

There's nothing but data out there

Author: Dr Craig S Wright GSE GSM LLM MStat

Abstract / Lead

In this article, we are going to step away from the present and try for a moment to think forward into the world of 2020, 2030 and beyond. This is a world of data. It is a world where little more than data matters. We have moved to a world where we print the items we need, that has hologramatic images of people delivered to us, that delivers all we need and which relies on data form everything.

Welcome to the world of the near future, one that has changed radically in a short amount of time and which relies on data. The items we create are all derived from data. The clothes we wear, the plates we eat off of, the furniture we sit on all comes from data. In this world of the future, data is king and security of that data is paramount.

Introduction

Let us for example imagine it is 20 years from now.

Two decades have passed from today. Imagine we are now in 2032 and not looking forward from 2012, the present. The technology, just emerging at this point today will be old, superseded and retro. Basically a quaint memory we all love to laugh at.

What will the world of that time be? How is society already changing and changed, and most importantly *where have all the unskilled jobs gone?* Well actually, many skilled jobs will also disappear. Many things we see as skilled jobs can be and will be replaced in the coming years and we will come to trust the security of the system more than we ever have before. This means we need to ensure the security of the systems more than we have ever done before.

2012 has seen the introduction of the robotic pizza machine. Oovie and others started to replace the dated video store until Netflix finally gained enough bandwidth in enough places to have replaced these physical stores in a box.

We have a world and society on the cusp of change and few seem to understand the impacts and outcomes of this process. In it, many workers in industrialised economies will feel the changes as we move towards a new

Food stores and fast food in the future

Just as the pizza stores started to be replaced by vending machines, so around 2021, the new autonomous delivery vehicles started to collect pizzas and replace the pizza boy. You call in an order, the machine (somewhere in your city) creates the order and within 15 minutes you find it hot and perfectly cooked as you like it (and it takes your feedback and improves each and every time you order) delivered wherever you happen to be. So, there are no more delivery jobs either.

The autonomous systems work on machine time, not human time.

They work 24/7 and have little downtime (other than upgrades and they are cheap and easy to replace). When you start to do the calculations, we see several shifts for each machine. The amount of downtime and time off for each “store” decreases. The number of overtime hours is nil.



Figure: Pizza Macines

Your local McDonalds no longer hire the youth or elderly. The role of a McDonalds worker is that of an algorithm now with the requirement to place a patty on a grill, time it, flip it, time it, move it to a bun and serve it. A machine can and will do this better, faster and more consistently. Mostly, the economics of this exchange make it likely that the machine will do this for a fraction of the cost of an ideal worker, let alone a lazy or sick one.

With no holidays, no sick days, no personal time and never getting tired; machines will be the low cost alternative to service workers. The world of the future is one without the existing range of low end occupations.

In this future world, we have seen 20 years of vending machines and robotized shops gradually replacing the unskilled workers in the retail, food and service industries. We have a shift from many of the routine industries we see now into a world where the

Do we remember Johnny Cabs is the movie "Total Recall" from 1990? Just imagine Johnny Pizza. An autonomous robotic vehicle with a pizza oven (or Ham Burger bar) that takes the order remotely, delivers it to your door cooked as you like it in 15 minutes or it is free? Why simply stop at pizza? With automated systems delivering anything you can imagine to order from centralised automated warehouses, run low on a few drinks at a party and expect a robotic courier to deliver a case of beer at 2am on a Saturday morning.

There is no human manufacturing

In a world of 3d printers, of lights out factories and even 3d metal printing and manufacture, there is no place for an assembly worker. The car workers of the future are programmers and designers. When automated systems are less expensive, work longer and produce more without unions and strikes, there will be no place for humans in manufacturing. We will start to see this move towards these systems now and as it becomes less and less expensive to introduce automation, we will start to see and feel the change in and across many industries.

Even mining is not unaffected. Mines are becoming more and more automated with robotic systems reducing the danger and increasing productivity. What we need more of in the future are thought jobs. These are the roles where computers and AI have a long way to catch up let alone exceed humans. We need to train people to do more than routine roles.

There is a coming divide between the skilled and the unskilled we need to address and to address now. Education is cheap in the future, but this still does not empower many people to take on the roles in a growly competitive world. Math is the most valuable of skills. We have many things we can program a computer to do better (including many forms of iterative maths) and we will form the creative parts of a system different to anything we can now imagine.

Only humans can solve some problems. Not all problems can be solved through computation and this is our only remaining edge.



Figure: 3d Printng in Stainless Steel

(<http://www.gizmodo.com.au/2009/08/3d-printing-now-available-in-stainless-steel-adamantium-next/>)

The Nike of the future will not hire people in third world countries. There will be no low cost Chinese sweat shops. There will be no manufacturing in these places as it will be less expensive to make a local lights out factory. Even shoes will be printed and many times right at home. We will have anything we wish as we want it. There will be no delay as we select an item last minute and hit print. Let us just hope that the print queue is not too large around Christmas day.

There will be no exploitation in third world countries. We have won that battle and at the same time lost the war as there are **NO** low cost jobs at all in third world countries. We have replaced these people and made them obsolete. I hope those who have fought to stop the people being “*exploited*” are happy with their Pyrrhic victory.

What there will be is global competition on a scale unimaginable to any people alive now, including myself. With low cost access terminals, ones that will be available to every person on Earth, there will be competition based on data. When software is king, location becomes less important. When a Klout score and other online determinates govern reputation, it matters not where you are, but what you do. Here, we have a world where a programmer in Hyderabad can compete equally and likely more effectively with one in California. When it makes more of a difference what you produce and location matters naught, then we need to see that data is king.

Food in the future

Farming in 2030 will be completed in containerized systems, not farms. We will grow anything locally. There will be no “fair price” coffee or cocoa as all foods are grown locally, delivered fresh daily and completely automated. The argument on exploitation will vanish as we simply stop sending money to other countries for food and even tropical spices are one day grown in Canada.

It will be fresher, closer and better. Hydroponic towers will fill deserts, wastelands and areas that we see as unable to support life and there will be no reason to support cash crop farmers. They will not exist other than for charity.

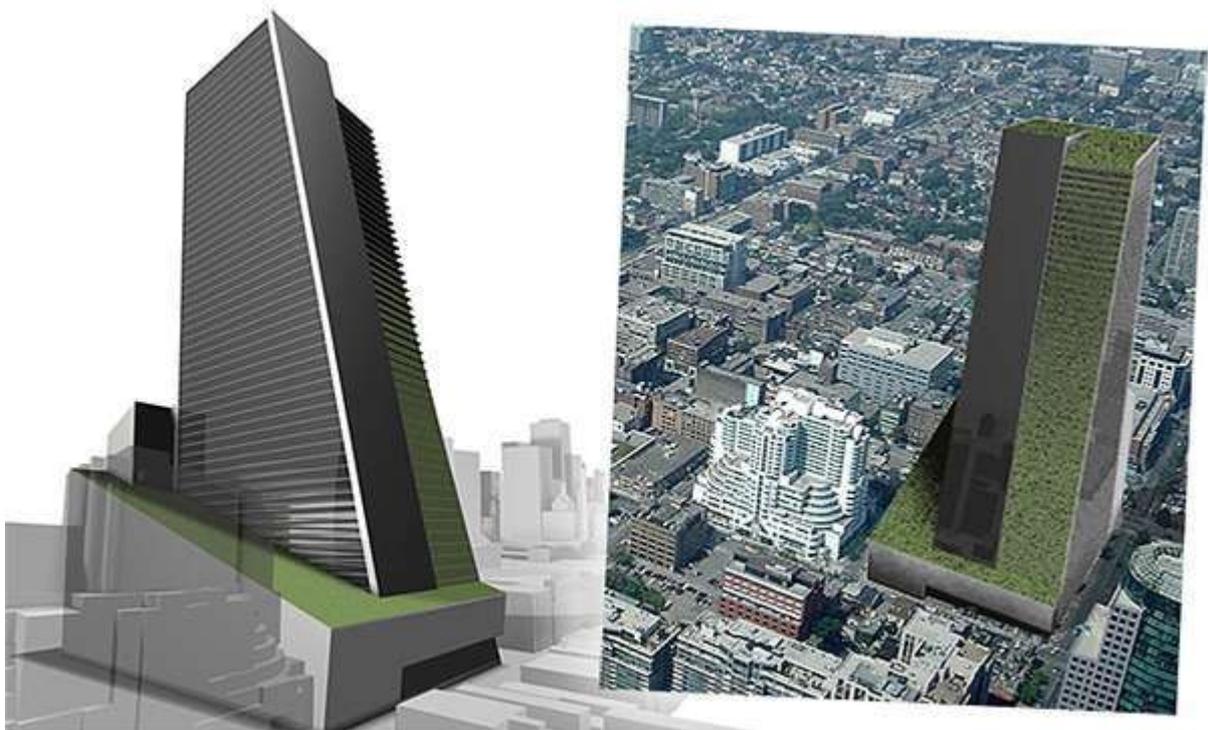


Figure: Vertical Urban Farming

(<http://www.trendhunter.com/trends/vertical-farm-toronto-sky-farm>)

These are systems that will be run on SCADA based controls and create the food base of the future. We are starting to see some of these replace garden markets already. The food is produced without pesticides and can even be grown organically. There is no need for pesticide as the container can be

sealed from start to harvest. The cycles are controlled and the freshest food is produced to order in a factory system. If you want to attack the food supply of the system, you will, attack data and controls.

Just imagine however, when you purchase online and have your tastes and desires fed into an online database that stores not only your own preferences, but those of millions of people and you can see how a data driven system will know what people expect to eat and when. It will plan algorithmically when to start crops and know at the outset what will be delivered. No disease, not need for pesticides, just the desired crop in the desired quantity.

All of this is based on data. It is based on crowd sourcing and it means that we have lower costs and more of what we want at the same time.

Vision in a world of augmented reality

We look fondly back at the start of Google glass remembering those geeky people with the silly goggles and headsets the same way we in 2012 remember those with a brick of a mobile phone is the 80's. Yes, they are still a little unusual and not what many think are sexy right now, but what of the near future?



Figure: Google's Sergey Brin in augmented reality glasses

(<http://www.flickr.com/photos/thomashawk/7050489913/sizes/c/in/photostream/>)

What we have in the now of the future is a bionic system implanted to augment our seemingly inferior natural vision, hearing and other senses. If you no longer need glasses and wear contacts as I do, moving to a technologically enhanced alternative is a simple choice, but what of all those with 20-20 vision?

Start to think of all the advantages we will have min these devices and you can start to see why people with perfect vision will become augmented as well as those in need of an improvement such as me.

Just as we have with digital cameras now, imagine a zoom function, night vision and text overlay. Start to add data feeds and even driving is improved as we make safe driving a game and overlay data into our field of vision allowing us to better judge road conditions. That is for the few of us still actually driving ourself.

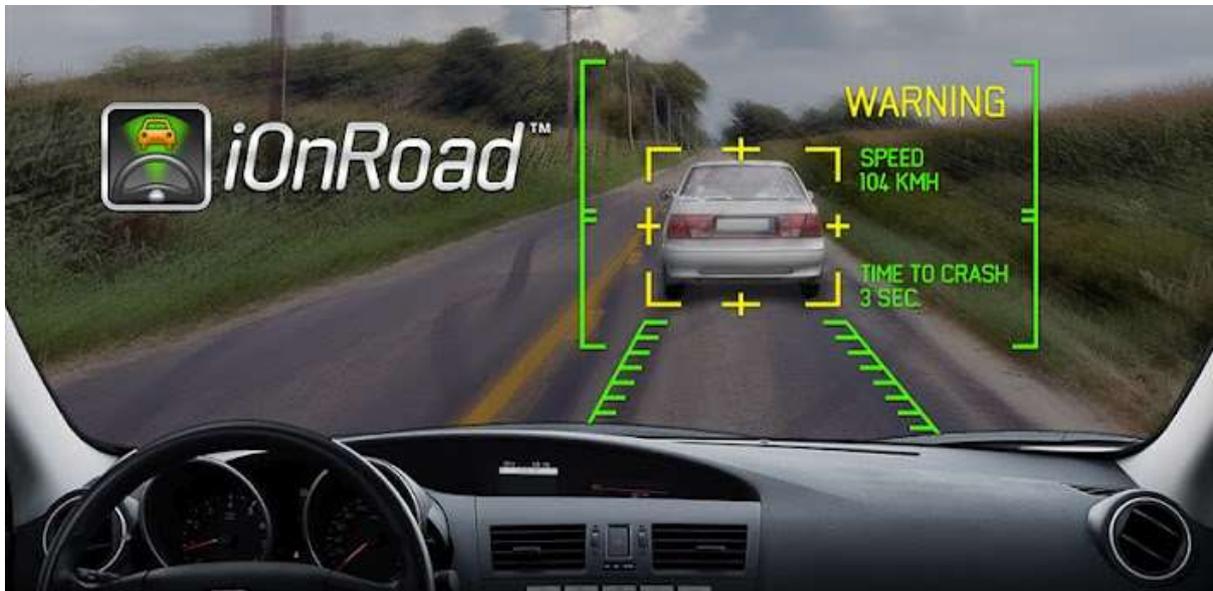


Figure: iOnRoad Augmented driving

We will have the elderly climbing Everest in exoskeletons originally designed to replace wheelchairs. The future of powered suits will also aid the general community become faster, climb higher and do more without training.

Good or bad, would you choose to climb the Matterhorn if you could without risk and for a minimal exertion? Our future reality is augmented in many ways.

Retail in the world of automation

We have already seen a move towards online stores. We have online stores delivering groceries (and in the future using automated vehicles) now. Add the ability to have a suit measured using a laser scanner and created with more precision and quality than the best bespoke tailor could have hoped to achieve to the ability to print 3d items including clothing and shoes and the retail store of the future is in serious trouble. It is not competition from Amazon and its ilk, but the entire range of future competitors that will allow you to download a design and print it at home.

Next, we add the entire item mapping and supply management systems to the mix. Where we have stores, allowing some items to be stored and viewed as people make an excursion of the day, robotic help systems will guide us. We will have IPv6 enabled RFID (or their following technology) to track and manage all the goods in these stores using technology in place of people. Ask any question, and the store's automated system will deliver (via a Watson-like system) the most likely answer more effectively than the most highly skilled and personable store assistant could hope to manage.

We already have automated payment systems, self-service counters and more. It is not too long before all of these roles are made redundant and we track what people purchase and auto-bill them as they leave a store. What matters in all of these scenarios is data driven.

If you can compromise the system, fool it or bypass it, this is the theft of the future. Again, this is a data driven system with data driven attacks. It will be the system that you need to fool, not people. As with all aspects of this future society we are moving towards a data based environment where the physical is reliant on the virtual.

But what of skilled roles?

In some countries, trains have already moved to driverless operation. We are not that far from pilotless aircraft. Just as US drone systems manage to fly remote missions with little aide, airlines will start to move towards pilotless systems in coming years. This will be a big leap for the first player in the industry. That said, when the lowered costs are factored into this, and the cost pressure in the airline industry is immense, then it will be a short time to when all airlines are operating pilotless aircraft.

That seems a scary though, but when we consider the ability to have a remote operator on the ground interact and manage the system unemotionally and when they are not tired (as many pilots can be towards the end of a long flight),

Personally, if you are starting in the airline industry, I would take a long hard look at your future career prospects.

We will all accept this as the cost of transport and travel will decrease. Pilot salaries are a large component in any airlines cost structures and the ability to add more personalised service opportunities will

Future Education

We need to stop teaching endless lines of facts and start teaching students to **Think!**

Why you ask? Well, we will have a personal assistant (see Watson below) that can instantly answer any natural grammar based question and recall any fact, make any simple calculation and replace any spread-sheet in under a decade.

And it will fit into a watch sized device and talk to us using natural speech.

Remembering facts is not educating people, learning how to think and argue is what education needs to be all about. Socrates taught people to question, not to memorize. We need to do the same.

The false arguments as to why we will not have this world

It is argued that automation, robotics and computerization will not affect the near future. This is an argument that we require systems with **vision, touch and hearing just like humans do.**

Well, these things are here in this world.

Watson, IBMs learning machine that won Jeopardy has become an iPhone app in 2017 replacing the failing Siri 3.x. This app, working through your augmented system that delivers a visual update (similar to the visuals in the movie Terminator) will be delivered at first using contact and cameras, then by 2020 will be implanted to offer true Bionic vision. We will go to a “body shop” periodically to get bioware updates as needed.

We also will see hologramatic images of people as real as you can imagine without them being there.

If that Johnny Pizza seems as if it was a real person and the pizza is better, why would we order any other way?

We will learn differently. When all the facts are there, the entire Library of Congress is online and available, what will matter is the ability to access and analyse information.

In the world of the future, there are no more service jobs, no manufacturing, no low cost roles to fill. It is a world of data, design and creativity. What we need to do is start to imagine ways to make this a world that works in this future.

Rome

Rome of the empire was a place with massive unemployment. We created games to fool the masses into acceptance of their lot in life. This was a decadent and corrupt society that was derived from a far more virtuous (in relation to the later period) society than it ended.

Rome had many people unemployed and a slave based economy.

We have a future robotic society with robots taking the place of the slaves in Rome with less chance of a rebellion.

We will have masses of people who do not fit this future. Will be become those who do not learn to become the creators and long for a past of manufacturing? Are we to be a people who are driven by the Gladiatorial future sports and Jerry Springeresk entertainment of the lowest denominator?

Change starts now or we are destined to make the same mistakes we made again.

Art for Art's sake

What people will, do other than the calculations and work machines cannot do is the artistic. Yes, there will be simple reproductions and many things that will have mass market appeal, but we are a long way from the next true masterpiece as much as some like to argue this point.

To conclude...

In all of this, we have a society that is reliant on systems and data. Here, we see a new need to be even more vigilant than we have been in the past. When food systems are based on SCADA style controls, there is far less room for allowing rouge access to the databases and systems that run the controls that enable this future? Security has always been important, but as a future career, it is one that is not going to disappear. We may see automated systems replace even skilled jobs (such as a pilot), but it will be a long time before we start to have secure systems that do not involve people.

Now personally... with qualifications in Statistics, Finance and Economics, do you wonder why I have chosen to work in Information Security and big data analysis?

Author's bio

About the Author:

Dr Craig Wright is a lecturer and researcher at Charles Sturt University and executive vice – president (strategy) of CSCSS (Centre for Strategic Cyberspace+ Security Science) with a

focus on collaborating government bodies in securing cyber systems. With over 20 years of IT related experience, he is a sought-after public speaker both locally and internationally, training Australian and international government departments in Cyber Warfare and Cyber Defence, while also presenting his latest research findings at academic conferences.

In addition to his security engagements Craig continues to author IT security related articles and books. Dr Wright holds the following industry certifications, GSE, CISSP, CISA, CISM, CCE, GCFA, GLEG, GREM and GSPA. He has numerous degrees in various fields including a Master's degree in Statistics, and a Master's Degree in Law specialising in International Commercial Law. Craig is working on his second doctorate, a PhD on the Quantification of Information Systems Risk.