Rise of the machines: Are robots after your job?

// About Job

Rise of the machines: Are robots after your job? Tarafından: Chahal, Mindi, Marketing Week (Online Edition), 1/12/201

**Should marketers fear for their jobs or embrace the rise of artificial intelligence and machine learning, so they can adapt now and stay relevant in the future?**

It has been predicted that machines will eventually overtake **human** **intelligence** thanks to the advancement of computer power and increase in data collection. But while fears that robots will one day wipe out the **human** race might be extreme and distant, the rise of **artificial intelligence** (AI) does have the potential to disrupt brands and those working within them in a far more immediate way.

So does that mean marketers jobs are at risk, and that a new way of thinking is required in order to adapt to this transformed employment market?

Programmatic buying and other automated techniques are already having a huge effect on marketing efficiency and the way the industry operates, and marketers at all levels now need to consider how AI and machine learning might affect their roles.

As Bank of England Governor Mark Carney stated in December last year, we are "in the midst of a technological revolution" that will "**destroy** jobs and livelihoods well before new ones emerge".

'Intelligent agents' or AI will **destroy** 6% of all jobs in the US by 2021, according to research by Forrester, which shows the biggest effect will be felt in transportation, logistics, customer service and consumer services. A study by Oxford University suggests the top five jobs at risk of automation are loan officers, reception and information clerks, paralegals, retail salespeople and taxi drivers and chauffeurs.

A separate study by Oxford University and Deloitte at the end of 2015 suggests that for marketers specifically the risk is less pronounced. For 'marketing associate professionals', it is fairly unlikely (33%) that their jobs will be automated over the next 20 years and for 'marketing and sales directors' it is very unlikely (1%).

Meanwhile, a poll of 800 senior marketing and sales professionals across the EMEA region, conducted by Oracle, shows the use of emerging technologies is set to surge by 2020.

It reveals that 78% of brands expect to provide customer experiences through virtual reality in the next four years, while 80% of brands will be using chatbots for customer interactions by 2020. It also finds that 48% of brands have implemented automation technologies in sales, marketing and customer service, with another 40% planning to do so by 2020.

[**Need for experts**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

But rather than **destroy** the need for a **human** workforce, there is an argument that the move towards automation will simply create new and different jobs.

And as technology use grows so does the need for experts on that technology. For a marketing professional, understanding how and when to use automation tools and managing these will be a big part of the role in the future.

"These things don't **destroy** jobs, they just change what jobs are needed," says Larry Kotch, co-founder of Brainbroker - a startup aimed at helping brands blend technology and talent. Instead, he says it "pushes people into the managerial, consultative and search function rather than the implementation function".

Brainbroker acts as a consultancy, matching the latest software-as-a-service (SaaS) and marketing tools with clients looking to use the capabilities those tools offer.

Kotch says that although "people say marketing automation is taking jobs, the sheer number of these tools is warranting consultants for the tools themselves". Since hundreds of tools are launched each year, he says there will be a "premium on having a **human** tell you what you should be using based on a specific use case".

Kotch also believes that the onus is on the people in those jobs to "get a monopoly on how [tools] work" so when the transition happens, "they are the best placed people to take that forward and pioneer new roles".

He adds: "There's going to be an element on shifting rather than deletion of roles. The quicker you can get on top of this world, the more likely you will profit personally."

Tech entrepreneur Jeremy Hindle, who co-founded entry-level recruitment app Headstart together with Oxford University student Nicholas Shekerdemian, agrees and says it is "not something people should be afraid of". He advises anyone who is nervous about the effects of AI to read up on the subject and look into improving their technical skills.

He adds: "I'm not talking about the need to be amazing at programming, [but] reading around topics so they can understand concepts and feel more comfortable and position themselves in their roles as things develop - be engaged with what is going on."

For younger generations it is also about education, according to Avril Murphy, vice-president of sales EMEA at Neato, which designs robots for the home. She says: "We are seeing four- and five-year-olds learning how to program - that is the way forward because you are already developing the skill set."

[**AI in customer-facing roles**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

Yet despite the scope for professionals and knowledge workers such as marketers to adapt their roles to technology, many examples of automation and AI-based services replacing humans already exist and are making headlines, particularly in customer service functions.

So even if marketers can adopt tactics to survive the encroachment of automation onto their roles, they will still have the headache of working out where **human** employees are needed within the areas they are responsible for, and where these can be dispensed with in favour of AI.

Last year, Uber acquired an AI startup, as the race to launch driverless cars accelerates; Amazon tested the 'Amazon Go' store concept, which allows people to grab items and leave, with the products charged to their Amazon account on exit; and Starbucks let customers order a coffee via a chatbot. All are potential future replacements for tasks performed by humans.

Google Home and Amazon Echo virtual assistants also made an appearance in 2016 as part of a growing trend towards internet-connected homes. Intelligent virtual assistants provide information, add events to personal calendars, control other internet-connected services in the home such as heating, and can place orders on other websites.

The workplace upheaval that AI brings is being lauded as the fourth industrial revolution but experts warn that the upheaval and disruption could be like nothing we have seen before.

"AI and machine learning is a different beast," says Kotch at Brainbroker. "It will be foolish to say it will follow that same trend that it did with the industrial revolution, computers and the internet."

He says: "It is something different and far more worrying in terms of just how much it can replace a **human**'s job."

The fact AI is not yet replacing professional jobs such as marketing roles at scale means businesses and their workforces have some time to think about how their company should operate and what the jobs of the future look like. Retaining a **human** control element to automated processes may be one key step.

[**Controlling the effect on jobs**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

Harry Armstrong, senior researcher of technology futures at innovation foundation Nesta, focuses on researching the effects and implications of potentially disruptive technologies and believes that people can have control over how technological automation impacts jobs.

"One thing that is forgotten every time this automation conversation comes up is how much control we have on the design of jobs and the tasks within the jobs," says Armstrong. Although repetitive jobs can be automated, the decisions affecting those processes may still require **human** input. He therefore advises the designing of jobs that require more task discretion rather than repetitive tasks.

When industries create totally automated systems, employees are quickly forced to conform and therefore the "narrative that we have control of, what those jobs will look like and what they do" is lost, argues Armstrong.

In some sectors a mix of automation and **human** interaction will be vital to how those products or services are received. It is the effect on the end result that matters the most rather than the technology, according to Rurik Bradbury, global head of research at messaging service LivePerson.

The company believes that bots are not ready to be the primary customer service agent, meaning customer service jobs are not redundant yet but will change.

"Brands that have tried bots have forgotten that consumers don't care [whether it's a] bot or not, they just want to get customer service," says Bradbury. "They treat bots the same way as an agent; they are either happy or unhappy."

He advises a "hybrid of bots" where "you have humans behind the screen but you can scale up their effectiveness and how much they can accomplish selectively". For example, simple tasks such as updating an address or a credit card, occasions where there is not much chance of a misunderstanding, can be done by a bot.

This gives customer service representatives the time to tackle the more open-ended or difficult problems and means customers do not have a bad experience with the bot or the **human**.

Headstart also requires a hybrid of machine learning and **human** input. The job app uses machine learning algorithms for a matching system that considers personality, interests, skills and demographic background, as well as traditional criteria such as qualifications and experience - asking students applicable questions using an AI-powered chatbot.

Hindle at Headstart says the **human** input on recruiting is a requirement because the algorithm learns based on how recruiters hire. He says: "That will always be the case because **human** factors and culture change and therefore no matter how good your machine learning algorithm gets it has to learn more - and for it to learn it has to have a positive response that it got it right."

[**Consumer uptake**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

The majority of the disruption that AI will cause depends on how the people using AI-powered products react. Pictures of Terminator-style takeovers often accompany the headlines surrounding the use of robotics and machine-based services so there is a certain amount of fear attached.

US-based Neato sees some resistance to its robot vacuum cleaners, particularly in the UK "where [Britons] haven't embraced the technology as much", according to Murphy.

"The UK has the lowest penetration of dishwashers in Europe, so it could be a pride thing about not being a big deal to do your own washing up or vacuuming," she says.

We need to do a better job of marketing and communicating because [people] have this perception and fear factor of having a robot in their home and [whether] they're opening up their door to something that is going to be detrimental in the long term."

AI-driven investment advisor Munnypot's co-founder Simon Redgrove believes people will embrace its offer as they did online banking. The service was created because its founders believed existing auto-advice services were too robotic and wanted to create a more natural experience.

Consumers can use the service to answer questions about their life goals and can interact with different scenarios to understand how their finances could be affected by different decisions. "I've heard bad feedback and fear [about] using services like that but we are not experiencing that with ours," says Redgrove.

He adds: "Robo-advisors have demonstrated that you can get the guidance you need; it's subjective and not biased. People embrace it in the same way they do online banking and [it will be] interesting to look at [customer behaviour towards AI] in 12 or 18 months time."

[**The onus of reskilling**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

For those already in the jobs that are being automated, it is down to individuals to adapt to change, but also to be aware that "it's not going to happen overnight", Neato's Murphy says. "Not every taxi driver in London has to fear for their job. Other opportunities are going to emerge. There will be more opportunity in manufacturing or development that will attach around automation and AI."

Armstrong at Nesta does not believe the onus on reskilling is as straightforward. He says: "There isn't really a clear understanding of whose responsibility it is - the industry, the state or a personal responsibility."

He adds: "If we are about to see a big disruption or at least continued change from technology, those are the questions we need to start answering now, coming up with plans for processes and structures to deal with them."

It is not just self-driving cars and stores without cashiers that will have an effect on job losses. The biggest problem is digital technology, according to Alex Warren, senior account manager at technology PR agency Wildfire and author of Technoutopia, which looks at the negative effects of digital disruption on society.

He says that although Google is seven times the size of General Motors, it hires less than a quarter of the number of workers; WhatsApp is worth $19bn (£15.4bn) but has 55 employees; and Instagram was worth $1bn (£811m) when Facebook bought it and had around 12 employees at the time.

The danger is that digital applications are becoming increasingly "influential in our lives" but "don't have to play by the same rules as traditional companies," says Warren.

He says technology companies are "not job creators but job destroyers" and are "creating a massive wealth divide of a handful of billionaires and an army of people on zero-hours contracts, working in a gig economy or not working at all".

Warren believes that the world has got "trapped in the idea that technology is always progress - it's technological determinism". He adds: "[It's] the idea that if something is new and is technology-based, it is automatically progress. We can't stop it, there is nothing we can do about it, we just have to accept that fact."

[**A realistic timeline**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

Technological advances will continue and while the effects of that progress are becoming clearer, the speed at which it will happen is not. Getting a clear timeline depends on breakthroughs that could happen in a couple of years or a few decades.

Armstrong at Nesta predicts a "subtle shift rather than a sudden disruption" in terms of a timeline for change.

"It may be more of a problem in the short term than the long term," explains author Warren. "In the short term there is going to be a massive wealth divide that will happen as a result, there will be job cuts. There will be lots of cheap goods and services, which is great, but it will have a knock-on effect."

Warren also predicts a generational divide where those growing up in a digital world will not want the jobs that are being disrupted. He says: "[Young people won't] grow up wanting to be a driver. Obviously those jobs are going and we're not going to miss them."

[**What does AI mean for marketing jobs**](http://0-eds.b.ebscohost.com.divit.library.itu.edu.tr/eds/detail/detail?vid=19&sid=6d5c72af-173c-4e8f-807d-d8a1a09e1812%40sessionmgr120&bdata=Jmxhbmc9dHImc2l0ZT1lZHMtbGl2ZQ%3d%3d#toc)

* Roles that involve a high level of social **intelligence** and original ideas are less likely to be replaced by machines.
* Adding in an element of **human** control to decision making will ensure marketers do not relinquish all responsibility to **artificial intelligence**.
* The move towards automation will free up time to spend on other, more strategic areas of business.
* The introduction of new tools and automated processes will change the job role; adapting now will allow marketers to lead the way.
* Machine learning requires **human** input, so there will be a demand for experts in specific areas to work with technology rather than against it.
* The creativity and business understanding required in marketing roles means they are relatively safe from being replaced, although purely executional roles, for example in media buying may be more vulnerable.

Time to ensure robots do not rule the world Southland Times, The, 01129910, Dec 09, 2014

## Time to ensure robots do not rule the world

// Elon musk , S. Hawking quot..

Time to ensure robots do not rule the world Southland Times, The, 01129910, Dec 09, 2014

**Edition: 1, Section: FEATURES--NATIONAL, pg. 6**

The experts run the whole gamut from A to B, and they're practically unanimous: **artificial** **intelligence** is going to **destroy** **human** civilisation.

Expert A is Elon Musk, polymath co-founder of PayPal, manufacturer of Tesla electric cars, creator of Space X, the first privately funded company to send a spacecraft into orbit, and much else besides. "I think we should be very careful about **Artificial** **Intelligence** (AI)," he told an audience at the Massachusetts Institute of Technology in October. "If I were to guess what our biggest existential threat is, it's probably that."

Musk warned AI engineers to "be very careful" not to create robots that could rule the world. Indeed, he suggested that there should be regulatory oversight "at the national and international level" over the work of AI developers, "just to make sure that we don't do something very foolish."

Expert B is Stephen Hawking, the world's most famous theoretical physicist and author of the best-selling unread book ever, A Short History of Time . He has a brain the size of Denmark, and last Monday he told the British Broadcasting Corporation that "the development of full **artificial** **intelligence** could spell the end of the **human** race".

Hawking has a motor neurone disease that compels him to speak with the aid of an **artificial** speech generator. The new version he is getting from Intel learns how Professor Hawking thinks, and suggests the words he might want to use next. It's an early form of AI, so naturally the interviewer asked him about the future of that technology.

A genuinely intelligent machine, Hawking warned, "would take off on its own, and re-design itself at an ever increasing rate. Humans, who are limited by slow biological evolution, couldn't compete and would be superseded." So be very, very careful.

Musk and Hawking are almost 50 years behind popular culture in their fear of rogue AI turning against **human** beings (HAL in 2001: A Space Odyssey). They are a full 30 years behind the concept of a super-computer that achieves consciousness and instantly launches a war of extermination against mankind (Skynet in the Terminator films).

Then there's The Matrix, Blade Runner and similar variations on the theme. It's taken a while for the respectable thinkers to catch up with all this paranoia, but they're there now. So everybody take a tranquiliser, and let's look at this more calmly. Full AI, with capacities comparable to the **human** brain or better, is at least two or three decades away, so we have time to think about how to handle this technology.

The risk that genuinely intelligent machines which don't need to be fed or paid will eventually take over practically all the remaining good jobs - doctors, pilots, accountants, etc. - is real. Indeed, it may be inevitable. But that would only be a catastrophe if we cannot revamp our culture to cope with a great deal more leisure, and restructure our economy to allocate wealth on a different basis than as a reward for work.

Such a society might well end up as a place in which intelligent machines had "**human**" legal rights, but that's not what worries the sceptics. Their fear is that machines, having achieved consciousness, will see humans as a threat (because we can turn them off, at least at first), and that they will therefore seek to control or even eliminate us. That's the Skynet scenario, but it's not very realistic.

The saving grace in the real scenario is that AI will not arrive all at once, with the flip of a switch. It will be built gradually over decades, which gives us time to introduce a kind of moral sense into the basic programming, rather like the innate morality that most **human** beings are born with. (An embedded morality is an evolutionary advantage in a social species.)

Our moral sense doesn't guarantee that we will always behave well, but it certainly helps. And if we are in charge of the design, not just blind evolution, we might even do better. Something like Isaac Asimov's Three Laws of Robotics, which the master laid down 72 years ago. First Law: A robot may not injure a **human** being or, through inaction, allow a **human** being to come to harm. Second Law: A robot must obey the orders given to it by **human**beings, except where such orders would conflict with the First Law. Third Law: A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

Not a bad start, although in the end there will inevitably be a great controversy among **human** beings as to whether self- conscious machines should be kept forever as slaves. The trick is to find a way of embedding this moral sense so deeply in the programming that it cannot be circumvented.

As Google's director of engineering, Ray Kurzweil, has observed, however, it may be hard to write an algorithmic moral code strong enough to constrain and contain super- smart software.

We probably have a few decades to work on it, but we are going to go down this road - the whole ethos of this civilisation demands it - so we had better figure out how to do that. Gwynne Dyer is an independent journalist whose articles are published in 45 countries.

# **The Caliphate of numbers**

// Hem referans kaynaklar hem kendisi etik, gender, race ile ilgili..

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Abstract:

##### **Purpose**

The purpose of this paper is to catalogue the various ways in which algorithm-driven decision-making now permeates myriad fields of human activities from insurance through criminal justice to hiring and employment and suggest that this diffusion represents a qualitatively new level of reputation threat for organizations in every industry.

##### **Design/methodology/approach**

The author uses an audit of numerous secondary sources to identify common themes and distinctive impacts of the uses of algorithms.

##### **Findings**

This research determined that perverse and unintended consequences of the spread of algorithm-driven decision-making were pervasive.

##### **Research Limitations/implications**

Based on a review of secondary resources, data on the impact of the algorithms is of necessity primarily anecdotal.

##### **Practical Implications**

The research shows that the pervasive inequities produced by algorithm-driven decision-making represents a very significant reputation risk and a potential flashpoint for many different organizations.

##### **Social Implications**

If algorithm-driven decision-making indeed entrenches racism and other inequities, it is critical for society that we find an effective way to regulate their use.

##### **Originality/value**

While considerable attention has been devoted to individual instances of inequities produced by algorithm-driven decision-making, we believe this is one of the first reviews to look across the spectrum of applications from a reputation risk perspective.

Keywords:

[Machine learning](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Machine+Learning), [Racism](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Racism), [Algorithm](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Algorithm), [Artificial intelligence](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Artificial+Intelligence), [Inequity](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Inequity), [Reputation risk](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Reputation+Risk), [Gender bias](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/keyword/Gender+Bias)

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### **Article**

Ninth-century polymath Muhammad ibn Mūsā al-Khwārizmi is enjoying his moment in the sun. But who knows what Al-Khwarizmi, known as the father of algebra and the decimal numbering system, would have made of the twenty-first-century impact of the algorithm, the mathematical tool that took his name ([Brezina, 2005](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). Everywhere one looks, from e-commerce to ride sharing platforms, the algorithm rules supreme. It dictates medical care, prison sentences, job seeking, remote welfare eligibility, even the growing practice of predictive policing. With the explosion of data from the internet of things, the algorithm, a set of instructions for automated decision-making, has metastasized across practically every area of human life.

There are many reasons to celebrate the increasing reliance on evidence-based decision making that the algorithm makes possible. Faced with a difficult medical diagnosis, most people would prefer that it be based on the evidence of thousands of similar cases rather than on the experience of one doctor ([Winters-Miner, 2014](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). Machine learning and artificial intelligence, love children of the humble algorithm, have simplified and streamlined a vast range of processes across human society, from finding companionship to avoiding a predatory plumber.

An increasing number of voices are being raised, however, suggesting that algorithm-enabled automated decision-making, rather than compensating for the frailties of human judgment, actually drives those frailties underground, amplifying the effects of human prejudice, ignorance and fear ([Angwin, 2016](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). They argue, with growing concern, that the assumptions encoded in mathematical formulae simply reproduce the injustice and inequity of the real world but in a language inaccessible to correction or mitigation. As automated decision-making enters new spheres at a rapid pace, we need to develop new ethical tools and standards to foster the positive impact of Muhammed ibn Mūsā’s legacy and mitigate the many forms of potential harm.

One of the more problematic uses of the algorithm is its use in a number of US states in helping judges assess the length of prison terms for convicted felons. As documented by [Angwin *et al*. (2016)](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098), a reporter for ProPublica, “risk scores” developed by Northpointe, a private company, are being used by judges in Illinois to determine a convicted offender’s potential future criminality and therefore the length of the sentence and eligibility for parole. These scores are now also provided to judges in advance of sentencing in Arizona, Colorado, Delaware, Kentucky, Louisiana, Virginia, Washington and Wisconsin. ProPublica’s analysis found that these risk scores were highly unreliable in predicting future criminality. Their study also determined that the “formula wrongly labeled black defendants as future criminals at almost twice the rate as white defendants”. In spite of the fact that the scores were supposed primarily to determine what types of treatment an offender might need, judges are inevitably using them to determine sentences, as at least one judge has readily admitted. These evolving practices present a clear challenge to fundamental principles of both law and ethics effectively undermining the presumption of innocence.

Algorithms are also becoming universal in the world of employment. This is not news to job seekers and there are dozens of articles purporting to teach them how to “outwit the robots” ([Perman, 2012](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)) including such gems as plucking keywords from job listings and eschewing all formatting and picking a machine-friendly font such as Arial or Times New Roman. Behind this relatively benign sounding contest between man and machine, however, is a much more troubling reality, namely, that the assumptions baked into these resumé reading algorithms actually perpetuate disadvantages for women and minorities. One concern already surfaced by recruitment algorithm company Evolv is the use of commuting distance as a criterion for hiring customer service workers (Peck, 2012). Since different towns and neighborhoods often have distinctive racial profiles, there is an inherent vulnerability to racial bias in the use of this criterion as part of a hiring attractiveness score.

Nor is the danger solely a question of résumés inbound. A noted Carnegie Mellon study found that Google returned more executive-level salaried positions to users its algorithm deemed to be male than female ([Carpenter, 2015](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). Research from Harvard demonstrated that searches for people with names more commonly carried by African Americans returned results accompanied by ads for arrest record inquiries ([Bray, 2013](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). As Ifeoma Ajunwa of the District of Columbia Law School points out, standardized test scores, housing status and credit scores, all used in hiring algorithms, reflect underlying inequities in our culture and are poor predictors of fitness for a specific job or role ([Alexander, 2016](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)).

The use of big data and algorithms to customize risk in the insurance industry has also turned up some unexpected and alarming cases of new bias types. A 2014 report on social justice and technology discusses the now increasingly common practice of offering car insurance discounts to drivers willing to mount a surveillance device in their vehicles ([Leadership Conference on Civil and Human Rights, 2014](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). The data analytics behind this program reward drivers who brake smoothly, stay off the roads at night and drive infrequently. The unintended consequence of the more targeted risk allocation these data enable is that low-income workers, many of them people of color with long commutes and graveyard shifts, are penalized because the algorithm groups their behavior with that of late night party goers, who are also more likely to be intoxicated.

Nowhere is the power of the algorithm more seductive than in the emerging field of predictive policing and the attraction is understandable. By developing algorithms that deploy data on location, past crimes, temperature, time of day and proximity to certain types of facilities, police departments all over the country are increasingly able to allocate resources more effectively to prevent and mitigate patterns of crime. In Chicago, the police department has sent officers out to make house calls guided by a so-called computer-generated “Heat List” that identified people not necessarily under investigation but that the algorithm considered most likely to be the victims or perpetrators of violence [Leadership Conference on Civil and Human Rights, 2014](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). Mayor Emmanuel argues that the visits have been an effective crime deterrent, but the potential for abuse and error is clearly significant. Although FOIA requests for the data sources have been declined on the grounds that revealing the information might endanger law enforcement individuals, media reports, according to the Leadership Conference on Civil and Human Rights, have reported that the data used to generate the lists include “arrests, warrants, parole status, weapons and drug-related charges, acquaintances’ records, having been a victim of a shooting or knowing a victim […] as well as social networks”.

What the foregoing survey clearly suggests is that the risks of big data abuse are only increasing as its applications push into ever wider areas of human life but. Fortunately awareness of these risks is also increasing. In May, the [Executive Office of the President (2016)](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098) issued a report entitled “Big Data: A Report on Algorithmic Systems, Opportunity and Civil Rights”. In July 2016, New York University hosted a series of workshops under the heading “The Social and Economic Implications of Artificial Intelligence in the Near-Term” underlining the notion that the threats are real and here today, not in some imagined future “Singularity”. Participants in these and other forums are united in the belief that we need to develop better standards for validating the assumptions behind increasingly intrusive algorithms and understanding the ways in which these assumptions can create negative as well as positive outcomes in actual day-to-day use. The most frequently discussed approaches tend to fall into the following categories:

* The collection and use of public data;
* Transparency; and
* Training audits.

##### **Collection and use of public data**

Section:

In assessing the impact of public data sets in machine learning, it is important to understand imperfections in many public data sources, collected over time often for different purposes than those to which the algorithm puts them. The E-Verify program, for example, used by employers to determine the citizenship status of potential employees, is subject to a wide range of errors caused by different cultural naming conventions and its inability to stay current with changes in marital status. In one set of successfully resolved cases, according to “Civil Rights, Big Data and Our Algorithmic Future”, 94 per cent of the errors were traced to a worker having legally changed his/her name. Each error can lead to E-Verify reporting a negative finding to the employer leading to weeks of frustrating effort by the potential employee to correct the mistake. We believe that there needs to be a public and transparent process to test public data repositories for the likelihood that they will generate false outputs.

##### **Transparency**

Section:

The issue of transparency represents significant problems. Ideally, any subject of a machine-driven outcome should have the right to “cross-examine” the algorithm and the data behind it. The difficulty is that most of these algorithms are proprietary, held in private hands and licensed to commercial and public entities. In some cases, vendor contracts with algorithm providers explicitly prohibit customers from disclosing critical information about the technology. A contract with the Tucson Police Department and Harris Corporation, which manufactures “Stingrays”, a high tech device that mimics cell phone towers to snoop on mobile phones, prohibited the police department from responding to public record requests, potentially in contravention of public record laws ([Zetter, 2014](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)).

The issue of transparency is complicated by the fact that search algorithms, for example, need to be opaque to achieve their aims. As Google has justifiably maintained, if its search algorithm were completely transparent, it would be subject to extensive spamming, defeating its very purpose. Nonetheless, there needs to be some formal mechanism, perhaps in the form of a panel of jurists, to impartially assess the accuracy and equity of a given algorithmic outcome. In the [European Union (2016)](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098), some rudimentary protections have been built into Article 15 of the EU Data Protection Directive, which provides for the right to “opt out” of any decisions that are “based solely on automated processing of data intended to evaluate certain personal aspects”. The adoption of similar language in the USA would at least create a mechanism for individuals to know if they have been the subject of an algorithmic decision. Other than in the realm of credit scoring, there is currently no grievance mechanism but we believe this will eventually need to be created.

##### **Training audits**

Section:

The process of machine learning requires that an algorithm be exposed to big data sets so it can “learn” to identify meaningful patterns to create decision-making tools. This learning process is currently completely opaque, not only because the technology is itself proprietary but because the engineers have no incentive to disclose the assumptions they have built into the algorithm. Unfortunately, this is exactly where human biases and errors become encoded. Ideally, there would be an independent review process in which impartial third parties could audit the training protocols and methodology. Some commentators believe that this is a highly problematic requirement and have proposed a different test. As described by Anupam Chander in a UC Davis Legal Studies Research paper, “The Racist Algorithm?”, the only equitable and workable approach is to borrow from recent legal rulings on affirmative action and suggests the question to ask is: “does this algorithm produce inequitable or biased outcomes?” ([Chander, 2016](http://0-www.emeraldinsight.com.divit.library.itu.edu.tr/doi/full/10.1108/JBS-09-2016-0098)). If so, he says, companies should be required to apply explicit affirmative action programs to correct those outcomes.

***Summary***

With the emergence of machine learning and artificial intelligence, we have entered a new era of liability for both public entities and private corporations. Just as they have had to deal with the analog problems of redlining and hiring discrimination, they must now prepare themselves for a new world of reputation risk in predictive analytics. In the future, companies will need not only to be able to demonstrate care over customer and employee data, but also be ready to answer questions about their use or algorithms in hiring, promotion and customer relations. Picture Muhammed ibn Mūsā’s, sitting in Baghdad’s “House of Wisdom” in the hot summer of 832, as he completes his “Compendious Book on Calculation by Completing & Balancing”, the work that started the whole business. We think he would have relished the challenge.

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