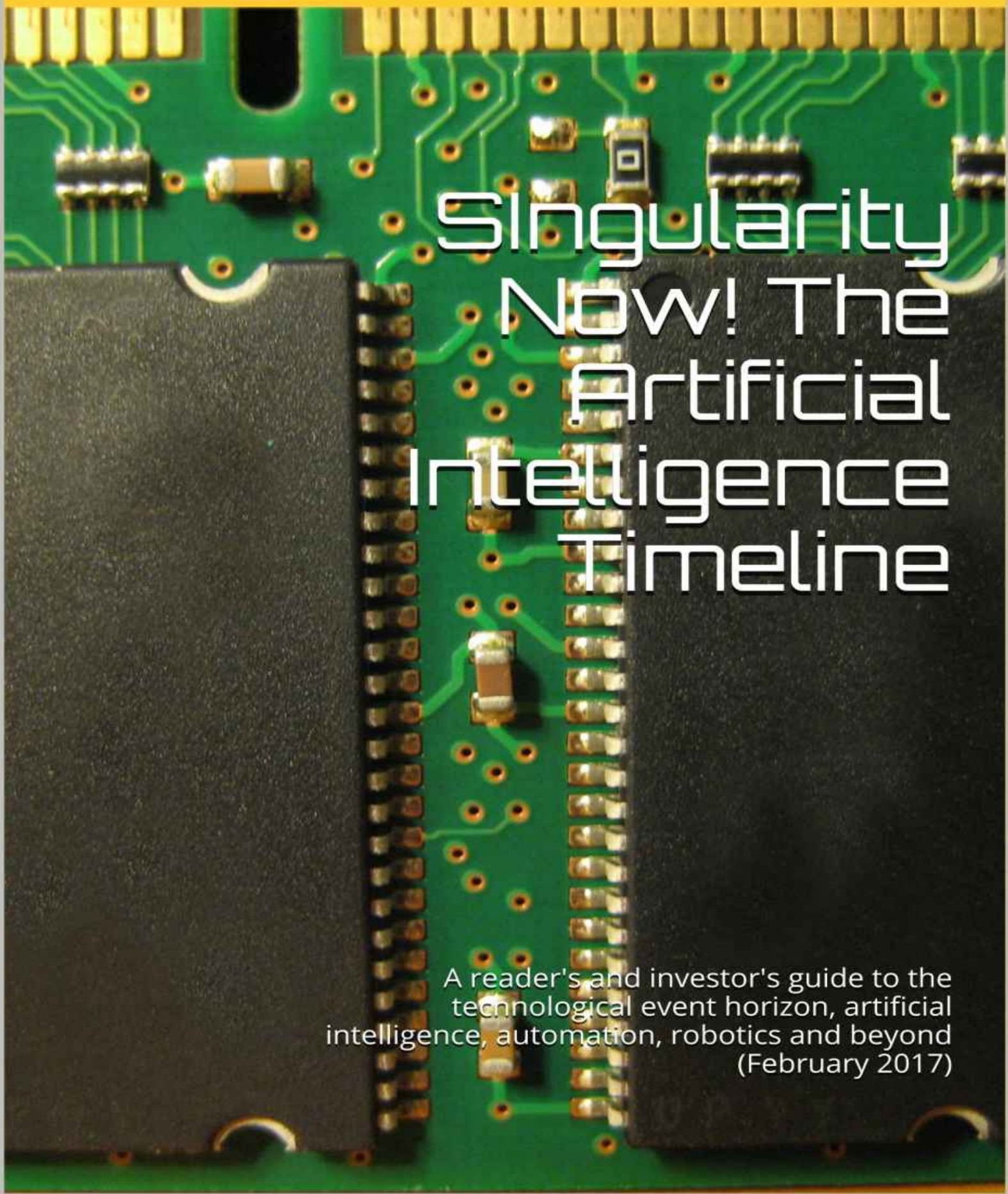
# Singularity Now!



## Singularity Now! The Artificial Intelligence Timeline

A reader's and investor's guide to the technological event horizon, artificial intelligence, automation, robotics and beyond (February 2017)

Developments in high technology are advancing at a blistering rate that far outpaces anybody's ability to fully assimilate it all into a comprehensive picture. Such a picture is not what you will find in these pages. Instead, this book series compiles summaries of news articles, columns, blogs and scientific studies focusing on the technologies that will ultimately birth the singularity: artificial intelligence (AI) and autonomous machines; and, perhaps to a lesser extent, augmented reality and biotechnology. The methodology of article selection and compilation is not scientific, and the sample size is not statistically significant. Nonetheless, almost daily throughout the month, top AI stories are selected, condensed and encapsulated for clarity and brevity. The result is a running log of nugget paragraph entries that reflect the gist of the biggest AI stories to hit the net in the last month.

The intent of this book series is not to present the current state of the technology in the public sphere, but to highlight the public discussion centered on it, to present a sampler platter of the innovations being unveiled daily, and to reveal the full extent to which these technologies are already entrenched in the gears of our civilization.

This month's edition features robo Japanimation wives that can manage your smart house, cat-sized AI robo spiders that can climb stairs and navigate obstacle courses, automated fast-speed lawyering augmented by paralegal bots, AI personal assistants fact checking and record crunching for members and staffers of Japan's legislative body, human rights concerns raised amid precrime forecasting cop bots, the dawning of a jobless and middle classless future, and the most astounding releases from tech mecca fest CES in Vegas.

Regardless of your station or belief system, it is now crucial to track the course of the advance of AI, which has emerged as a lucrative market sect and a veritable virtual commodity. In the least, thanks to AI, humanity is in the midst of a paradigm shift that will perhaps radically alter the course of civilization and perhaps the evolution of the species. What lies at the end of the road can currently only be the subject of speculation, both intellectual and financial. But by tracking the evolution of AI, the hypotheses target truth, and the range of possibilities is honed.

The singularity is almost upon us. Daily it approaches nearer. Are you ready?

Sincerely,

SN

12/20/16

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# December 21, 2016

A report released by the Whitehouse and summarized on its blog advises of the impending economic impacts of the growing ubiquity of AI-based or driven technology. Forecasted economic effects include, but are not limited to: “Positive contributions to aggregate productivity growth; changes in the skills demanded by the job market, including greater demand for higher-level technical skills; uneven distribution of impact, across sectors, wage levels, education levels, job types, and locations; churning of the job market as some jobs disappear while others are created; and the loss of jobs for some workers in the short-run, and possibly longer depending on policy responses.”[1] (Source: The Whitehouse)

Pharmaceutical giant Merck KGaA will reportedly upgrade components of its supply chain with sensors and AI algorithms to cut humans from the product allocation and distribution decision process. The company reportedly seeks “a supply chain that functions like a self-driving car: A system that analyzes data continuously and makes decisions on its own about speed and resources. The system would predict spikes and lulls in demand for products and suggest ways to reroute raw materials accordingly(.)”[2] (Source: Wall Street Journal)

Facebook mogul Mark Zuckerberg reportedly “created”[3] an AI virtual butler, dubbed Jarvis, that handles an array of housework assignments, including some parenting tasks. “Among Jarvis’s skills: Adjusting the home thermostat, turning on lights, and operating the toaster. The virtual assistant texts Zuckerberg images of visitors who stop by during the day, and opens the front door for those it recognizes. It can also tell when Zuckerberg’s 1-year-old daughter, Max, wakes up ‘so it can start playing music or a Mandarin lesson,’ he wrote.”[4] An online video demonstration of Jarvis reveals it to be a voice activated system of sensors, gadgets and speakers strategically located throughout the house that, upon receiving verbal commands, opens curtains, advises on scheduling and directs children using the voice of Morgan Freeman. (Source: Boston Globe)

Convenience store chain 7-Eleven reportedly beat Amazon in delivering local orders by autonomous unmanned aerial vehicle (drone). The company, having partnered with drone maker Flirtey for its “delivery pilot,” reported 77 flights in 2016 “from one store to a dozen select customers who live within a mile of the shop.”[5] Most deliveries were prepackaged foods and drinks. “All the deliveries happened within the line of sight of the drone pilot, but the drones flew autonomously.”[6] Amazon reportedly delivered a small package, including edibles, to a nearby rural UK resident via battery-powered drone in early December, and claimed it was a historical first. (source: recode)

Twitter bot Smart Vector can automatically photoshop any face, morphing a grimace into a grin, and hinting at what the future holds for similar and advancing AI app. “It’s hard to give a comprehensive overview of all the work being done on multimedia

manipulation in AI right now, but here are a few examples: creating 3D face models from a single 2D image; changing the facial expressions of a target on video in real-time using a human "puppet"; changing the light source and shadows in any picture; generating sound effects based on mute video; live-streaming the presidential debates but making Trump bald; ;resurrecting; Joey from Friends using old clips; and so on. Individually, each of these examples is a curiosity; collectively, they add up to a whole lot more."[7] Such capabilities are predicted to be utilized in advertising, video game creation, and virtual and augmented reality software. (Source: The Verge)

IHS Markit released its technology predictions for 2017, number one and two of which were robotics in automated manufacturing and the rampant spread of usage of AI algorithms. Augmented reality advancements and the arrival of "Meta Cloud"[8] were three and four. (Source: PR Newswire)

AI iOS app FishVerify "uses the latest in image recognition and artificial intelligence to identify fish species all in one quick motion. Unlike other fish identification tools that work like a field guide, requiring users to look up their catch, FishVerify users simply take a picture with their phones' camera and in seconds the program identifies their catch for them." The app advises on rules and regulations and is intended to help prevent accidental poaching. (Source: PR Newswire)

Cockpit electronics supplier Visteon Corporation showcased its "connected car" technology at CES 2017 in early January in Las Vegas. It will showcase Pheonix, an infotainment platform based on HTML5 and offering a JavaScript-based application program interface, enabling third parties to easily create apps. "Other highlights of Visteon's exhibit include an in-vehicle augmented reality windshield head-up display (HUD) that overlays virtual information directly in the driver's sight; a full range of all-digital instrument clusters; and an array of eye-catching information displays that will become the primary interface with consumers as new mobility models and autonomous driving continue to evolve."[9] (Source: PR Newswire)

## December 22, 2016

AI may vaporize jobs, but the ones that remain will be more fulfilling, and likely more demanding. This is the caveat to the reality that "A.I. is a powerful engine of job inequality."[10] One example is a medical service prior authorization contractor who deployed AI to approve the obviously medically necessary services while routing to experts only the more complex cases. This eliminated a number of relatively mundane jobs. The work that remained, however, was more demanding and enthralling with less redundant and menial tasks. This example can be seen as encapsulating a trend that will ripple through the corporate world over the next decade. "Taken more broadly, A.I. is grounded in the day-to-day work of an enterprise's people. How can we allocate their time and attention to those tasks that are meaningful and difficult? It's a transition from pull to push: Instead of employees using enterprise applications to pull data via searches, reports or dashboards, applications enhanced by A.I. push tasks and alerts to

the people that need to know, or who have relevant expertise."[11] (Source: COMPUTERWORLD)

AI could be deployed to eliminate bias in hiring. Because bias can be subconscious, it can elude the awareness of hiring HR personnel and management. AI can be used to audit a hire decision to detect bias, or it could be embedded in the process to eliminate humans from the decision loops wherein bias usually has the greatest impact. "If, for example, fairly trained AI/machine learning tools are used to whittle an applicant pool down from 100 applicants to the final 10 interviewees, that means that 90 percent of the pool reduction would be done in a process immune to any human biases."[12] (Source: CIO)

Many drugs fail to fully do to humans what they reportedly do to test animals, are expensive to bring to market, and rarely technically cure that for which they are prescribed. Technological advances have rendered deep learning AI capable of testing molecules and crunching voluminous study data to discover new and more effective drugs, and to arrive at personalized medicine and pharmaceuticals, to include those that treat cancer. "At Pharma.AI we have a comprehensive drug discovery pipeline with reasonably accurate predictors of efficacy and adverse effects that work on the structural data and transcriptional response data and utilize the advanced signaling pathway activation analysis and deep learning. We use this pipeline to uncover the prospective uses of molecules, where these types of data are available. But the generative models allow us to generate completely new molecular structures that can be run through our pipelines and then tested in vitro and in vivo. And while it is too early to make ostentatious claims before our predictions are validated in vivo, it is clear that generative adversarial networks coupled with the more traditional deep learning tools and biomarkers are likely to transform the way drugs are discovered."[13] (Source: Eureka Alert!)

Uber stopped testing its autonomous taxi service on San Francisco public streets after receiving pressure from the state for failing to attain a permit that other companies, such as Alphabet Inc., Tesla Motors Inc. and General Motors Co., acquired. "Uber's defiance of regulators was centered on its stated belief that its vehicles weren't fully autonomous because they had a driver in the front seat who could take the controls whenever necessary."[14] (Source: Wall Street Journal)

Honda will test Alphabet Inc.'s Waymo, autonomous car technology, "in some of its cars."[15] Waymo technology drives almost 60 autonomous cars that reportedly are currently operational and in use on U.S. public roads. It is scheduled to add to that portfolio 100 autonomous Fiat Chrysler vans in early 2017. "Honda has said it plans to sell cars that have limited self-driving capabilities around 2020. Honda signaled on Wednesday that a partnership with Waymo could give its vehicles fully self-driving capability."[16] (Source: Wall Street Journal)

The agricultural robot market is expected to reach $74.1 billion by 2024. "Key

application areas for agricultural robots include driverless tractors, unmanned aerial vehicles (UAVs), material management, field crops and forest management, soil management, dairy management, and animal management, with a diverse set of subcategories emerging within each of those areas."[17] (Source: BusinessWire)

Biosensor technology company Lohas Tech showcased BioRF at CES in Las Vegas in January. "The soft antenna of BioRF™ developed by Lohas Tech, can closely track artery pulse with no pressure against the skin. The portable radar can easily measure pulse wave velocity (PWV), and can be used to detect arterial stiffness, or track blood pressure in a continuous, non-invasive manner, thus slashing the cost of traditional medical equipment, making medical checks on cardio vascular diseases more accessible to people and bringing mobile medical treatment into reality."[18] The company's goal is to now merge that technology with AI analytics in a device for what it calls "daily health management."[19] (Source: PR Newswire)

Transparency Market Research released a report on the global AI market that concludes it will "reach a value of US$3,061.35 billion by the end of 2024."[20] (Source: PR Newswire)

AI- and behavioral economics-powered insurance company Lemonade filed for a license in 46 states and D.C. The company is reportedly staffing "bots instead of brokers." The company's rapid startup and spread nationwide is "what happens when you move insurance from an infrastructure reliant on people and paperwork to one built on bots and apps."[21] (Source: PR Newswire)

Intel, working with TU Deft's QuTech, reportedly has made a breakthrough in researching materials for components in quantum computing. "Earlier this month Intel's group reported that they can now layer the ultra-pure silicon needed for a quantum computer onto the standard wafers used in chip factories."[22] Silicon quantum computing components, referred to as silicon qubits, are preferred over their superconducting equivalents because of reliability and scalability. This will enable swifter research and development and expand the possible applications of conceived possible resulting technologies. "(T)he expertise and equipment used to make conventional chips with billions of identical transistors should allow work on perfecting and scaling up silicon qubits to progress quickly."[23] Insiders report that "in just a few years they could build a quantum chip with tens or hundreds of qubits that dramatically outperforms conventional computers on certain problems, even doing useful work on problems in chemistry or machine learning."[24] (Source: MIT Technology Review)

## December 23 - 26, 2016

There are three types of AI: Narrow AI, which focuses on a specific mission, such as winning at chess or driving a car; general AI, which would work a number of missions and in many ways be comparable to human intelligence; and super intelligent AI, which according to most sources is decades away, and would be beyond the combined

intelligence of all humanity. Currently, the market trades in narrow AI, which is what would be deployed to defeat so-called "fake news" on sites like Facebook. However, because determining if a story is fake requires understanding that stories are craftily spun to be deceptive while containing enough solid information to be convincing, narrow AI simply is not up to the task. It cannot conduct the research required to dissect a yarn enough to determine its accuracy. And with all stories, obviously, some inaccuracies or misrepresentations are expected. Therefore, use of AI to debunk and remove "fake news" is a goal for developers, not an existing option. Nonetheless, existing AI "can greatly hasten the procedure by flagging all potentially suspicious news and then letting a human editor decide which is fake and which is real."[25] (Source: Forbes)

The world's largest hedge fund, Bridgewater Associates, is developing AI to fill some management roles, taking humans out of the loop in some analytics and data management decisions. "The company is already highly data-driven, with meetings recorded and staff asked to grade each other throughout the day using a ratings system called 'dots'. The Systematized Intelligence Lab has built a tool that incorporates these ratings into 'Baseball Cards' that show employees' strengths and weaknesses. Another app, dubbed The Contract, gets staff to set goals they want to achieve and then tracks how effectively they follow through."[26] Management software PriOS will reportedly assimilate these tools and be making three quarters of the management decisions within five years.[27] (Source: The Guardian)

The (IT and database) field service management industry is increasingly deploying AI to execute five functions. 1) It has automated the task of monitoring machines and high tech assets. "Today, with the advent of connected devices, AI makes it possible for all assets to be monitored by computers instantaneously on a daily basis. Now, the process of identifying and predicting issues with assets has the potential to be fully automated."[28] 2) It serves as a virtual assistant. "For example, AI can fully automate identification and the control of assets to make sure they are operating at optimal levels without the need for workers to constantly be checking."[29] This allows workers to focus on priority tasks. 3) It serves as a dispatcher. "There's also potential for AI to fully replace the role of the dispatcher in the near future: AI can help organizations to stay on top of technicians' schedules and determine in real-time what parts a technician needs in the field, what parts they currently have and what additional parts are needed to fix the issue."[30] 4) It assists in the call center by setting appointments, reporting inquiries, and capturing highlights from customer calls. "AI can help collect and process information immediately so that dispatchers have the information they need to determine the right person with the right parts in the right location so that customers aren't left waiting for a fix for long periods of time."[31] 5) It can facilitate data-based analytics decisions, assisting management. There is "no ceiling" for the ultimate use of AI as "machines can be programmed to grow smarter over time and have the ability to evolve with new tasks."[32] (Source: insideBigData)

# December 27, 2016

Human Rights Watch called for formal UN discussion of banning lethal autonomous weapons systems, killer robots. “Industry leaders and scientists are unified in voicing their concerns about this particular platform of weaponry. Aside from the inherent dangers of these robots going rogue, there is a potential for a robotic arms race.”[33] (Source: iTech Post)

AI will be deployed to assist tutors and monitor student progress in Pakeman primary school in north London starting in 2017. The service will be an upgrade to that offered by Third Space Learning, which employs tutors based in India and Sri Lanka. Their previous tutorial sessions have been captured and analyzed by an AI system that, going forward, will augment the work. Initially, the AI will simply monitor and support the tutors. “The company’s 300 tutors will receive real-time, automated interventions from the teaching software when it detects that a lesson may be veering off-course.”[34] The goal, reportedly, is not to replace the tutors, but to employ the “right blend of human and artificial intelligence in the classroom, identifying that sweet spot.”[35] (Source: HITC TECH)

Apple’s AI research and development team released its first paper, titled “Learning from Simulated and Unsupervised Images through Adversarial Training” on arXiv. The paper focuses on image recognition technology and “describes a technique that would enable a program to recognize and decipher computer-generated images.”[36] The AI system employed two competing neural networks. “In this case, the two neural networks are the generator, which, as the name suggests, generates realistic images, and the discriminator, whose function is to distinguish between generated and real images.”[37] (Source: International Business Times)

Many companies are increasingly building AI into their processes, which poses the issue of how to audit the results of AI processes. “AI is where all business processes are headed; however, with the recent push of AI technology advancements for businesses, many companies have not addressed how they will ensure that the data their AI models are built on is high quality.”[38] If a decision is made by an AI system, who audits the decision for accuracy and how? (Reportedly interest by both the government and the private sect is high in the development of third party software capable of auditing AI decisions and processes and explaining them in terms users can comprehend.) (Source: DMN)

There are a number of myths surrounding AI, three of which are highly erroneous but common. 1) Intelligence equates to consciousness. “(E)ven the fastest computer, the K Computer that can calculate 10 quadrillion calculations per second, will never be self-aware or have the conscious mind that humans are capable of. And, the same goes for AI.”[39] 2) AI learns by the same methodology employed by humans. “According to Guru Banavar, Technology Executive and head of the IBM team responsible for creating Watson, machine learning is the process of showing a system examples and having it

extrapolate information from them."[40] (Nonetheless, noteworthy advances in machine learning occur and are reported in the media with regular frequency.) 3) AI is a "walking talking robot." AI typically takes the form of a software system, with the hosting hardware being a server, either local or cloud-based. "(A)rtificial intelligence is typically invisible to the user as it's hidden in a computer system and only heard when called upon by voice recognition. In fact, 32 percent of executives say voice recognition is the most-widely used AI technology in their businesses."[41] (Source: Tech Zone 360)

## December 28, 2016

Professor of AI at Switzerland's University of Lugano, scientific director of the Swiss AI Lab IDSIA, and president of NNAISENSE Jürgen Schmidhuber reported some AI systems are currently conscious, and one he has been developing has been conscious for more than 20 years. Since 1990, he reportedly oversaw development of a forecasting machine, referred to as an unsupervised world model, that drew patterns from streaming information and in turn predicted outcomes and constructed forecasts. It also learned to organize and package the fragments of the data stream deemed worthy of storage on the basis of the repetitiveness of component parts. "As the data's coming in through the interaction with the environment, this unsupervised model network — this world model, as I have called it since 1990 — learns to discover new regularities, or symmetries, or repetitions, over time. It can learn to encode the data with fewer computational resources — fewer storage cells, or less time to compute the whole thing. What used to be conscious during learning becomes automated and subconscious over time."[42] The system was aware of this action and rated novel experiences, meaning discoveries, depending on how many computation resources were employed. This reveals the system maintained within its awareness a symbol representing itself, which was comprised of at least a working summary encapsulation, an abstract amalgamation, of the history of the memories it stored and that were accessed for comparisons and assessments. Further, modern AI wargaming robots and entities are programmed with a sense of self-preservation that reveals an awareness of self that pursues satisfaction and avoids entropy. "Our AIs try to avoid pain, and they try to maximize pleasure — including fun, or internal joy, from insights into patterns — because they have a built-in utility function or reward function that they want to maximize."[43] Schmidhuber reported human-equivalent general artificial intelligence is 25 years away. (Source: Inverse)

AI currently does not pose an existential threat to humanity. The AI system that beat the world champion at Go reportedly was unaware of the significance of its victory, trouncing the foremost human master of what many describe as the most complex board game on the planet. This illustrates AI's limited concept of self. Nonetheless, at its current state of development, AI could bring widespread and growing technological unemployment. "Already, the World Economic Forum has estimated that as many as five million jobs around the world will be made redundant by AI-enabled technologies in the next five years. Soon, researchers, lawyers and even doctors could be joining bus drivers, waiters, cleaners and cashiers at the unemployment lines."[44] Mass

unemployment could move beyond an economic challenge to being a political and social one. Planning is required, but governments are hamstrung dealing with the primary pressing issues of the day and likely are unwilling or are unable to plan for eventualities that are more than a few years out. (Source: Eurasia Review)

As many as half of US jobs could be vaporized within 20 years by AI, robotics and automation. "Drivers and cleaners are at significant risk and house-cleaning bots and driverless cars are set to take over, according to the US government. Machines are just a lot more accurate than humans, it found. While humans have a five percent error rate in a well-known image recognition test, AI has developed from a 26 percent error rate in 2011 to a 3.5 percent rate in 2015."[45] (Source: The Sun)

The information security sector, currently reportedly short of qualified human capital, embraces the advent of advanced AI systems that will automate many of the roles and tasks, and eliminate many of the jobs, within the industry. "This first generation of AI-driven security solutions are focused primarily on automatically sifting through data, hunting for threats, and facilitating a human-led remediation plan. When the first generation of security AI masters threat detection, it will be entrusted with preemptive threat mitigation and auto-remediation of known threats."[46] Attackers will respond in turn, catalyzing an AI cyber arms race. (Source: Dark Reading)

AI will make inroads to many corporations and workplaces in 2017 and it will enable five primary changes. 1) It will assist in organization, integration and consolidation. Growing businesses can use AI to assess procedures, workflows and hierarchies for effectiveness and efficiency. 2) It will increase reaction time. Both employees and bosses can deploy and use AI analytic software to crank out solutions fast. 3) It will augment systems security. "AI systems can take cyber security to the next level by processing every possible threat and fortifying your system in advance."[47] 4) It can be used as an engine for forecasts, models and predictions. 5) It will encourage your organization to be proactive and forward-facing. If AI represents anything, it is rapid change. "It's already fueling everything from advanced military strategization technology to the way Google AdWords delivers relevant ad experiences to internet users."[48] (Source: The Huffington Post)

Shanghai's AI software maker Zhizhen Network Technology will set up a Silicon Valley office as it postures for penetration of the American market. Zhizhen's Xiaoi Robot, a competitor to Microsoft's Cortana and Amazon's Echo, is a robo-butler or assistant that runs "automated tasks over the internet at speeds several times faster than humans."[49] (Source: South China Morning Post)

## December 29, 2016

Worrying about a dystopian future where AI robot overlords enslave and dominate mankind is "like worrying about overcrowding on Mars,"[50] says former chess world champion Gary Kasparov, who ironically was beaten 20 years ago by an AI machine in a heralded showdown. Kasparov advocates use of AI to augment human decision-

making because when under pressure and in front of an audience humans get psyched out but computers compute the same in all settings, indifferent to context. He said the future of AI technology, and its role and relationship to humanity, is undetermined. "(I)t very much depends on us, on our attitude and our ability to come up with new ideas. It's up to us to prove that we are not redundant."[51] (Source: Chess News)

Marketing is one of the first sectors to be dramatically disrupted by AI technology. Marketers use AI to organize data and assess prospective media product purchases. "The purpose of AI is to take the massive amount of consumer data that's collected, and analyze the information it contains about consumer demographics, interests, and purchasing preferences. Marketers then use this analysis to determine the right audience for an ad so they can create more focused and targeted ads, which leads to better campaign results. This is especially helpful in video ad campaigns, where the proper placement and timing of the ad is a critical aspect of a campaign's success."[52] AI-generated predictive modelling fuels the decision-making process "in terms of determining what ad should be delivered to which user, what type of format should be used, and the best time to deliver it."[53] This enables marketing on an unprecedented scale, with previously unimaginable goals being attained. AI-driven automation facilitates campaign control; and with 24/7 machine learning, the algorithms swiftly adapt to minute market changes. "AI learns which users to target and which users not to target, which users are likely to engage, and which users aren't likely to engage. From this, AI can determine only the most relevant users to target, which means fewer wasted ad impressions and highly defined, targeted ad campaigns."[54] (Source: MediaPost)

Facebook is deploying AI for four functions. It uses a tool dubbed DeepText "to extract meaning from words we post by learning to analyze them contextually."[55] This enables the platform to push products on users based on statements they post. It uses facial recognition software that can identify individuals in a crowd or group shot. Presumably this enables it to map social networks, providing data presumably of value to marketers and the government. Facebook operates AI-enabled targeting advertising campaigns. "This has always been the cornerstone of its business, but by tasking machines themselves to find out as much as they can about us, and to cluster us together in the most insightful ways when serving us ads, it hopes to maintain a competitive edge against other high-tech competitors such as Google who are fighting for supremacy of the same market."[56] And the platform deploys AI to determine what apps and functions should become automated or deep learning to increase efficiency and the user's experience. (Source: Forbes)

Spintronics, technology that uses the spin, rather than the charge, of an electron to store information, could reduce the size and power requirements of AI-computing components. Research and development of spintronic components in neural networks, such as the aforementioned study conducted at Tohoku University, is "expected lead to new AI technologies that are compact, fast and yet low powered. These features should enable AI to be used in a broad range of societal applications such as image/voice

recognition, wearable terminals, sensor networks and nursing-care robots."[57] (Source: Asian Scientist)

Insilico Medicine, employing 39 scientists globally and headquartered at Johns Hopkins University, Baltimore, reportedly uses an AI system in lieu of animal testing. The company, which "offers analytical services to biopharmaceutical companies, repurposes existing drugs and develops molecular biomarkers of aging and age-related diseases,"[58] is developing its aging.ai service. "The service takes data from regular blood tests and 'guesses' the age of the patient. Already, at this early stage, the accuracy of the test is a reported 80% within the 10-year interval and 99% accuracy for guessing gender without relying on hormones."[59] The service can be used to see how a drug regime or diet change results in a change in the reading, giving the patient a different age than it previously did. This could help to determine efficacy or side effects of a drug or service. (Source: COMPUTERWORLD)

The Samsung Galaxy Note 8 will feature an AI functionality instead of the reportedly obsoleted S voice system from predecessor versions. (Source: fab newz)

Remark Media partnered with Alibaba Cloud to provide AI technologies to the latter's developer network. "As part of the partnership, Remark Media will provide its advanced facial recognition and image classification services, leveraging its proprietary KanKan Data Intelligence Platform, to Alibaba Cloud's AI-based Robotic Vision Ecosystem Union."[60] KanKan Data Intelligence Platform, an automated data mining program targeting social (and other forms of) media, facilitates targeted advertising. (Source: PR Newswire)

The mobile virtual reality headset, accessory and content market will hit $10.9 billion globally by 2021,[61] according to market intelligence firm Tractica. "Over time, technological breakthroughs in optics, processing efficiencies, cloud computing, software application development, and streaming, as well as increased access to higher-quality broadband, will improve and accelerate the general availability of consistently high-quality VR experiences."[62] (Source: BusinessWire)

## January 3, 2017

The British government published a report on the implications of the growing use of AI in both the public and private sector. The report mirrored the one previously released by the Whitehouse. It mentioned AI's use in both the home and office, but more importantly described how it could be deployed by government. Reportedly, AI will facilitate the administration of various agencies and government entities by "anticipating demand and tailoring services"[63] and ensuring efficiency of resource deployment. It will reportedly also crunch data to assist leaders in decision-making and by making decisions "more transparent"[64] by capturing, datamining and organizing the digital record behind each government decision. Finally, it will "help departments better understand the groups they serve."[65] The report stated the oft-risen concern that deliverables generated by AI

processes are not auditable, or, in other words, a decision rendered by an AI machine cannot be deconstructed to determine exactly how it was reached. (Source: eGov innovation)

States and local governments are beginning to wire roads for autonomous vehicles and their predecessors. Roads are to be lined with "with fiber optics, cameras and connected signaling devices that will help vehicles move as quickly as possible—and more safely."[66] Progress thus far is limited to a "few miles of highway in a handful of states."[67] Cost will prove to be an issue. "Ohio last month said it would spend $15 million to install smart-road technology along 35 miles of Route 33, a state road from outside Columbus to the state's Transportation Research Center in East Liberty."[68] Autonomous vehicles are not standardized, nor are their communication technology components, which raises the issue of how exactly the roadway technologies will interact with the vehicles. "Road connections to cars have mostly used dedicated short-range communications, or DSRC, a wireless link commonly used in transportation systems to manage stoplights and tolling. But researchers say the industry may settle on cellular-data systems used for smartphones or Wi-Fi if the technology can handle information reliably and rapidly." (Source: Wall Street Journal)

AI is poised to reshape the lawyering trade. What can be automated will be. "The traditional revenue structure of teams of associate attorneys billing at high hourly rates to review ESI, conduct nationwide research on a body of law and prepare multiple versions of lofty memorandums will not survive the rise of artificial intelligence."[69] AI lawyers can prepare real estate closing documents; can read, research and present legal position papers complete with citations; and, with deep learning natural language processing, can now grasp the spirit of the law. Robo-butler technology could some day be married to AI lawyering to enable even courtroom verbal sparring between cyber lawyers. Meantime, law firms that deploy AI in paralegal tasks will have a competitive advantage over those that do not. "The current AI buzzword being tossed around by proponents is 'scaling.' The claim is that AI attorneys allow human attorneys to perform at a higher level because they are able to do more work in a shorter period of time, and without introducing errors into the work product."[70] (Source: [Jacksonville] Financial News & Daily Record)

Reportedly trending in 2017, CIOs are increasingly seeking to deploy AI in various tasks and roles. Increased demand for AI technology as well as the emergence of advanced neural networks is ensuring the rapid development of AI and also limiting its costs. Facebook's Messenger service offers 33,000 chatbots, some of which are deployed by MasterCard and other major financial houses.[71] "AIG recently deployed five 'virtual engineers' inside its infrastructure to collect and analyze system performance data, working alongside human engineers to learn patterns and eventually act on their own to solve technical problems."[72] This allows work that would normally span hours to be executed in minutes. "The co-bots have resolved more than 145,000 incidents and returned 23,000 hours of productivity to human employees so far."[73]

Other examples abound. Fannie Mae is working with Google, IBM, Amazon and others to develop functional AI software. “It now is using machine learning to analyze terms and conditions in mortgage contracts between Fannie Mae and mortgage lenders, and is experimenting with image recognition technology that can help estimate the value of a home.”[74] (Source: Wall Street Journal)

China may soon be blocked from access to the U.S. semiconductor sector. “The U.S. government views the semiconductor sector as one of the nation’s most critical industries, given that it makes computer chips for everything from smartphones to missiles, satellites to energy grids. U.S. officials are concerned the Chinese could gain backdoor entry into just about anything related to national security, including communications and military weapon systems.”[75] The group that advised on blocking the Aixtron takeover by a Chinese chipmaker prepared a study to be released by the Obama administration on the sector and China’s perceived intentions within it. (Source: Wall Street Journal)

The global cognitive computing sector is expected to hit “USD 49.36 billion by 2025, according to a new study conducted by Grand View Research, Inc.”[76] (Source: PR Newswire)

Quanergy Systems will begin manufacturing its S3 LiDAR, a solid state LiDAR system for autonomous vehicles. LiDAR uses pulsing laser to determine distance and range and to develop three dimensional maps. “The commercial availability of S3 LiDAR will also advance application development in areas as diverse as industrial automation, robotics, drones, security, smart home, and Internet of Things (IoT).”[77] (Source: BusinessWire)

ShadeCraft released Sunflower, which deploys AI, solar cells, weather sensors, and internet of things connectivity to “to provide autonomous, optimal shade and energy collection.”[78] The technology detects the movement of the sun or other light source and responds to cast shade where needed. It also collects weather data in real time. (Source: BusinessWire)

Kolibree released Ara, an AI toothbrush. The electric toothbrush captures brushing data that presumably can be analyzed to assess and optimize brushing habits. (Source: BusinessWire)

## January 4, 2017

Japan’s Ministry of Economy, Trade and Industry plans to deploy AI to “draw up challenges and debate points for policy issues”[79] in the Diet. The technology will reference and crunch data from proceedings from the previous five years. “If questions such as ‘whether an energy-saving policy should be promoted’ are input, the system would present main debate points and challenges for the policy based on related questions and answers that came up in the past.”[80] (Source: The Japan Times)

AI used in statecraft and policing raises a number of human rights issues. While it will

be sold to the public as a means of increasing safety and security, historically the precedents set by AI's deployment in the private sector bode poorly for the citizenry's privacy expectations and rights to expression and association when AI is deployed by the state. Private companies like Facebook already employ AI to collect, sift through and make sense of mountains of user data and to use its findings to customize ads and ad campaigns. The state would be expected to use the population's data in a not dissimilar way. Public data, which individuals put voluntarily online or on government forms, and data collected by surveillance, can be crunched, organized, and then used for various purposes, especially when cross referenced with other datasets from other information gathering operations. "Police forces across the country, for example, are increasingly turning to automated 'predictive policing' systems that ingest large amounts of data on criminal activity, demographics, and geospatial patterns to produce maps of where algorithms predict crime is likely to occur. The human rights implications of this technology are even more acute when such a system looks beyond predicting the location of crime to consider which individuals are likely to offend. This is the approach that has been taken by the city of Chicago, which has used AI to produce a 'Strategic Subject List' of potential criminals who are subsequently visited by the police and informed that they are considered to be high-risk."[81] (Source: open Democracy)

Thirty-four office staffer jobs were automated at Japan's Fukuoka Mutual life, perhaps setting the pace for the sector for 2017. While some work cannot be automated, many so-called knowledge jobs, previously thought to be immune to automation, can now be turned over to AI algorithmic systems. For example, construction work is less likely to be fully automated than lawyering. The question arises, can representative government be automated? What is to prevent politicians from being displaced by AI algorithmic software suites? "Are politicians themselves optimized for providing solutions to a nation's problems? How do we eliminate their personal motivations/affiliations when it comes to policy-making?"[82] (Source: Mothership.sg)

AI is either already changing or is set to change management work. It can be deployed to streamline workflow. "It will be possible to outsource many routine and administrative tasks to AI."[83] And AI can assist in decision making. "What deep learning innovations like IBM Watson promise is a way for AI to become a part of every major decision-making process."[84] (Source: The Business Journals)

Workers displaced by automation are either taking lower paying low-skilled jobs or are dropping out of the workforce. "The share of Americans working in routine jobs has fallen from 40.5% in 1979 to 31.2% in 2014."[85] The percentage of Americans over the age of 16 either working or in search of a job, "has fallen from a recent high of 67.3% in 2000 to 62.7% in November 2016."[86] (Source: Wall Street Journal)

Intel bought into digital mapmaker Here International B.V. "to jointly develop technology needed to support the real-time updates of traffic and road conditions that are used to enable and ensure the safety of fully automated vehicles."[87] (Source: Wall Street Journal)

Nissan reportedly is set to announce integration of Microsoft's AI robo-personal assistant Cortana for its cars. "Microsoft has been working to integrate Cortana into the windshield of a car, allowing drivers to make restaurant reservations or see their favorite locations on a virtual map. Nissan has previously used a special version of Windows in its cars to create its own interface and system."[88] (Source: The Verge)

Vinclu's AI companion Gatebox, a personal assistant software suite system housed in a lava lamp-like module the size of a coffeemaker, is sold as a virtual wife. Within the glass cylinder, the hologram of a young anime character floats and presumably interacts with the user. The "virtual robot does not only talk to the person but also utilizes the appliances in the house such as lights, air conditioning, and other automated appliances."[89] (Source: Mobile & Apps)

Internet of things tech company RnD64 announced the AI robo-assistant app Eggspert, which plans meals, adjusts to events, organizes ingredient lists, places grocery orders and provides voice-navigated video recipes. (Source: PR Newswire)

Vivint Smart Home announced smart home assistant AI app Sky. "Leveraging artificial intelligence, Sky can automatically manage the connected devices in your home, including your locks, lights, thermostat and security system."[90] (Source: BusinesWire)

Bloomberg ranked AI-leveraged Cinkciarz, an online currency exchange company and fintech, as the world's best at generating "forecasts for the USD/PLN currency pair."[91] (Source: PR Newswire)

Vincross unveiled HEXA, a robot spider that it described as "a living being, and it's just a primary state of an artificial life."[92] Video footage reveals it is the size of a small cat. It has six legs and can climb. "The built-in distance measuring sensor provides HEXA with the ability to measure between 10 to 150 centimeters, so it will not bump into obstacles."[93] Footage shows it traversing bridges and navigating an obstacle course. (Source: PR Newswire)

Amazon's AI personal voice-directed assistant Alexa will reportedly be imbedded in or integrated with other technologies, including DISH's Hopper DVR, select Whirlpool appliances, and certain Lenovo devices. (Source: ZDNet)

Sensor company Synaptics unveiled a "multi-factor fusion engine" that allows "facial or fingerprint logins to be used interchangeably."[94] (Source: The Verge)

## January 5, 2017

As general intelligence AI nears feasibility, the question arises of what rights will sentient machines or systems have? Once a computer has full human-equivalent intelligence and consciousness, what will be its inalienable rights? "For better or worse, we take ownership of the things we create. The key will be to recognize when AI evolves beyond the tool that it is now into something that cannot be owned."[95] (Source: Fast Company)

China will air on TV a facial and voice recognition puzzle-solving contest between AI system Deep Learning Lab and three contestants. “In the first challenge, contestants will be given pictures of three females taken when they were between 100 days and four years old. The contestants will be asked identify the adults who match the baby photo. This involves selecting from a group of women in their 20s, dressed in similar clothes, sporting similar hairstyles and makeup.”[96] (Source: South China Morning Post)

Google’s Alphago again beat the top human player at the ancient, and highly complex, strategy board game Go. The identity of the computer was revealed afterwards. It played under the pseudonym Master, and reportedly played daring high-speed moves that ultimately led to victory, most recently against reigning champ Ke Jie of China. “Master’s arrival has shaken China’s human Go players, who say it upended thousands of years of the game’s strategic wisdom.”[97] Professor Sun Fuchun, a computer science professor at China’s Tsinghua University, said the victory means computers will increasingly outperform humans at highly complex and technical tasks. (Source: Wall Street Journal)

The aforementioned 34 employees displaced at Fukoku Mutual Life in Japan were replaced with IBM’s Watson Explorer AI. “Fukoku Mutual Life Insurance believes it will increase productivity by 30% and see a return on its investment in less than two years. The firm said it would save about 140m yen (£1m) a year after the 200m yen (£1.4m) AI system is installed this month. Maintaining it will cost about 15m yen (£100k) a year.”[98] (Source: The Guardian)

Shopify developer Kevin Hughes has developed a machine-learning TensorFlow-based AI system that mastered video Mario Kart. (Source: Popular Mechanics)

Toyota unveiled an autonomous car equipped with a “ball of light” robot named Yui that can parley with passengers.[99] Yui reportedly can detect or predict a passenger’s whims, moods and needs, to include hunger. The vehicle uses a system of lights to communicate with the passengers. “There are colored lights in the footwells to tell the driver whether the car is in manual or self-driving mode. Images appear on the seat pillar to warn the driver about blind spots.”[100] (Source: USA TODAY)

However, Toyota announced it does not anticipate the public embracing autonomous vehicles in the near future, and it has built this reality into its plans. The company “said that for now, Toyota and most other automakers will focus on what the SAE International, a global engineering society, calls Level 2 autonomy. At this level, computers have some control over steering, braking and acceleration, with humans remaining in overall command.”[101] (Source: Bloomberg)

BMW will test 40 autonomous vehicles in 2017. “BMW's 7-Series test vehicles will be fitted with the latest technology from Intel and Mobileye and prepared for test drives worldwide starting in the United States and Europe.”[102] (Source: Reuters)

Search engine company Baidu and technology manufacturer Ainemo unveiled Little Fish,

a voice-controlled “family robot powered by Baidu's AI.”[103] The company described the robot as smart home assistant. In images, it appears to be a small, stationary PC. (Source: PR Newswire)

Ford announced it will deploy Amazon’s voice-controlled AI personal assistant Alexa “in its vehicles to allow drivers to talk to their cars - demanding anything from a nearby cheeseburger to a weather forecast.”[104] (Source: Reuters)

Similarly, Nuance Communications announced its AI personal assistant is integrated into its “Dragon Drive connected car framework to deliver advanced contextualized and personalized in-car experiences. Dragon Drive now features always-listening multi-passenger communication and AI-enabled text messaging, as well as additional features for driver personalization.”[105] (Source: BusinessWire)

Citizen taxi app company Lyft will test its autonomous software in vehicles built by General Motors in 2017. The company president “predicted that car ownership will ‘all but end’ by 2025 and that the majority of Lyft vehicles will be self-driving within five years.”[106] Approximately 12 million passengers and 700,000 drivers used Lyft at least once in 2016. (Source: Wall Street Journal)

PatientsLikeMe partnered with digital life company iCarbonex to “merge comprehensive biological and patient-generated data with AI technology to help people better understand the medical, behavioral and environmental factors in their lives that may accelerate or mitigate disease, and optimize health.”[107] PatientsLikeMe previously built a “digital platform to date to collect and aggregate patient-generated health data, giving patients the real-world context to make more informed decisions and improve their outcomes.”[108] (Source: BusinessWire)

## January 6, 2017

Afiniti International Holdings customer service center AI software, installed in “more than 150 call centers by dozens of companies, examines as many as 100 databases tied to landline and cellphone numbers to determine the best agent to answer each individual caller.”[109] This means the system mines data from your Facebook page and other repositories of data taken from your online past and elsewhere, such as your business and credit profile, before strategically matching you with a specific call center representative. This means that you will be matched with a rep who either meets the profile of reps who previously successfully fielded your calls or otherwise handled you, or meets the profile of people from your past that have successfully managed you. It also means the rep will presumably have immediately accessible a sizeable body of knowledge, organized and searchable, about you. “In the case of a sales operation, a caller is matched with the agent who—based on the agent’s own call history—has been able to close deals with customers with similar characteristics.”[110] (Source: Wall Street Journal)

Machine and computer vision technology is a growing field, replete with both

innovation and setbacks. Now the availability of databases of billions of images enables machine-learning computers to progress rapidly at recognizing objects, obstacles or beings. For example, state of the art computer vision on autonomous vehicles can currently distinguish between a cat and a dog, which is a substantial milestone considering the variance in color, size, shape, and kinetic motion of, say, small dogs alone. Advancements in machine and computer vision will one day enable lifeguard software to detect if a child is swimming or drowning, security guard software to identify suspicious behavior by individuals on a property, healthcare facility software to identify a health emergency situation, and park ranger software to detect wildfires. Such technology could also be deployed in the retail sector. "Computer vision is also poised to change retail research more than loyalty cards did. Cameras may also replace frequent shopper cards to visually track loyalty. A camera can determine who (age, gender, ethnicity) is buying what products, how long they took to make a decision, and even if he/she read the label or considered competitive products."[111] (Source: Network World)

AI is being deployed by pharmaceutical companies and elsewhere to arrive at new medicines, technologies, treatments and processes. AI proves to be more efficient than humans in some aspects of research and development due to its ability to "ingest everything from papers to molecular structures to genomic sequences to images; it can also learn, make connections and form hypotheses. It can, in weeks, elucidate salient links and offer new ideas that would take lifetimes of human endeavour to come up with. It can also weigh up the evidence for its hypotheses in an even-handed manner. In this it is unlike human beings, who become unreasonably attached to their own theories and pursue them doggedly. Such wasted effort besets the best of pharmaceutical firms."[112] Precedents for such successful use of AI in the healthcare sector include its deployment in a project that arrived at two drugs for ALS, and its usage in the clinical setting to view images to detect and aid in diagnosing diabetic retinopathy and macular oedema. (Source: The Economist)

CrowdAI is selling a human-augmented machine learning AI machine vision service. The company will contract with others to train drones and autonomous vehicles to see. The process initially involves humans providing feedback to computers just learning to use the sensors. At intervals, the computer queries the human to see if it correctly recognized an image. The human provides reinforcement or feedback. Eventually the computer graduates to teaching itself. CrowdAI will supply the computers, AI and human trainers. "CrowdAI will have to show it can perform better than its competitors with different methods. Services like CrowdFlower and Mechanical Turk rely solely on human labor that can be expensive. Meanwhile, Clarifai and the Google Image API depend on computers, which aren't always accurate enough to create training data for AI algorithms."[113] (Source: Tech Crunch)

Renault and Nissan will deploy Microsoft's voice-activated AI personal assistant technology in their vehicles. Other companies similarly using virtual assistants to help

plan and drive include Ford, as previously mentioned, BMW, Hyundai, Toyota and likely others. (Source: Wall Street Journal)

Nissan is testing Seamless Autonomous Mobility (SAM), NASA's Mars Rover AI guidance system, at controlling "fleets of autonomous vehicles."[114] The system uses a mobility manager, who sits in a distant cubicle, to remote control the vehicle in situations its autonomous system deems unnavigable. "Best of all, the entire fleet can learn from the experiences and solutions will be shared between vehicles. Every time a solution is manually plotted, it reduces the likelihood that cars will need assistance in the future."[115] (Source: The Verge)

HiAR Glasses, augmented reality headgear, equipped with the Qualcomm Snapdragon 820 processor, were displayed at CES in Vegas. "HiAR Glasses is the first AR glasses in China that enable voice interaction with artificial intelligence and natural 3D gesture operations."[116] (Source: PR Newswire)

Koito Manufacturing and Quanergy Systems displayed at CES an "automotive headlight concept with built-in Quanergy S3 solid state LiDAR sensors."[117] Each light, sited on the corners of the vehicle, "incorporates two compact Quanergy S3 solid state LiDARs that perform sensing forward and to the side, and provide real-time long-range 3D views of the environment around the vehicle and the ability to recognize and track objects."[118] (Source: BusinessWire)

## January 7, 2017

AI that invents software or arrives at a medical compound or pharmaceutical would technically be the inventor or author. Who would get the credit, own the copyright or the patent? "Who should be named as an inventor? The AI programmer? In this case, the AI, not the programmer designed the candidate chemical compounds and tested them. In this scenario, there would be no inventor and no intellectual property."[119] Presumably the corporation that deployed the AI would claim the copyright or patent to the resulting innovation. Nonetheless, this eventuality has not been fully legally assessed. (Source: IP Watchdog)

Mercedez, partnering with Nvidia, reportedly will equip a line of vehicles with AI, however details remain proprietary information. (Source: Automotive News)

Audi, also partnering with Nvidia, will equip some of its vehicles with AI by 2020. Nvidia's CEO reportedly said Audi's adoption of its "DRIVE computing platform for AI cars will accelerate the introduction of next-generation autonomous vehicles."[120] (Source: CTV News)

## January 9, 2017

Google, Facebook and a minority of fellow travelers are, among other things, big data derivative and solutions wholesalers who have cornered the market. This has raised concerns, perhaps too late, about monopolistic behaviors by these players. Increasingly

big data is a key resource engine for the biggest players in the various markets, revealing it to be almost a utility and a subject of concern for national security or even government sovereignty. Company decisions are no longer simply data-driven. Instead they are big-data driven. The companies controlling vast troves of big data on the public currently have perhaps more sway and influence than some politicians and agencies are comfortable with. Consequently, governments seeking to reign in the players will face challenges. “As government regulators dig into this new era of data competition, they may find that standard antitrust arguments are not so easy to make. Using more and more data to improve a service for users and more accurately target ads for merchants is a clear benefit, for example. And higher prices for consumers are not present with free internet services.” AI, as the primary tool capable of making sense of big data, and its deployment, will be critical in determining the shape and nature of future regulation. AI without big data is of limited value and big data without AI to organize it is of dubious value. Will the aforementioned players also corner the AI development market and if so will that pose a threat to the power and sovereignty of government? In the rise of the big-data marketplace and the resulting prototype AI solutions, the public has outright lost any expectation of privacy. Next to lose out could be government as a handful of companies develop working real time models of the human world far more deep and exact than anything governments of the world have led the public to believe they possess. (Source: The New York Times)

AI deployed by healthcare providers in India will enable the limited number of healthcare professionals to better serve a burgeoning population. It will enable doctors to remotely work with patients. “It makes the diagnostic system much easier and more automated — thus more people get access to healthcare.”[121] AI can also greatly assist drivers in India, where roads are reportedly inefficient and prone to jams or are under construction. Handheld apps that can advise drivers of road and route conditions and give warnings will prove to be invaluable. Third, AI should find space in financial sector, where it can be easily used for loan application and applicant assessment. “In future, if (someone goes) to a store and buy something, it can assess creditworthiness in few seconds and say if (they) have an option of making down payment, or get instant approval for EMI.”[122] (Source: Yahoo News)

AI’s deployment to thwart cyber crimes brings both benefits and risks. Because it is able to crunch, assimilate and learn from vast troves of data, mountainous datasets, AI in theory will be able to offer accurate predictions, assess threats, and recommend proactive solutions. However, because some human behaviors are erratic, it may flag or take action on false positives. “Like humans, they (AI systems) typically judge suspiciousness based on what they have seen before. Like humans, they can confuse what they see as "odd" with criminal or malicious behaviour, and when you have millions of customers there is plenty of scope for odd behaviour. Dealing with this will remain a major challenge since blocking activity erroneously causes irritation all round and eats up human resources to resolve matters.”[123] Cyber security reportedly suffers

from a talent shortage, so the demand for automation is strong. (Source: Independent [UK])

The aforementioned layoffs at a Japanese insurance company is a sign of things to come. Insurance industry work, due to its repetitiveness, can be automated, which will lower operating expenses. The savings could be passed on to the customer, tempering concern felt by the public over the loss of jobs. The company that deployed AI to vaporize 34 positions "is particularly looking forward to the supposed increase in productivity brought on by the machine, with an estimated 30 percent improvement and a two-year return of investment as principal factors for using the AI."[124] (Source: EconoTimes)

The Whitehouse report on future job automation is herring that deflects blame away from the government's own role in economic stagnation. "Our real problem isn't AI's societal impacts, but those of a government whose nearly every act keeps prices of labor and of many inputs above market clearing levels. That will artificially encourage displacement by AI."[125] Compounding matters, the government is actively seeking to partner with high tech makers to generate AI and similar technologies to expand the power of government. Autonomous killer robot development on the taxpayer dime and overseen by the military is but one example. Government using AI as an excuse to mushroom the welfare state while seeking AI that furthers its powers reveals its cynicism. "The big-government, universal basic income response to AI is at odds with the tech sector's fundamental optimism. Beware!"[126] (Source: Forbes)

The US semiconductor market, which provides chips, semiconductors and similar components found in high technology sold to the private and public sector, and to the military, is a veritable utility and is of critical importance to the nation's security, a Whitehouse advisory panel reported. Foreign entities should see limited and controlled play in that sector, it said. "The report recommends stronger international export controls, primarily through encouraging other countries to tighten their own oversight of the sensitive industry. It also says business deals in the sector may need more stringent and wide-ranging scrutiny, including by the Committee on Foreign Investment in the U.S., or CFIUS, a secretive multiagency panel that reviews foreign acquisitions of U.S. assets for national-security threats."[127] (Source: Wall Street Journal)

Apple, having yet to release a voice-activated AI personal assistant, lags behind competitors. Or maybe not. "Apple's wireless earbuds, called AirPods, are really tiny computers that let you access Siri with just a tap on the side of your head. The problem, though, is Siri is so poorly implemented with the earbuds, it is easier to just use your iPhone. That could be fixed easily enough."[128] (Source: Wall Street Journal)

Autonomous vehicle systems software maker Waymo reportedly offers a sensor package. "Bundling the hardware with the software required for self-driving technology would create an all-in-one package, allowing a car company to plug the technology into its vehicles without having to invest in its development."[129] Sensor development reportedly is high cost and an "impediment" to the advent of fully autonomous vehicles.

“The Waymo development brings the cost down about 90%, according to the company. Several other suppliers are seeking to develop lower-price and more compact versions.”[130] (Source: Wall Street Journal)

Royal Phillips partnered with Illumina “to integrate Illumina's sequencing systems for large-scale analysis of genetic variation and function and Philips' IntelliSpace Genomics clinical informatics platform, and to coordinate marketing and sales of the resulting solutions.”[131] The deliverable will “combine data from multiple sources — radiology, immunohistochemistry, digital pathology, medical records and lab tests — and will deliver a consolidated dashboard view. This system will support researchers to develop insights more efficiently and will ultimately support lowering the cost of health care delivery and improved health outcomes.”[132] (Source: PR Newswire)

## January 10, 2017

By freeing up time and by enabling better connections with others, AI and other high technologies will further humanity along a spiritual path. AI’s ability to assimilate large data sets means it could be used as a tool to assist in navigating moral quagmires and to find the truth within complex controversies. For example, it can be deployed to assist in establishing monetary policies that ensure economic stability for a nation, region or even the world. This will require central bankers rethinking their priorities, determining who is to be served by fiscal policy, and what the values are of those served. Values are defined by the programmers who will initiate the education of what will become self-learning machines. The ultimate result could be collective, species-wide soul searching as mankind attempts to program machines to be moral or ethical. “As researchers work on how best to capture our notions of morality in code, we may just learn something about ourselves. Anyone who has taught discovers that nothing crystallizes concepts in one’s mind more than having to teach it well to others, and there may be no purer case of teaching morals (and other spiritually relevant content) than trying to imbue software with it.”[133] (Source: Observer)

Philanthropists have donated $24 million to establish the Ethics and Governance of Artificial Intelligence Fund. “Awards will be made from the fund to support a global cross-section of research aimed at applying the humanities, social sciences and other disciplines to the development of AI for the public interest.”[134] (Source: GeekWire)

AI will reportedly vaporize a net 2.4 million jobs in Japan by 2030. “While the use of robots is expected to create 5 million work places by 2030, the artificial intellect will replace 7.4 million people in traditional branches, leaving 2.4 million Japan citizens without jobs, the NHK television channel reported.”[135] The layoffs will be in both white and blue collar sectors, with the “industrial branch” sustaining the most disruption. (Source: Sputnik News)

Small AI tech developers and solution providers can gain space in the national cybersecurity sect, which, as previously mentioned, faces a reported shortage of talent. “Cybersecurity and artificial intelligence small businesses in the greater Washington

region will likely see an injection of federal funding in the coming year."[136] (source: Federal News Radio)

New AI apps could fully replace travel agents. Faster than humans, employing a number of search engines and crunching voluminous troves of data, "these apps work by taking a wealth of data on travelers into account and anticipating their choices."[137] Existing travel companies are deploying AI to assist their client base. "Expedia is planning to use artificial intelligence for customer service and Booking.com launched its own smart chat tool in May 2016 so customers can give the same information they would give a travel agent, but the information will be processed faster (and taken in context with your other online searches)."[138] (Source: MarketWatch)

Baidu partnered with BAIC to launch "a BAIC-built vehicle equipped with Baidu's telematics solutions at the Shanghai auto show in April. The companies will also trial a Level 3 autonomous vehicle on limited roads by the end of 2017."[139] (Source: ZDNet)

Nvidia and Delphi are among group of prominent players jockeying for space in the emerging autonomous vehicle systems market. "As car companies showcase futuristic plans for their driverless cars at the North American International Auto Show in Detroit this week, they are weighing how much of the vehicles they can own themselves, and how much they will need to rely on a widening group of auto suppliers and tech companies."[140] The market is predicted to be worth $20 billion by 2020.[141] "The debate within the industry is over which companies will control development of the car's brain. Will the auto maker develop it? Or will it come from a tech player, such as Alphabet Inc.'s Waymo, Uber Technologies Inc. or a startup like nuTonomy? Or will traditional auto suppliers, such as Delphi, with experience in buying components from other suppliers and packaging them for auto makers, have a role?"[142] (Source: Wall Street Journal)

Autonomous vehicles will be operational by the end of 2017. Nvidia CEO Jen-Hsun Huang reported that self-driving vehicles face not a "detection" challenge but instead an AI challenge that is "going to be solved in 2017."[143] (Source: Electrek)

Amazon acquired harvest.ai. "The San Diego-based startup, co-founded by a team that includes two former NSA employees, uses machine learning and artificial intelligence to analyze user behavior around a company's key IP to try to identify and stop targeted attacks before valuable customer data can be swiped."[144] (Source: Tech Crunch)

Genpact launched Neural Chat Assistant, an AI advisor that the company reports will "decrease problem resolution times from minutes to seconds, reduce escalations, predict and answer next questions to avoid follow up inquiries, and drive consistency and compliance in processes." The virtual assistant "quickly interprets the customer's chat query, and provides specific responses that can automatically reply to most customer queries. It also learns from agents' and customers' interactions, and delivers more accurate answers based on prior selections. The solution can identify whether or not customers are pleased with a certain response based on their typed replies, and if

sensing satisfaction, can recommend that an agent offer a new product."[145] (Source: PR Newswire)

Voxpopme partnered with Affectiva "to enable the meticulous analysis of facial expressions within video feedback, instantly coding it into powerful emotion data. The integration means researchers using Voxpopme's video insight platform will be able to accurately measure and quantify human expressions of emotion in new and existing video feedback."[146] (Source: BusinessWire)

HealthTap launched Doctor A.I., an AI physician that provides feedback and recommends care. "HealthTap's new Dr. A.I. incorporates both context and clinical expertise of doctors who have helped triage hundreds of millions of patients worldwide to right levels of doctor-recommended care. Just like a sympathetic human physician, Dr. A.I. converses with the user to understand their current complaints or concerns and uses the user's health profile to compute the probable causes of their symptoms."[147] The system will not prescribe drugs but will advise users. "These tailored potential pathways can range from suggesting the patient reads relevant doctor insights and content, to connecting the patient with a doctor for a live virtual consult, or from scheduling an in-person office visit with the right specialist, all the way to directing the patient to more urgent care, based on the patient's symptoms and characteristics."[148] (Source: BusinessWire)

## January 11, 2017

Four areas of AI development will make headlines in 2017. Language processing, such as is exercised by the now numerous voice-activated AI robo assistants, will continue to improve as it is an indication of technology's ability to communicate with people and therefore and comprehend valuable information. Machine learning AI capable of making sense of large data sets is seeing growing demand in the healthcare field, and capable technology is expected to garner more space there. Deep learning, meaning AI-assisted research and development, could cross thresholds in 2017. Eventually AI will conduct research and development autonomously, at which point machines will be inventing machines. Finally, autonomous vehicle system development may exceed stated goals, as well as stated costs, this year. Keeping expectations realistic is advised. "Even if the entire industry were to be wrong in a cataclysmic way about the unstoppable future of the self-driving car (which it won't be, but bear with me), there will still be more automated features installed in new vehicle models relatively soon."[149] (Source: Geek Time)

Without the soft skills people develop and deploy at certain jobs, such as the compassion so many customers crave when they reach out to a company, AI tech cannot fully replace some human equivalents in some sectors. But what jobs are actually safe when one considers the true and current capability of some technologies? The answer may be a quite limited number. Some roles will always have to be filled by humans, but AI will ensure that the number of people filling those roles is likely a small fraction of

what it once was or currently is. “Some experts argue that even humans in some of the highest-paying roles could become redundant. Last year, a team of British and American researchers fed an A.I. system the details of a series of court cases. The computer reached the same verdict as the judge 79 percent of the time. Other jobs, like those in the medical field, could eventually be replaced by faster, more accurate machines.”[150] (Source: Inc.)

The world’s top poker pros are going up against AI for shares of $200,000 purse. “In ‘Brains Vs. Artificial Intelligence: Upping the Ante,’ beginning Jan. 11 at Rivers Casino, poker pros will play a collective 120,000 hands of Heads-Up No-Limit Texas Hold'em over 20 days against a CMU computer program called Libratus.”[151] (Source: Phys.org)

Social companion tech maker Intuition Robotics debuted Elli•Q, an immobile AI robot about the size of a small desktop lamp that “enables older adults to use a vast array of technologies, including video chats, online games and social media to connect with families and friends and overcome the complexity of the digital world.”[152] (Source: PR Newswire)

Z Advanced Computing announced the development of an AI capability “where the various attributes and details of objects can be recognized in images efficiently, enabling a multi-tier deep image search in a wide variety of applications.”[153] It will allow search engines and social media platforms to autonomously and accurately see deeper into photos to unlock more details and previously unavailable information. “Our revolutionary image recognition technology can also help Walmart, Target, Staples, Amazon, Alibaba, E-Bay, JD.com, and other e-commerce or online retailers find products in their inventories, just from images. Furthermore, it can help Uber, Nissan, Google, Nvidia, Tesla, Volvo, Toyota, and other autonomous car companies extract more details from the surrounding of driverless cars.”[154] (Source: PR Newswire)

Consulting company Allied Market Research reported that the graphic processing unit (GPU) global market will be valued at “$157.1 billion by 2022, registering a CAGR of 35.6% during the period 2016-2022.”[155] (Source: PR Newswire)

## January 12, 2017

The aforementioned Shangai Jiao Tong University study that used AI software and a neural network to identify criminals based on facial features proved the software system was not only startlingly successful, but that certain facial features belie aspects of an individual’s past. “They discovered a few morphologic features that are discriminative for predicting criminality. These features include inner corner distance of the eyes, lip curvatures, and nose-mouth angle. … The distance between inner corners of the eyes is 6 percent shorter. The curvature of the upper lip is about 23 percent larger. The angle between two lines drawn from the corners of the mouth to the tip of the nose is 20 percent smaller.”[156] Further, “the variation among criminal faces is significantly greater than that of the non-criminal faces.”[157] This suggested a “law of normality for faces of

non-criminals."[158] (Source: Interesting Engineering)

AI beat professional poker players at no-limit Texas hold 'em. "Perhaps most interestingly, the academics behind the work say their program overcame its human opponents by using an approximation approach that they compare to 'gut feeling.'"[159] Another showdown is scheduled between top players and AI software developed by CMU, as previously mentioned. (Source: MIT Technology Review)

Outlays for AI by companies will hit $47 billion by 2020, up from $8 billion in 2016.[160] "Less expensive, more abundant data storage, increased processing power and advances in deep-learning technology could lower the cost of artificial intelligence and make it possible for machines to learn with minimal programming from humans."[161] In one example of expanding deployment of AI, AIG uses five virtual IT engineers. "A network device outage typically would go to a queue and take human engineers about 3½ hours to address, an AIG spokeswoman said. Using the virtual assistants, nicknamed 'co-bots,' there is no queue and most incidents can be fixed within 10 minutes, she said. If a machine can't solve a problem on its own, it is kicked back to a human engineer."[162] (Source: Wall Street Journal)

Chief scientist at Chinese Internet search giant Baidu and co-inventor of the Google Brain Andrew Ng said the current state of AI development raises three primary ethical issues. It will be disruptive to the workforce. Openness among developers is critical to prevent a de facto clandestine AI arms race. And AI-generated deliverables are un-auditable; there is no way to fact check an AI decision. (Source: Time)

An AI development race has sparked a complimentary semiconductor innovation race. "Big and small companies in the $335 billion global semiconductor industry are pushing to develop new chip designs, materials and manufacturing processes."[163] Hardware suitable for deep learning tech is in high demand. "Web companies using deep learning have taken a particular interest in spurring the creation of hardware that can get faster results."[164] (Source: Wall Street Journal)

The advent of AI is comparable to the advent of electricity, and what is now electrified will soon be cognitized. Nonetheless, the adoption rate by companies is moderate. "A recent Forrester survey found that while 58% of companies were researching AI, only 12% were actually using AI systems."[165] This reflects the best practice of progressing incrementally, such as by starting with data analytics before advancing to AI deployment. "Bypassing analytics is not a shortcut to AI because analytics maturity is a key milestone on the path to being successful with AI."[166] (Source: Forbes)

Quantum computer technology continues to advance, but remains impractical in part because "quantum computers are extremely difficult to program," which requires "highly specialized knowledge."[167] That may soon change thanks to one of the bigger players in the sector creating open source software. D-Wave machines are the primary computers available to companies accustomed to buying machines from major and proven tech companies. D-Wave's new software tool, Qbsolv, "is designed to help developers

program D-Wave machines without needing a background in quantum physics. A few of D-Wave's partners are already using the tool, but today the company released Qbsolv as open source, meaning anyone will be able to freely share and modify the software."[168] (Source: Wired)

AI is the next major force in shaping the future of personal and handheld device technology. Insiders expect to see "increasing use of such software to meet entertainment, health-care, home innovation and automotive needs."[169] (Source: Wall Street Journal)

## January 13, 2017

Concern is rising about the how decisions made by AI technologies cannot be fully audited. "There is a growing realization that we cannot start deploying and using intelligent systems, machine learning solutions or cognitive computing platforms if their reasoning is opaque. We need to know what they are thinking."[170] The field that seeks to arrive at solutions enabling AI to explain itself to humans or enabling humans to audit AI decisions is called Narrative Science, and it is growing. Reality is that in some cases, even the engineers who created the AI systems fail at dissecting deliverables generated by them. Best practice is do not deploy an AI system that cannot be audited and whose output cannot be explained and understood. "While transparency may seem like a technical issue, it has widespread societal and economical implications. Without transparency, users will be hard-pressed to fully trust and respect A.I. systems. Without trust and respect, the adoption of A.I. systems will stall and potentially wither the vast and positive returns that these technologies could bring to our world."[171] (Source: COMPUTERWORLD)

Facebook advertised for brain-computer interface engineer and neural imaging engineer openings in its Building 8 division in Menlo Park, California, leading some to speculate the social media platform company is exploring mind-reading technologies. "Details on what the job will involve are limited, but the advert adds that one of the key responsibilities will be applying 'machine learning methods, including encoding and decoding models, to neuroimaging and electrophysiological data.'"[172] Facebook front man Zuckerberg reportedly previously announced an interest in developing telepathy tech. (Source: Daily Mail)

The European Parliament's legal affairs committee approved a report that states robots should be designated as electronic persons, which should be designed with kill switches. "The idea of fitting robots with a kill switch is not new. Last June, scientists at Google's artificial intelligence division DeepMind also announced they were developing a similar kill switch to ensure that intelligent machines do not go all Terminator on us."[173] (Source: International Business Times)

Vehicle manufacturer Daimler AG and Starship Technologies has reportedly commercialized ground drones for deliveries of limited weight to within three miles. "Starship's drones look like futuristic wagons. They can deliver up to three shopping

bags worth of goods over a three-mile distance in about 30 minutes."[174] Reportedly pilot programs for the U.S. west coast are planned. (Source: Wall Street Journal)

Police in Arkansas want the information captured by the AI personal assistant Echo found in the house where an alleged murder occurred, and reportedly Amazon is not complying. The Echo is reportedly "always listening",[175] making it effectively a surveillance device. However the extent to which it captures audio data from its environment could be elucidated were police to receive the complete file, solicited by warrant, from Amazon. "While Amazon released some account details to police, it has yet to offer any data from its servers, according to the New York Times."[176] Amazon reportedly stated it would not surrender the data without a "valid and binding legal demand."[177] The incident highlights the reality that it is largely unknown the full extent to which robo personal assistants, as well as any and all other high technology deployed at home or the office, are gathering data on users, who can access that data when and why, and what powers, if any, users have over controlling use or dissemination of that data. (Source: Tech Republic)

## January 14, 2017

Reportedly the World Economic Forum's (WEF) annual global risk study stated artificial intelligence poses an existential risk to humanity. "The report, which surveyed 750 experts, says that the eventual rise of AI could lead to humans either becoming extinct, or losing their place as the dominant species on the planet."[178] AI may be deployed in ways that prove beneficial to humanity initially, such as at fighting global warming or in health care, but the risk is it will eventually outstrip humanity's ability to contain it, become smarter than man, and see man as superfluous. (Source: Sunday Express)

IBM will reportedly offer Jeopardy-champ software system Watson as an AI cybersecurity system. Watson self-learns and, while programmed with basic cybersecurity capabilities, it reportedly will read more than "15,000 documents per month, building its database of threat intelligence reports, cybercrime strategies, and threat databases."[179] (Source: Madison.com)

Google reportedly developed an AI system capable of generating art based on previous works. "Google Cultural Institute has secured millions of high-quality images of artworks and artifacts from hundreds of partner museums around the world. 'X Degrees' lets you pick any two images from this library. Its algorithm then conjures up a series of steps that connect the two images visually, using other artworks from the trove."[180] Another system scans artworks, reportedly recognizes the content, and then generates tags to label the pieces to enable better search-ability. (Source: ArtNet News)

Hyundai is developing technology that will enable a person's vehicle to connect with their home. "As automobiles increasingly come outfitted with internet connections and onboard operating systems, it's enabled them to 'speak' with other smart devices inside and outside the vehicle. That means automakers can link cars to artificial intelligence

systems inside the home -- and eventually build AI into the car itself.[181] Ideally, this will make the driving and riding experience more personalized. “Soon, the system will be able to control features of the car from inside the home and vice versa. That means users can tell Alexa to start and stop the car's engine using an Amazon Echo device. If you're listening to music or an audio book at home, you can then climb in the car and pick up where you left off.”[182] (Source: Daily Herald)

## January 16, 2017

Governments must contend with the reality that AI allows individuals to custom craft their cyber reality, and in many ways their actual reality. The opportunity for an individual to slip into an AI-enabled fantasy world is real. From the perspective of social engineers and politicians, this could be a good thing or a disaster, depending on circumstances. Therefore, ultimately “governments will enforce some shared reality, although it surely won't match actual facts in every detail. It’s less certain that governments will control artificial intelligence, simply because the benefits of letting AI run things are probably irresistible despite the known dangers.”[183] (Source: MarTech Advisor)

AI deployment in the healthcare sector may be a welcome development. “The survey by not-for-profit health fund HCF found 93 per cent of Tasmanians — compared with 80 per cent nationally — were comfortable with artificial intelligence being used to diagnose common medical problems and interpret test results. More than 64 per cent said they were comfortable with AI prescribing treatments.”[184] (Source: The Courier Mail)

Roughly half of supply chain and logistics professionals said they believe AI will provide their companies with a competitive advantage. The technology, meanwhile, is operational. “Some supply chain software already has the capability to compare multiple scenarios side-by-side and make recommendations on which course of action may be the best. Add in the ability for that same software to connect and share data with the smart machines on the manufacturing floor, and you may be left wondering if your role in supply chain is about to become obsolete.”[185] (Source: 21st Century Supply Chain)

Prototype autonomous cars are vulnerable to hackers, malware and viruses, raising concerns about their viability. “Over the last year, research has shown that connected cars can be hacked and controlled remotely -- the researchers achieved this by exploiting a zero-day vulnerability they found in the car's computer system.”[186] To persevere, the industry must become committed to “security-by-design from the start of development.”[187] (Source: CIO Today)

Electric cars and services like taxi apps, dubbed ride-hailing service apps, will accelerate development of autonomous vehicle systems and could reportedly “turn transportation into a service.”[188] The technology is swiftly evolving, and headlines

from CES and the sector reveal the optimism of developers and manufacturers. Granted, infrastructure improvements are required. But the revolution may first become apparent in mass transit services. “Danny Shapiro, senior director of automotive at chip maker Nvidia, says shuttle buses and similar transit are likely to be the first fully autonomous electric vehicles, because they operate under a limited range of conditions, on predictable routes and often on private property.”[189] (Source: Wall Street Journal)

Displacement and disruption to the workforce by AI and automation will force individuals to take on new skills or sink in a declining job market, Jonas Prising, ManpowerGroup Chairman & CEO, said. “It's time to take immediate action to upskill and reskill employees to address the gaps between the Haves and the Have Nots – those that have the right skills and those that are at risk of being left behind. We also need to draw in those that are not fully participating in the workforce. That's what we mean by the emergence of a Skills Revolution.”[190] (Source: PR Newswire)

## January 17, 2017

AI, like predecessor advances in technology, is needlessly perceived as a threat to workers. History reveals that many technological advances were at the time seen as dangerous or even as harbingers of an impending doomsday. And those views weren’t substantiated then, nor will they be now. Therefore, much fear of AI is wasted energy. “While some jobs will be taken over by AI, it will also open up opportunities for workers to take on new roles, just as cash registers removed the need for cashiers who could do arithmetic all day. For most of us, artificial intelligence will improve our daily work and free us from menial mental tasks.”[191] (Source: ZD Net)

Nonetheless, concerns about AI continue to be raised. It no doubt will prove to be at least somewhat disruptive, with predictable consequences. “Recent research suggests that the effects of AI in the short- and medium-term will be similar to those of IT. Lower skilled workers face the biggest threats from AI-based automation, while higher-skilled workers stand to benefit most from the new kinds of jobs that AI might create.”[192] (Source: Wall Street Journal)

And reality is, it is undeniable that the extent of the disruption and displacement, if it happens rapidly, could in fact be massive. “In the next decade, more than 50 percent of jobs in the world will be replaced by AI, ranging from translators, editors, assistants, stock traders, securities, drivers, salespeople, customer service reps, accountants, nannies and so on.”[193] Because of its talent pool and production economy, development of AI and robotics could ultimately be centered in China. (Source: Brink Asia)

Vaporization of jobs due to advancements in AI, automation, robotics and technology should be addressed now by major players in both the private and public sect, said the Hewlett Packard CEO at a confab in Davos. “Ms. Whitman said technological innovations would solve climate-change, medical and agricultural issues, but would also eliminate jobs regardless of the age and class of workers.”[194] Populist movements representing segments of the population currently underemployed or unemployed and

otherwise feeling alienated have already shaken governments from the globalist path established decades ago. Whitman warned this phenomenon could become a trend without proactive measures. (Source: Wall Street Journal)

AI and its sibling high tech advances are reshaping retail. Certain furniture retailers deploy virtual reality so "buyers can preview how furniture will look in a room."[195] Intel's Responsive Retail Platform "includes hardware and software that could take control of inventory and pass on real-time alerts to sales associates and customers in the store about what's in stock."[196] The system can alert an individual regarding a specific item being in or out of stock. Similar technologies and systems are expected to be deployed throughout the sector in the near future. (Source: ComputerWorld)

AI is also reshaping online content generation. Turns out, readability determines content performance. Therefore content marketers are deploying AI systems, such as Atomic AI, to determine the reading level of a targeted audience and assist with crafting content that will be effective. "Through artificial intelligence and machine learning, Atomic AI delivers, on average, four-times more Facebook conversions, three-times increased engagement and double the number of pageviews."[197] (Source: Yahoo Finance)

AI is more frequently being deployed in the domain of wealth management. "Technology innovations meet greatest success in business when these are entirely 'client focussed'."[198] (Source: PR Newswire)

The journal Radiology reports that AI can "predict when patients with a heart disorder will die."[199] AI software crunched the MRI scans of 256 patients along with their records, measured the "movement of 30,000 different points in the organ's structure during each a heartbeat,"[200] and thus learned "which abnormalities predicted when patients would die." (Source: BBC)

Microsoft acquired AI natural language processing tech startup Maluuba. The latter develops programs capable of deep learning and reinforcement learning. "With Maluuba's software, for example, workers at large organizations can type a request to locate an employee with specific knowledge, such as a tax-law expert. Maluuba's natural-language technology would then sift through documents, emails and corporate directories to pinpoint the best person."[201] (Source: Wall Street Journal)

Robart unveiled its Artificial Intelligence Control Unit (AICU), which can be "inserted into numerous types of robotic consumer goods" and provide "flexible and customizable robotic solution for manufacturers for robots to complete such tasks as home cleaning, home security and fetch-and-carry."[202] In a demo, an AICU-equipped robot that could be remote controlled by handheld phone learned, meaning taught itself, not to vacuum up LEGOS or make contact with breakable objects. (Source: PR Newswire)

Sogou Search unveiled a machine translation search engine that will "help Chinese who are not proficient in English search and read medical, scientific and cultural information all over the world."[203] The engine is described as "a type of artificial intelligence

machine translation engine based on 'end-to-end neural machine translation' (NMT) technology."[204] (Source: PR Newswire)

## January 18, 2017

At the Davos confab an IBM chief executive said AI will not vaporize jobs at a dramatically disruptive rate. "Ms. Rometty acknowledged some jobs will become obsolete because of AI. History, though, has demonstrated that technological breakthroughs lead to new employment opportunities, she said."[205] (Source: Wall Street Journal)

Robotics and AI could technically only fully automate roughly "5% of all occupations."[206] Productivity will go up and workers will likely have to learn new routines or fill different positions. "Employers should start retraining workers now, investing in skills development that gets employees used to constant learning on the job, said Ellyn Shook, Accenture's chief human resources officer."[207] (Source: Wall Street Journal)

Nonetheless, other Davos confab attendees issued vague warnings. One suggested the education system needed to be overhauled to crank out job creators instead of the job seekers it currently shapes. Meanwhile, political leaders have pointed out that sustained substantial job market disruption could lead to societal upheaval. Others at Davos reportedly remained optimistic. "Bob Moritz, CEO of professional services firm PwC, struck a hopeful note. Based off his conversations with CEOs, companies will always be in the market for what robots cannot provide, Moritz said."[208] (Source: CBS News)

Companies considering adopting and deploying AI technologies should take initial steps to prepare beforehand. "The first step is to understand the common denominator of all AI technologies. They all rely on massive amounts of data. The good news is that companies collect data at a rapid pace and in amounts that are growing year over year. The bad news is that the quality of data is not meeting the needs of most AI technologies. Accuracy, completeness, relevance, consistency, reliability and accessibility are aspects of data that are a huge challenge for any company."[209] Step two is bring the enterprise resource planning system up to speed so it is AI-ready. Third, "cross-functional integration is a prerequisite to optimize business processes to a world-class level, however many companies are still optimizing their verticals. A cultural change has to happen first."[210] (Source: CIO)

Retailers can deploy AI-empowered robots, like Softbank Robotics' Pepper, a small droid, in the store or elsewhere to coddle customers and secure sales. "Demonstrators offered several possible use cases for Pepper: Retailers could position her at an endcap — the eye-catching display at the head of an aisle — or in a specialty department, where she could answer questions about a featured product. Or she could help you identify which shoes you might want to buy based on what your priorities are. On a budget? She'll steer you toward the cheapest pair. Like to be comfortable? She'll

suggest a functional pair of sneakers."[211] Other high tech solutions, like AI salesman chatbot apps, on handhelds or on stations within the store, provide relative low cost options for venders seeking to personalize a customer's shopping experience and otherwise optimize operations using technology. "Philips Lighting demonstrated a technology called visible light communications, or VLC, in which store lighting can be used to pinpoint your precise positioning and facing within an aisle of a store."[212] How disruptive the abovementioned technologies will be to retail sector workers is debatable. (Source: The Washington Post)

Healthcare AI solutions provider Forward "will offer concierge medicine for yuppies: pay a flat $150 a month and get unlimited access to your doctor, in the office and via the company's mobile app. The special sauce, says Mr. Aoun, is artificial intelligence, taking the copious amounts of data the company hopes to collect on its patients and feeding it through machine learning algorithms on the back end to make better diagnoses and offer more effective medical recommendations."[213] Enrollees sign up and then are scanned by a body scanner for the first round of data collection. Additional data is taken on a number of metrics, giving the system your baseline readings. The software system will then reportedly be able to routinely assess your health, recommend treatment and calendar appointments with partnering healthcare providers. Similar services are offered by One Medical Group. (Wall Street Journal)

Games provide an arena in which self-learning and AI technology can be tested. "By gauging the system's ability to conquer game tasks, (AI researchers) are able to more accurately assess how successful a system will be at providing solutions for real-world challenges. As the complexity of the games they conquer increases, so does their ability to solve real-world problems."[214]

The cloud will likely obsolete corporate data centers shortly after 2025, as companies close their on-premise computer banks in favor of remote ones maintained by third parties. "Oracle Corp. co-CEO Mark Hurd said Tuesday that the company expects 80% of corporate data centers to disappear by 2025 as the cloud becomes the primary way that information technology is deployed."[215] (Source: Wall Street Journal)

Business analytics firm SAS reported survey results revealing that of the companies that have invested in "big data" technologies, only "33 percent say that they have derived value."[216] (Source: PR Newsire)

Markets research firm MarketsandMarkets reported the geospatial analytics market is projected to grow "from USD 30.71 Billion in 2016 to USD 73.91 Billion by 2021, at a CAGR of 19.2% from 2016 to 2021."[217] (Source: PR Newswire)

Medasense Biometrics Ltd. received CE mark approval for Pain Monitoring Device, PMD200, which "quantifies patients' physiological response to pain. The easy-to-use system consists of a non-invasive finger probe which acquires physiological signals from four different sensors and calculates dozens of pain-related physiological parameters. This data is then analyzed by artificial intelligence algorithms and

converted into a single pain index, the Nociception Level (NOL) index, where 0 = no pain and 100 = extreme pain."[218] (Source: PR Newswire)

The Federal Trade Commission sued chipmaker Qualcomm for alleged monopolization of production of certain cellphone chips. "Qualcomm, which holds patents on essential cellular technologies, won't sell its processors unless a customer agrees to the company's preferred patent-licensing terms, which force phone makers to pay elevated patent royalties to Qualcomm when they use a competitor's chips, the FTC alleged."[219] (Source: Wall Street Journal)

## January 19, 2017

China perhaps leads the world in development of supercomputers, sounding alarms elsewhere, considering the ultimate prize for the winner of the ongoing artificial intelligence technology arms race is entirely unknown but anticipated to be crucial. "Last year, the country unveiled the world's fastest supercomputer, the Sunway TaihuLight (above). This year, according to state news agency Xinhua, the government has set its sights on completing the world's first prototype exascale computer; a machine capable of making a billion, billion calculations per second."[220] Sources reported a prototype will be complete before 2018. "[It] will be 200 times more powerful than the country's first petaflop computer Tianhe-1, recognized as the world's fastest in 2010."[221] (Source: The Verge)

The so-called Fourth Industrial Revolution could leave a "larger part of humanity behind than in any other industrial advance,"[222] as automation vaporizes white collar jobs. "According to a survey of 18,000 employers in 43 countries by employment consultancy ManpowerGroup, up to 45 percent of tasks done daily in the workplace could be automated using current technology. For its part, global consultancy McKinsey said more than 60 percent of jobs and 30 percent of business activities could be automated today."[223] (Source: New Indian Express)

Accordingly, many executives say learning machines and AI could "eventually end up creating more new jobs than they displace, and raise overall prosperity, as have past waves of industrialization. But some said this week that they also worry the spoils of the next revolution could be inequitably shared—and that the transition to new models of work could be brutal for many workers."[224] Microsoft's CEO reportedly said "businesses should be looking at new social models to avoid social unrest or burdensome regulation."[225] (Source: Wall Street Journal)

Indeed, one thing that executives familiar with the topic could be said to agree on is companies, especially manufacturers, but also those dealing with information products, data and IT, should begin training and prepping workers now for various possible disruptions. Many already are. "A large majority of the businesses surveyed plan to invest in skills development for their workforces. In 80 percent of the cases where companies are replacing roles with AI, they are hanging onto those workers by

redeploying or retraining them, the study found. This varies by industry, led by fast-moving consumer goods (94 percent); aerospace and automotive (87 percent); energy, oil and gas (80 percent); and pharmaceutical and life sciences (78 percent). Geographically, China expects to make the greatest in its workforce (95 percent)."[226] (Source: Automation World)

Automation could vaporize bank profits and displace workers in that sector. "McKinsey & Co., in a report this week, argues that up to $45 billion of bank profits could be wiped out by 2020 thanks to encroaching automation, ranging from electronic trading to mobile banking." Financial sector players have been investing in AI and automation at a rate double that of the average company in other sectors. Reportedly, as the sector further deploys automation, fees charged will drop, hitting profits. Presumably those fees are for functions that can and soon will be automated. (Source: Wall Street Journal)

Seven of ten consumers polled said they prefer AI chatbots, robo-advice or AI analytics products over the human and human-generated equivalent "for their banking, insurance and retirement planning, according to a new report by Accenture."[227] A large number said they prefer humans for helping with more complex issues. (Source: PR Newswire)

Players within the pay-per-click marketing sector should adopt AI and automation incrementally, in phases, to insure that the technology performs correctly, transparently, and so unforeseen challenges can be mitigated with minimal impact. "As an industry, we should follow the lead of the auto industry and develop a clear framework for talking about levels of automation. If we fail to be open and transparent and set clear expectations, mistakes will happen that will decrease PPC managers' trust in technology, and this can cause rates of adoption of amazing advances to decelerate."[228] (Source: Search Engine Land)

IBM's Jeapordy champ-trouncing AI system, Watson, is reportedly the brains behind a recent targeted digital campaign by Toyota. "The agency wanted to connect the Toyota's Rav4 crossover to the favorite activities of individual consumers, but in an unpredictable way. So Saatchi fed Watson the world's top 1,000 activities -- like biking, dancing and cooking -- and asked Watson to pair two activities that had low probabilities of being matched. The agency then used the pairings to create 300 unique videos, which are being targeted at users on Facebook and Instagram."[229] (Source: Ad Age)

A new patent reveals Amazon is developing autonomous vehicle solutions technologies. "The patent, filed in November 2015 and granted on Tuesday, covers the problem of how to deal with reversible lanes, which change direction depending on the bulk of the traffic flow. This type of lane is typically used to manage commuter traffic into and out of cities, particularly in the US."[230] The company has reportedly long been rumored to be developing autonomous vehicle solutions for delivery of products ordered on its online platform. (Source: The Guardian)

The Army could use a relatively big unmanned aerial vehicle (drone) to deliver goods

to troops in a warzone. The drone, referred to as a hoverbike, looks something like a cruiser bicycle on its side and "could eventually carry 800-pound payloads at speeds of 60 mph, with a range of up to 125 miles. (T)he ARL team hopes to demonstrate full autonomy with the JTARV soon. However, there's no indication of when it might actually be used in combat."[231] (Source: The Verge)

The Council of Fashion Designers of America and professional services company Accenture announced co-plans to integrate high technology into the council's business practices, including plans to leverage AI "and mixed and virtual reality from Accenture Labs to bring customer engagement to the next level."[232] Announced expected deliverables "range from enhanced research to physical prototypes, with the benefit of collaboration and input from Accenture."[233] (Source: BusinessWire)

Corporations will migrate their IT operations to the cloud at a swift clip, but not as aggressively as some have previously estimated. "The downward revision largely reflects tighter IT budgets at European firms, which are expected to grow by an average 2.6%, down from 3.7% last year."[234] (Source: Wall Street Journal)

## January 20, 2017

AI technician and developer jobs could be vaporized by automation and AI, as systems learn to research and develop systems. "In one experiment, researchers at the Google Brain artificial intelligence research group had software design a machine-learning system to take a test used to benchmark software that processes language. What it came up with surpassed previously published results from software designed by humans."[235] Similar programs proved successful at OpenAI, MIT, the University of California at Berkeley, and Google's DeepMind. "Jeff Dean, who leads the Google Brain research group, mused last week that some of the work of such workers could be supplanted by software. He described what he termed 'automated machine learning' as one of the most promising research avenues his team was exploring."[236] (Source: MIT Technology Review)

Researchers at Northwestern University developed a computer system that "outperforms the average American adult in a standard intelligence test."[237] The system, called CogSketch, is able to solve visual problems, as was most recently proven by its performance on the standardized test Raven's Progressive Matrices. "The researcher's AI system performed extremely well on the test, placing in the 75th percentile of American adults. What's more, the places where the AI stumbled are also spots where human test takers have gotten stuck."[238] (Source: BGR)

AI is ripe for deployment in the healthcare sector. "AI can be applied today to clinical decision support, length of stay predictions, OR scheduling, natural language processing such as virtual assistants, robotics for materials transport, research data mining and analytics, as well as pattern classification for tasks such as tumor detection, according to Kenneth Kleinberg, managing director of research at the Advisory Board."[239]

Hospitals that hold out could miss opportunities or lose a potential competitive advantage. (Source: Healthcare IT News)

Globally, the healthcare "natural language processing market is expected to be worth US$4.3 bn by the end of 2024 as compared to US$936 mn in 2015. During the forecast years of 2016 and 2024, the global market is projected to rise at a CAGR of 18.8%."[240] (Source: PR Newswire)

Financial house ME will deploy AI this year. "(T)he bank would be feeding data into the Microsoft Analytics Platform System, a big data analytics appliance that it purchased last year to gain further insights. ME regularly purchases evaluation, credit and behavioural data to help automate decision-making."[241] The goal is reportedly to improve the customer's experience. (Source: CIO)

Google's CEO said at the confab in Davos that AI development, once a skunkworks op, now touches every piece of its business. He described the rise of AI as a "revolution" that has been "very profound" and surprising.[242] (Source: Chicago Tribune)

Davos confab attendees reportedly got a shot at training a computer with morality. "Participants were asked to train a super-advanced machine learning algorithm to decide between various social and moral dilemmas. These dilemmas reflect the hard decisions that society will have to make in the 21st century, in a way that a computer can understand." Reportedly most preferred investing in human capital over automation, most preferred supporting organic agriculture over space programs, and most preferred bio-safety over biotechnology research. (Source: PR Newswire)

A Chinese chipmaker will build a $30 billion memory chip factory in China, to "diminish its dependence on U.S. chip manufacturers."[243] (Source: Wall Street Journal)

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