



BRAINTREE

nature of intelligence

The Creation of Employment Opportunities from Artificial Intelligence

There's no getting away from it, our technology is becoming smarter. The rise in clever software is helping us make sense of the vast amounts of data we produce. It's enabling amazing new technologies based on clever abilities such as voice or image recognition. Who knew that in 2017 we would be talking seriously about driverless cars? Or computers that can recognise our faces?

This rise in clever tech has led to several reports claiming that AI and increased automation will lead to massive job losses in the future, with the majority of new jobs requiring highly skilled workers. The sweeping generalisations contained within these reports are dubious, especially on the subject of AI.

Artificial Intelligence is not the same as robotics. It is not the same as increased automation. Almost all robots today are not controlled by AI – they are industrial machines that build cars or help run our factories, and are controlled by simple step-by-step programming. Increased automation may be happening, but this has always been the trend in industry. The drive towards increased automation is not caused by AI; at most some AI may be used to make the machines work more effectively, for example vision systems to spot manufacturing defects, or safety systems in transportation to prevent accidents.

AI is smart software, nothing more or less. It lives in a digital universe of our making and only understands data. We've been making clever software since the birth of computers, and many features of the software and hardware we use every day originated in AI labs. Tomorrow's computers will have fingerprint, voice and image recognition built-in – we won't even remember that these features were once called AI.

We're all a bit more excited about AI today because there is a convergence of several technological advances. We have more computing power than ever before. We have all these computers linked together in the Internet, enabling instant access to data. We have massive warehouses full of computers (which we like to call "the Cloud") that can be instantly used for large-scale processing and storage of information by anyone. We generate more data every day, and we keep making ever more ways of making data every day. The use of Internet-connected mobile devices is commonplace, and the "Internet of Things" is now starting to mature. All of these factors are combining to produce a problem: too much data, and a solution: smart software running on powerful computers to analyse that data.

AI is therefore an enabling technology. The Internet democratised information and made it accessible for all. Artificial Intelligence democratises *understanding* and makes it available to all. AI software explains the data for us. It tells us that this information corresponds to an image of a car, or that information indicates fraud in a company, or this information suggests that a patient may be suffering from a specific medical condition. Smart software is empowering. It is the solution to information overload. AI doesn't overwhelm us with information, it provides us with answers to our questions. It tells us what we need to know.

Just as the Internet created an extraordinary new array of jobs and business opportunities, so AI is beginning to do the same. In 2017 there are hundreds of new companies that list AI as one of their key unique selling points¹ – and plenty of old companies doing the same². These are providing employment for a large number of specialists, and in some cases there are signs that entire new industries are emerging, generating jobs for all. It's tremendously hard to predict new jobs that might exist in the next decade caused by AI, but below we'll look at a few possibilities that are emerging³.

New jobs in the next decade:

Construction (all areas), Architects, engineers

New industries are emerging. Self-driving cars, drones, and e-commerce will all produce a significant need for infrastructure change. When deliveries are automated via air or road, when many of our journeys are largely handled by automated vehicles, we will need new kinds of roads with dedicated self-driving vehicle lanes, new kinds of cities, new kinds of vehicles, new factories to make those vehicles, and updated service centres to maintain them. When electricity becomes the primary power source, we'll need massive construction to extend energy networks and modify buildings and homes to become smart contributors to the energy grid. We'll also need ever more environmental scientists and engineers to help us to obtain green energy.

Courier and Delivery

We'll have a largely automated system for goods delivery in the future. It will be an efficient process for the AI algorithms will optimise the schedule, and the self-driving delivery trucks will take care of the transport. But until we build new cities and houses that allow goods to be delivered automatically to a reception bay attached to our homes (and for all those historic houses we choose not to modify) we will need delivery to our door. For the immediate future there is no mechanism better than a pair of human hands to provide that final unloading and delivery service – so we will

¹ <https://hackernoon.com/an-extensive-list-of-european-ai-tech-startups-to-watch-in-2017-bbfbbed9c9009#1cxm1xo6j>

² <https://www.theguardian.com/technology/2016/sep/28/google-facebook-amazon-ibm-microsoft-partnership-on-ai-tech-firms>

³ With the help of The US Bureau of Labor Statistics projections of the 30 fastest-growing careers, and the ManpowerGroup Employment Outlook Survey.

need an ever-increasing army of hard working delivery personnel to bring our goods to us.

Regulatory, certification and law experts

When our societies change this radically, our laws, regulations and certification need to keep up. If your automated home that you programmed locks you inside until you starve, is it your fault or the fault of the designer of the system? Should there be new regulation to prevent “suicide by smart home”? If your self-driving car injures a pedestrian is that your fault or the manufacturer of the car? Expect new testing for vehicles, new driving tests for us, and all kinds of changes to insurance policies – all of which require a lot of talented people with a good head for detail to figure it all out.

Sales and marketing

If most sales are online, how best to market new products to us? Adverts cannot portray taste, touch, smell or the fit of new clothes – or can they? Forget shelf space in shops, we will need imaginative and clever new sales and marketing people who know how to use the latest AI software to reach targeted audiences and get their products in our favourites list.

Educators

Our classrooms have to keep up with the changes in society and make sure the next generation are given the right skills for the opportunities they will face. As companies and organisations change, there is also a need for the existing workforce to be kept up to date with new skills. We need energetic and enthusiastic educators at all levels to help us.

Entrepreneurs and Business People

Hundreds of new companies are being created each year that use AI technologies as a key part of their business. Thousands more are changing their processes, making use of smarter software. It's a good time to be an entrepreneur to help build the Googles of tomorrow, or a business person who can help companies stay up to date by introducing new technologies and managing change.

Healthcare, Medicine, and Veterinary Service Providers

Many of the technologies of AI are helping medicine of all types. We now have the ability to perform and analyse scans in more detail, create computer models that predict the growth of tumours and the effects of therapies on them, and correlate specific genes with probabilities of contracting specific diseases. We're seeing an

increased use of smart home monitoring to gather information about people. Clever computer analysis helps us create targeted treatments for each patient. Smart tech will also take notes for GPs automatically, transforming their role from computer operators back to caring for their patients. In the future, we'll need ever more healthcare workers who will use and benefit from these technologies, helping more people get well and stay healthy.

Product Designers and Artists

The Internet has created an uncountable number of opportunities for new products – everything from eBook readers, to interactive computer games, to music and television on demand, to the Internet of Things. These are all massive industries worth billions. AI looks set to create a whole new set of opportunities for product designers. Self-driving cars, smart homes, automated helpdesks, immersive interactive computer games, smart health monitoring devices... we need clever product designers to think of the newest and best uses for our amazing new smart software. We also need ever more talented artists to produce content or design amazing new interfaces.

Computer and Maths-based jobs

Ultimately, AI is software, and to make it and apply it to new applications we need programmers, software engineers, analysts, information security developers, data mining engineers. There will be an almost unlimited amount of work for every possible kind of computer developer, and as AI technologies mature, there is no need for PhDs – there is plenty of existing smart code that a good software engineer can exploit.

Researchers

For every few hundred software engineers we need a few researchers to actually invent the smart AI algorithms. The increase in usage of AI means there will be more funding available for this form of research, both in academia and industry. There will also be a great need for researchers who understand AI to assist in all other fields of research to enhance our understanding of data, whether medical, astronomy, or physics.

New jobs

One of the definitions of Artificial Intelligence is that it enables computers to do what they could not do before. This is an apt description, for many AI technologies of the past are now part of mainstream computer technology. But it also reveals the most difficult part of predicting future employment opportunities – AI will enable computers to do things that we cannot predict, and this will result in new jobs that

have never existed before. What might these look like? Some current examples emerging at the time of writing are:

- Data Architect (responsible for creating clever data models in large databases to enable faster analytics).
- Full stack AI developer (a developer who is competent in all the different levels of abstraction from high level languages to bare metal processor).
- Natural Language Speech Assistant (a linguist who helps AI form their sentences better).
- Social Media Guru (generates and implements innovative marketing techniques to increase brand awareness, and builds a loyal fan-base of customers).

An increased use of AI means our smart software will need more training and monitoring, so while call centres may become a thing of the past, expect many new jobs that involve feeding data to AIs, and correcting their errors to help them learn (AI Educators?). Instead of humans watching CCTV footage, expect jobs managing the AIs who watch the CCTV footage (AI Managers?). As our lives become more entwined with clever tech, expect new kinds of entertainment and new kinds of fame (human musicians performing with AIs, or human producers for AI acts). To supplement the washing machine repair people and the IT gurus, expect a whole new kind of repair people for AIs (AI psychologists?). Finally, just as the Internet enabled more startups and people working from home, so AI will increase this trend, allowing individuals to offer increasingly sophisticated solutions from their home offices.

Conclusions

Artificial Intelligence is not increased automation. AI is not robotics. AI is smart software that democratises knowledge. What we choose to do with this clever software is up to us, but so far, the signs are looking positive for the job market. Like the previous big revolution in technology caused by the Internet and World Wide Web, AI has catalysed hundreds of new companies and it is helping new industries to emerge, creating large numbers of new jobs at all levels. Today the pace of change is fast, but otherwise there is nothing new: we create new technologies that make some jobs obsolete but generate entirely new jobs in their place. This has always happened, and always will. Artificial Intelligence is (and by definition, always will be) the latest new tech, generating the latest new set of opportunities for us all, while also helping to make our lives better and healthier. It's a revolution, in a good way.