we think of as quintessentially human: being 'good team players.' While previous years have focused on individual algorithms doing things better than individuals, *2019 is about collections of algorithms starting to collaborate on complex tasks*. With their speed, absence of ego and built-in altruistic tendencies, the early indications are that AI team performance will quickly outdistance their human counterparts"—Timo Elliott, Innovation Evangelist, SAP

"AI offers healthcare a truly transformational opportunity, particularly in the arena of virtual care. What we've known as telemedicine is quickly becoming the analog past, while *virtual care is the digital future—the next iteration of the industry, and AI will play a large role in this transformation*. For example, complex algorithms can parse patient information, helping to direct them to the most appropriate level of care; natural language processing is advancing in a way that will make online interactions simpler and more effective; and smart systems can gather patient allergy, prescription history and health information to support safer and more effective prescribing. Best of all, with these AI tools in the hands of providers and healthcare organizations, the digital experience can enhance, rather than supplant, the patient-provider relationship"—Jon Pearce, CEO and Co-founder, Zipnosis

"2019 is the year where we have everything in our hands to use digital technology; it will be the year that will differentiate the laggards and the leaders, providing competitive advantage to the forward-thinking organizations. The laggards still believe there is time, and will keep developing solutions in silos, making small progress, without realizing the pace of change is accelerating faster than in the last 20 years. *The leaders are the ones that are set for digital transformation across their organizations, and who will leverage Big Data and AI to deploy solutions that fundamentally affect the full drug development life cycle*; they will reverse the current trend—growth of drug development timelines by 25%, reaching a startling 12 years on average—and bring much-needed therapies to the market sooner"—Isabelle deZegher, Vice President, Integrated Solutions, PAREXEL

"*In 2019, society will push for the demystification of AI and demand a better understanding of what technology is being built, and greater transparency into how it is being used*. As transparency increases people will better understand that AI is not an all-encompassing term for machines that can replicate and act like a complete human, but rather a more explicit set of functionalities that can better automate simple tasks and augment people executing more complex actions. This will result in less fear of a machine takeover and greater acceptance of new innovation"—Josh Feast, CEO and Co-founder, Cogito

"In 2019 Artificial Intelligence (AI) and Machine Learning (ML) will nearly reach its full potential by connecting and processing data faster over a global distribution of edge computing platforms. AI and ML insights have always been available, but possibly leveraged a bit slower than needed over cloud platforms or traditional data centers. We're already seeing this in the way airlines build and service airplanes, government defense agencies respond to hackers and how personal assistants make recommendations for future online purchases. *This year, thanks to AI and ML, someone will finally know if that special someone really wants a fruitcake or power washer*"—Alan Conboy, Office of the CTO, Scale Computing

"2019 seems as if it will be the year of analytics, machine learning and AI. These tools are already available, though their take up has often been delayed by a failure to match these new capabilities with appropriate new workflows and SOC practices. Next year should see some of the pretenders—those claiming to use these techniques but actually using last generation's correlation and alert techniques in disguise—fall away, allowing the real innovators in this field to begin to dominate. This is likely to lead to some acquisitions, as the large incumbents, who have struggled to develop this technology, seek to buy it instead. *2019 is the year to invest in machine learning security start-ups demonstrating real capabilities*"—Stephen Gailey, Solutions Architect, Exabeam

"Some existing applications that we may see more than others in 2019 will be chatbots and increasingly autonomous vehicles. The improvement in chatbot AI capabilities, will create an opportunity for innovative customer service groups to

step up in 2019 over competitors. *2019 will also be a big year for autonomous driving initiatives to leverage empirical data with continuously improving algorithms and hardware processing power*"—Scott Parker, Director of Product Marketing, Sinequa

"As AI and ML become mainstream, *a new breed of security data scientists will emerge in 2019*. Preparing, processing, and interpreting data require data scientists to be polymath. They need to know computer science, data science, and above all, need to have domain expertise to be able to tell bad data from good data and bad results from good results. What we have already begun seeing is the need for security experts who understand data science and computer science to be able to first make sense of the security data available to us today. Once this data is prepared, processed and interpreted, it can then be used by AI and ML techniques to automate security in real time"—Setu Kulkarni, Vice President of Corporate Strategy, WhiteHat Security

"A top tech trend of 2019 will be the impact machine learning/AI on the quality of software. In the past, we've designed delivery processes to be lean and reduce or eliminate waste but to me, that's an outdated, glass-half-empty way of viewing the process. *In 2019, if we want to fully leverage ML/AI, we need to understand that the opposite of waste is value and take a glass-half-full view that becoming more efficient means increasing value, rather than reducing waste*"—Bob Davis, CMO, Plutora

"*Companies will realize AI is an investment in the transformation of their internal processes, not just a feature that can be turned on to magically fix inefficiencies*. On the vendor side, technology providers will make AI tools and platforms easier to implement and put in place, and the difference between technology leaders who can truly create this change within an organization and those who are trying to capitalize on the hype will become more and more vivid"—Connie Schiefer, VP Product Management, Mya Systems

"For the last two decades, the epicenter of the world's economy has shifted as technology driven companies take over entire markets at the cost of businesses like Sears. But that's just the beginning. Big tech companies are already beginning

to use their advantages in AI and data to reach beyond their traditional markets into entirely new ones. Amazon has its eyes on entertainment and healthcare. Google is looking at the future of transportation. *No company is safe from AI driven disruption and we'll see this trend continue to accelerate next year*. If companies are foolish enough to be caught off guard, they'll quickly follow in Sears' footsteps, unable to adapt to the new digital world where AI and ML reign supreme. The hype around AI for automating everything will die down, though the urgency to create more efficient processes will only increase"—Sudheesh Nair, CEO, ThoughtSpot

"2019 will be the year that artificial intelligence companies begin dismissing efforts to modify broken hardware and processes. Instead, they'll set their sights on holistic ecosystems that reimagine and reshape the way we design processes altogether. While the technological aspects of this process overhaul will be what drives the necessary sea change, we'll come to realize that an even larger opportunity lies in *using advanced technologies to optimize human behaviors anywhere they intersect with business process flow*"—Alan O'Herliy, CEO, Everseen

"*In 2019, we'll stop doubting humans' role in the fourth industrial revolution*—nor fear they don't have one. It will become clear that the relationship between machines and humans is not either-or, but rather, it's highly symbiotic. We'll realize how crucial it is to marry human insight with AI in order to reach both AI's and humans' potential. We're already seeing that the AI solutions succeeding at both the department- and enterprise-level are those that leverage humans to set forth the larger strategic vision and drive the instinctual and intuitive elements of any complex process. Solutions that are built to capitalize on this give-and-take between man and machine will produce the best outcomes and experience rapid adoption, as a result"—Or Shani, CEO, Albert Technologies

"Most early business AI applications have revolved around predictive and prescriptive analytics, using AI to augment human decision making. In 2018, AI began going deeper, not just forecasting but actually taking business actions. *2019 will see more adoption of deep vertical-specific AI* that will autonomously take

high-value business actions across the supply chain—from purchasing and warehousing to messaging and customer service management"—Fayez Mohamood, CEO, Bluecore

"Almost all software companies know every click that a user makes in their applications. What's been missing is a true understanding of what the user was trying to accomplish and whether they succeeded or failed. *2019 will be the year that AI-driven technologies will begin understanding the difference between user intent and basic software functionality*. Armed with this information, companies can target individual, team, and function improvement efforts. And software companies can intervene proactively with customers who are on the path to sub-optimal outcomes. Additionally, this will inform software companies and their customers of the potential need for application or business process optimization"—Michael Graham, CEO, Epilogue Systems

"When it comes to using artificial intelligence in recruiting in 2019, talent acquisition teams will be adopting it with cautious optimism. While organizations using AI earlier in the hiring process have seen promising results, it's clear that the technology is still in its early adoption phase and AI is being used to inform better, faster and smarter hiring decisions, not make them. However, *we may see more widespread adoption of AI to reduce the amount of time recruiters spend on mundane tasks so they can use their time on more meaningful candidate interactions*"—Kurt Heikkinen, CEO, Montage

"We expect to see AI used more in higher education in 2019 as institutions continue their digital transformation journeys and look to appeal to students' preferences for adaptive, engaging learning experiences. Particularly necessary Gen Z, universities and professors need to meet students where they are at—online. As Gen Z is fully integrated with a digital era, their learning preferences will reflect differently than generations before them. *Using resources with AI components such as AI teaching assistants, online courses and writing centers will start to be used more frequently across campuses*"—Kanuj Malhotra, EVP of Corporate Development and President of Digital Solutions, Barnes & Noble Education

"As automated technologies shape the workplace in 2019, it's important for companies to think about how the onslaught of technology will impact their company culture in the short and long-term. Many organizations are already using AI to search for talent, but *when it comes to other areas of the workplace where employees will be encountering AI on a daily basis, companies need to understand employee perceptions from the start*. Before rolling out any new technology platforms, businesses need to be prepared to communicate the value the product will bring to the organization, how it will affect employees for the better, and the positive impact it will have on productivity and engagement. In doing this, companies will set their organizations up for success when implementing new technologies"—Andee Harris, President, HighGround/YouEarnedIt

"We predict *artificial intelligence will become more prominent in the insurance industry in 2019 as more insurtech companies and carriers utilize the technology in their customer experience strategies*. At the same time, we also don't believe that AI will replace the human insurance agent in the new year or in years to come. Though machine-learning models can be used to help agents become better advisors to their customers, the human touch will always be important in insurance"—Jeff Somers, President, Insureon

"As AI continues to be more prevalent, it is undeniable that *automated decisioning will replace traditional white-collar workers*. This means AI systems will be making the decisions instead of humans for anything from approving loans or deciding whether a customer should be onboarded to identifying corruption and financial crime. This is distinct from Robotic Process Automation (RPA), which simply emulates human decisioning. Instead, true AI systems will go beyond human capability. We can also expect to see greater understanding in the boardroom about what AI really means—including hard-nosed figures around competitive advance, reducing costs of operations and removing headcount. Expect to see this C-suite understanding trigger issues around unions and job security as a result of significant operational changes"—Imam Hoque, COO & Head of Product, Quantexa

"While smart virtual assistants and conversational AI will gain a lot of traction in 2019, a large focus of machine learning and its superset artificial intelligence will be on understanding content. *AI will be used to filter out what is real and what is not, what is appropriate and what is not*. And while strides will be made in understanding content in that context better, the bigger challenge is training data without applying biases. This catch-22 is what makes this problem extremely difficult to solve, but one that will have a lot of attention in 2019"—Sameer Kamat, CEO, Filestack

"Alongside the increase in demand for AI within companies, we've also seen a continued shortage of trained data scientists. To increase the adoption of AI, *AI platforms will need to empower traditional developers with tools to enable them to create machine learning models faster*, as well as ensure they have an integrated platform that will allow developers to annotate and label the data needed to improve the accuracy of their models"—Dale Brown, VP of Business Development, Figure Eight

"*The biggest threat to US and Europe is the rapid advances in AI coming out of China*. China is undoubtedly an AI juggernaut and will completely outmaneuver the west if we're not careful. Why? Because the success of AI is tied to the availability of massive amounts of organized data. In China, it is socially acceptable to trade private, personal information, for small amounts of monetary value / perks. For better or for worse, this gives companies who operate in the country a massive advantage over companies here. If we want to compete, we need a solution to the data problem, and fast"—Hanns Wolfram Tappeiner, Co-Founder and President, Anki

"The need for AI-enabled search and analytics solutions will become more prevalent in 2019. *Traditional search functions will give way to the emergence of cognitive search*, resulting in AI-driven solutions to help enterprises un-trap their data and derive more valuable knowledge and insights. By 2020, cognitive search will streamline information to the point of reducing reactive searching by 20%--and organizations need to be ready for this in the year ahead"—Kamran

Khan, Managing Director of Search and Content Analytics, Accenture Applied Intelligence

"*In 2019, we'll see more organizations move to glass box AI, which exposes the connections that the technology makes between various data points*. For instance, glass box AI not only tells you there is a new retail opportunity, it also uncovers how that opportunity was identified in the data. It also provides retailers with an opportunity to check their data—and any public or aggregate data they pull in—to ensure AI isn't making bad assumptions under the adage 'garbage in, garbage out'"—Nikki Baird, Vice President of Retail Innovation, Aptos

"With an increasing availability of Artificial Intelligence (AI) capabilities driven by cloud computing, *AI will make its way into video conferencing in 2019 in everything from meeting room activity analysis and efficiency, understanding participants' reactions to given messaging, automated joining procedures, and platform utilization*. As organizations seek to optimize their services and work more efficiently, it's only natural that AI, now readily accessible to assist with predictive analysis and turning data into actionable insights, will transform conferencing and collaboration as we know it"—Jordan Owens, VP of Architecture, Pexip

"We will in the near future see the lines between audio content and written content disappear. All audio will be searchable in the same manner the text-based web is today, and all text will be accessible as audio, with your favorite voice (Artificial Morgan Freeman?) reading it back to you. As voice assistants and search algorithms continue to advance, *you will soon be able to have a human-like conversation with your assistant, who has instant access to all the knowledge in the world*"—Johan Billgren, Co-founder and Chief Product Officer, Acast

"In 2019, I predict that it will become clear that the information and analytics systems that are on the bleeding edge of creating and policing truth—particularly AI-based technologies—are themselves part of the 'bias' problem. This will lead to *the start of a fundamental shift in how we think about truth*—not in binary terms

—but as points on a spectrum, with underlying information systems and analytics systems under fire for their inability to either measure or enforce the integrity of their underlying data sets and analytics methods"—Kris Lovejoy, CEO, BluVector

"I expect 2019 will be the year *we'll see an explosion of production applications leveraging artificial intelligence*. The tools and models available on the market are ready for prime time, which means it will be far easier for companies of all sizes to deploy intelligent applications. Along with that, we'll also see further soul-searching and advocacy around what role firms providing machine learning services should play in ensuring the ethical use of their products. AI experts carry a great deal of clout in that conversation, since the services ultimately won't work without their help. It will be interesting to see what norms emerge out of that process"—Blair Hanley Frank, Principal Analyst, ISG

"For enterprises, 2019 is the year early adopters of an AI platform strategy will experience a leap ahead of their less innovative competitors. There will be clear winners, and clear losers in terms of both market share and margin growth. The investments made in automating data ingestion, and building machine learning algorithms *will kick into the high gear of self-learning*. It's this phase—when ongoing patterns in data spur self-learning—that result in benefits that start to scale across the whole organization"—Dr. Anil Kaul, CEO and Co-Founder, Absolutdata

"Organizations will experience further disillusionment with all the vague hype around machine learning and AI. *They'll increasingly realize that accurate predictions require not just a large volume of training data, but a particular type—behavioral metadata*. Analysis of this data can be mined to better shine a spotlight on what's used and what's useful. This is the same insight that drove Google Search's ranking prowess two decades ago: the content of a webpage was less predictive of its utility than how often other pages—built by other people—linked to it. As the ML/AI buzz continues to wear thin, we'll see a strong appetite emerge for this type of impact-driven technology and behavioral metadata among organizations"—Aaron Kalb, VP of Design and Strategic Initiatives and Co-founder, Alation

"Last year was the year of the data scientist—enterprises focused heavily on hiring and empowering data scientists to create advanced analytics and machine learning models. *2019 is the year of the data engineer*. Data engineers will find themselves in high demand—they specialize in translating the work of data scientists into hardened, data-driven software solutions for the business. This involves creating in-depth AI development, testing, DevOps and auditing processes that enable a company to incorporate AI and data pipelines at scale across the enterprise"—Nima Negahban, CTO and Co-founder, Kinetica

"*AI will fundamentally automate the order-taking side of sales and empower successful reps to become consultants to buyers, helping both parties discover the critical resources needed to inform their buying and selling decisions*. AI-powered innovation will anticipate sales challenges and buyer objections and extract insights to better predict success during the buyer-seller engagement. In the post-sales phase, AI can pinpoint best practices and identify factors affecting customer experience to help increase both upselling and word-of-mouth selling. Finally, AI will rapidly produce a more coachable, customer-informed sales rep who is smarter, nimbler and better prepared to sell successfully"—Yuchun Lee, CEO and Co-founder, Allego

"Over the next few years, *AI will be increasingly used to dynamically modify and serve creative content based on what's relevant in a given context, for a given audience*. The goal and opportunity is to meet the audience where they are—whether being served content in a browser, interacting with a physical product and launching a digital experience by scanning packaging, or at home conversing with branded content using a voice assistant. While creative teams and designers will still determine the aesthetic and tone for a given piece of content, their role becomes even more crucial as the designers of generative frameworks, determining which elements in an experience to make flexible while still maintaining the core of the creative concept"—Claire Mitchell, Director, VaynerSmart

"While 2018 saw many retailers and brands gain more familiarity with AI and its potential use cases, 2019 will see those applications put into practice. *AI will*

fundamentally change the way consumers interact with brands, and I expect that to become abundantly clear in 2019 through new levels of personalization. Brands that adopt the use of AI to optimize the customer experience will see the implementation begin to impact their bottom line"—Adam Goldenberg, Co-CEO and Co-founder, TechStyle Fashion Group

"Thus far, the capabilities of AI have been zeroed in on solving the problems we know—more efficiently extracting patterns and insights from massive data sets we've always been familiar with historically. *Next year will bring the greater potential of AI into focus, demonstrating its capacity to digitize things that previously couldn't be digitized and introduce completely new data sets that change the status quo and solve problems we didn't know we could*. Video AI will be a great example of this, helping turn physical settings into actionable data that companies in retail and other sectors can utilize to strengthen customer experiences like never before—and unlock new services and customer value they may not have even thought about bringing to market"—Michael Adair, President and CEO, Deep North

"Personalization has long been the holy grail for marketers and everyone agrees results improve by knowing what customers care about and engage with. *Today's marketers have more behavioral data than ever, but often don't have the time, resources or knowledge to properly use it to tailor their approach. In 2019, AI technology will address this issue*, ultimately benefiting customers and business results. As marketers test machine learning, creative strategy will need to evolve"—Cody Bender, Chief Product Officer, Campaign Monitor

"2019 will be a pivotal year for AI in the workplace—it will be the year we move from conversation to impact. *We'll begin seeing AI integrated more deeply into the day-to-day employee experience through things like digital assistants, whether it's voice, SMS or another channel*. I think we'll also see AI-based digital assistants more front-and-center for new employees, taking a larger role in processes like onboarding or skills training"—Gretchen Alarcon, GVP of HCM Strategy, Oracle

"One of the biggest challenges in translating lab performance into the clinical setting is the ability to consistently replicate results over time, location and assay —hence the need for rock-solid quality systems and standards that provide quantifiable reliability over cohorts. As we move into 2019, *we are beginning to see real results on how we can apply artificial intelligence to a traditionally painfully laborious and human-driven process that used to take weeks and bring it down to real-time monitoring*. When applied properly, streamlining and expediting this process ensures that any variability in the workflow—from the sample collection, processing, and all the way to instrument ingestion—is drastically minimized and hence the results become supremely reproducible, and where potentially actionable and clinically relevant information is derived in mere seconds"—Aldo Carrasco, CEO, InterVenn Biosciences

"Our fascination with the use of computing power to augment human decision-making has likely outgrown even the tremendous advances made in algorithmic approaches. In reality, the successful use of AI and related techniques is still limited to areas around image recognition and natural language understanding, where input/output scenarios can be reasonably constructed, and that will not change drastically in 2019. The idea that any business can 'turn on AI' to become successful or more successful is preposterous, no matter how much data is being collected. But the collection of data to support humans and algorithms continues and raises important ethical questions and is something we need to pay close attention to over the next few years. Data is human and therefore is just as messy as humans. Data does not create objectivity. It is well established that data and algorithms perpetuate existing biases and automated decisions are—at best—difficult to explain and justify. Appealing such decisions is even harder when we fall into the trap of thinking data and algorithms combine to create objective truth. With greater decision-making power comes much greater responsibility, and *humans will increasingly be held accountable for the impact of decisions their business makes*"—Christian Beedgen, Co-founder and CTO, Sumo Logic

"In 2018, we saw many examples of adversarial AI algorithms attempting to fool humans, like Buzzfeed's video of President Obama delivering fake sentences in a convincing fashion. *Soon we can expect to see this concept evolve into a new*

class of cybercrime in which malicious content is automatically generated by AI algorithms—a new category we define as 'DeepAttacks.' DeepAttacks can manifest themselves at scale by generating code within malware files, creating fake network traffic in botnets, or in the form of fake URLs or HTML webpages. Next year, I expect hackers to deploy DeepAttacks more frequently in an attempt to evade both human eyes and smart defenses"—Rajarshi Gupta, Head of AI, Avast Software

"Ensuring data privacy, and in turn customer privacy, is a challenge we must solve to realize the benefits of AI. *In 2019 we'll see more solutions emerge to ensure that encryption on data used for AI is air-tight.* One of the most exciting emerging encryption technologies is homomorphic encryption (HE), which is a specific way of encrypting data so that third parties can operate on the encrypted data and still use privacy-preserving machine learning techniques to glean valuable insights. We're seeing this technique emerge in discussions at NeurIPS and in some public solutions already, and expect innovations around AI privacy and encryption to explode next year"—Casimir Wierzynski, Senior Director, Office of the CTO, Artificial Intelligence Products Group, Intel

"*AI will make a huge impact on cybersecurity by increasing exponentially the ability to detect rogue patterns and foul play, and in time will improve significantly on human ability to analyse data effectively*, which will lead to even faster detection and response capabilities via machine learning. Being realistic, however, it is not going to be possible for AI to eliminate security breaches entirely. This is a classic case of the trade-off between the acceptable rate of false positives (where a legitimate activity is blocked because it's erroneously assessed to be malign) and false negatives (where a malign activity isn't identified as such). To drive the false negative rate close to zero, an unacceptably high rate of legitimate activities would have to get blocked"—Richard Anton, Co-founder, Oxx

"In the automotive world, leading automakers and component suppliers are constantly looking for differentiation through AI, and as a result, there is currently a major shift underway from the rigid hardware solutions that started the AI revolution to more flexible, software-based ones that can be easily tailored

to customer needs. *In 2019 and beyond, AI will increasingly exist on the edge, as concerns around privacy, security and latency make edge-AI preferable over the traditional approach that relies on centralized AI systems*. Manufacturers, however, are struggling with the consequences of adding AI to their edge-based products, mainly due to the expensive, bulky and power-consuming hardware required for running them. They're seeking slimmer, battery friendly, and more cost-effective embedded solutions. This is why we'll also witness a growing demand for more practical AI that can be mainstreamed affordably, without requiring massive hardware or cloud, and without compromising on quality or performance"—Adi Pinhas, Co-founder and CEO, Brodmann17

Retail modularity based on data and AI-driven insights could literally lead to dynamic rearrangements within the store. This already happens to a degree with seasonal changes such as moving barbecue items to prominent positions as summer approaches. But now it will be possible for more granular changes. For example, the baby food and Hamburger Helper moves to the end cap on Sunday-Tuesday, but chips and beer move to the end cap on Thursday-Saturday. Roll away a couple of center-store fixtures on the weekend to make room for the olive bar installation. Flip the store layout by day of week"—Tony Rodriguez, CTO, Digimarc

"Artificial and augmented intelligence will help address our nation's mental health crisis. According to the National Institute of Health, nearly one in five American adults suffers from a form of mental illness. There are significant barriers to seeking care, including stigma, affordability and access. In 2018, the U.S. news cycle was dominated by high profile celebrity suicides, the constant drumbeat of emotionally charged stories in the news, and divisive midterm elections. That brought important conversations about mental health and depression to light for many people, thereby reducing the stigma. *AI will be able to help scale access to qualified providers and make it affordable for people to get the right level of care. Combined with technologies like teletherapy and telepsychiatry, it will play an increasingly important role in improving collaborative care*. AI tools and data-driven algorithms will help clinicians track patient histories, identify times of crisis, and provide personalized care for

individuals to reduce symptoms and improve outcomes"—Karan Singh, Co-Founder, Ginger.io

"AI will power cyberattacks more and more. In fact, it is reasonable to assume that *armies of AI hackers will have greater, faster penetration with more automation, allowing hackers to achieve greater success executing cyberattacks*. Cyber defense must look to AI for the faster analytics needed to find malicious activities. With machine learning and AI-driven response, security teams can automate triage and prioritization while reducing false positives by up to 91%. Enterprises will seek innovative solutions that enable them to stay ahead of the next unknown threat"—Gilad Peleg, CEO, SecBI

"*In 2019, AI technology will finally be able to help not just identify attacks, but also provide evidence-based guidance on how security teams can and should respond to threats*. In many situations, AI will be able to respond without the intervention of SOC teams at all. Because AI is constantly learning, the technology is poised to stay in step with attackers ever-changing tools and techniques. Overall, AI expedites the time from attack identification to remediation by eliminating many of the challenges and burdens that have traditionally slowed-down the process. The implementation of such AI-driven technology will result in a major risk reduction for enterprises of all sizes"—Eyal Benishti, Founder & CEO, IRONSCALES

"Machines will begin to understand cause and effect—today, when machines (such as chatbots and virtual assistants like Siri and Alexa) respond to us, it's purely based on correlations. They do not have an understanding of causation. But as machines are getting more disparate sources of data, they will begin to better understand the causal relationship between a large set of variables. As humans, we learn about cause and effect over time through pure common sense. *In 2019, we'll see this come to fruition with machines as we collect and feed them more disparate data sources that enable them to build conditional probability distribution to understand the direction of causality*"—Michael Wu, Ph.D., Chief AI Strategist, PROS

See also 60 Cybersecurity predictions for 2019

I'm Managing Partner at gPress, a marketing, publishing, research and education consultancy. Previously, I held senior marketing and research management positions at NORC, DEC and EMC. Most recently, I was Senior Director, Thought Leadership Marketing at EMC, where I launche... **MORE**

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Global Finance Leader Study: Data Science Is Most Important Expertise for Future Finance Team

By Steve Dunne, Staff Writer, Workday

As technology redefines how work is done, finance leaders are having to rethink what constitutes finance talent. The successful finance workers of the future will need skills that are not commonplace in the function today. What are the emerging roles and skill sets of the future finance function?

Our global "Finance Redefined: Workday Global Finance Leader Survey,"—which gauged the views of over 670 CFOs and senior finance leaders around the world—points to data analytics as the key driver of talent needs. According to the survey, data science is the most important emerging role for the future finance function across North America, Europe, and Asia Pacific, with statisticians and data security professionals reported as second and third. Respondents reported roboticists (that is, people responsible for automation within finance) as the least important emerging role:

1. Data scientists
2. Statisticians
3. Data security professionals
4. IT delivery specialists
5. Behavioral scientists
6. Systems specialists
7. Roboticists

Data Analysis Needed

Technologies—both established and emerging—are transforming the finance function. Cloud computing can reduce costs, improve productivity, and increase efficiency. Artificial intelligence and blockchain can provide real-time data analytics, make predictions, and help streamline processes such as reconciliations.

"Companies are looking to use data in different ways and create new business models," says Naved Qureshi, associate partner, finance transformation at IBM. "Finance needs to transition into a much more digital and rapid service to support the business."

But having the right technologies isn't enough. Finance leaders also need the right talent to be able to use them effectively to serve the business.

As finance shifts more into a business partnership role, the need for data analysis skills will grow, and prompt the creation of new roles within the function.

According to the Accenture report, "Meet the Finance 2020 Workforce," while traditional finance roles will evolve, newer roles will become more important, such as data scientists, scenario planners, market makers, and social/behavioral scientists. An EY study, "Is the future of finance new technology or new people?," also highlighted critical skills for the future finance team, with 57 percent of respondents saying that building skills in predictive and prescriptive analytics was critical for the future, while 55 percent noted the importance of improving digital technology skills in areas such as mobility, cloud, and SaaS.

"It's going to be important to have some sort of data science skills, or at least a general understanding," says Qureshi. "If you're going to do cognitive automation for predictive analytics, you're going to need some statistical skills inside the organization to interpret the data."

Some finance teams are already moving in this direction. Lena Shishkina, head of finance, EMEA and APJ at Workday, says that she realized the importance of financial data when she joined the company—"So I built a group called 'Data Science and Management.'" She adds that a colleague who is trained in finance has decided to do a master's course in data science.

Finance leaders are also focused on developing these skills on their current teams. "I might slowly bring in someone like a data scientist," explains Rick Rodick, CFO at TELUS International. "I'd rather repurpose or utilize my existing finance team first to see what they can do with better tools, and then maybe we can see what value data scientists can bring."

These changes in finance comes alongside a more general broadening of digital skills across the organization, explains Bill Briggs, CTO at Deloitte. "We've been telling the technology folks for decades, 'You have to become more business savvy and speak the language of the business,'" he says. "We're now seeing this interesting shift towards saying that the business needs to be more technology savvy."

The Robots Are Coming

According to the "Finance Redefined" study, respondents reported that roboticists are the least important emerging role in finance. However, this is likely to change as technologies such as artificial intelligence and robotic process automation (RPA) continue to evolve.

"A lot of people are talking about RPA just from an efficiency standpoint, but a few are taking a step further, exploring artificial intelligence in areas such as FP&A and forecasting early warnings," says Qureshi. He notes that RPA can bring a 70 percent reduction in manual work, while artificial intelligence can generate 15 to 20 percent productivity gains. He adds, however, that the real business case lies not in productivity, but in "the better decisions you're going to make."

RPA and artificial intelligence could also free up finance teams to do more value-added work. Accenture's"Finance 2020: Death by digital" report predicts that the use of robotics will automate or eliminate up to 40 percent of transactional accounting work by 2020, allowing finance teams to spend much more time on decision support, predictive analytics, and performance management.

Preparing for Talent Needs

How should finance leaders be preparing for these emerging talent needs? According to Rob Dicks, financial services industry leader for human capital at Deloitte, it's about thinking through how to balance new and emerging skill sets with more traditional roles in finance. "It's common for clients to look at the finance function and feel like they need more of everything—more analytics, more data scientists, more people who are thinking about how to program the bots," he says. "But they also recognize they still need to do statutory tax reporting, so balancing the need of all finance skills and expertise is important."

When predicting future talent needs, Dicks says that finance leaders should assess at a sub-function level, such as accounts payable, accounts receivable, tax, and investor relations. "Many accounts payable functions include significant processing and repetitive tasks," he says. "So that's an area where RPA, cognitive, and machine learning can come in. It won't feel like you need more of everything

when you start to get more specific about which area of finance you're talking about."

Finally, having conversations with existing staff about the future is important.

"We need to be open about how technology changes impact the team," says Robynne Sisco, co-president and CFO at Workday. "Some finance professionals may be concerned automation will make them replaceable. CFOs should drive strategies that clearly communicate to team members that by automating administrative parts of their jobs, they will not eliminate their roles, but instead will be given new and more interesting work that will help them develop and stay challenged."

For the full research findings behind the "Finance Redefined" global study, read the report here.

About the "Finance Redefined: Workday Global Finance Leader Survey"

We surveyed more than 670 finance leaders across the Americas, Europe, Asia Pacific, and South Africa covering 10 main sectors from September 2017 to January 2018. Over one-third (38 percent) came from large organizations with more than $1 billion annual revenues, with 35 percent between $500 million and $1 billion, and 27 percent between $250 million and $500 million. Over one-third of respondents were CFOs, finance directors, or chief accounting officers/controllers, and the remaining were drawn from senior finance roles, such as head of financial planning and analysis or vice president of financial operations.

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