Driving OUR Future

By Samantha Watson

By 2030, I’d love to be part of a multi-disciplined working team that creates the systems to make autonomous (or driverless) cars safer and more socially responsible, through the application of Artificial Intelligence (AI).

However, this area requires more than just technical input for it to actually revolutionise the “on call” transportation of the 21st century – for it to work, the new technology in driverless vehicles needs to tangibly improve people’s lives. Rather than just the potential pitfalls, people need to see and embrace the benefit that driverless vehicle technology brings – the opportunity to access convenient, cost effective and above all, safe transportation.

The “persuasive” side of STEM, including psychologists, will be needed to advance acceptance of AI technology that I will be developing over the coming decades. The change in people’s behaviour will be just as critical as the actual technology in developing driverless vehicles.

Ultimately, I believe that all problems we are currently considering in the development of driverless vehicle technology can be overcome. We are only now beginning to understand how to make machines learn more rapidly and react even faster than the human body. Since it is widely accepted that most vehicle accidents are caused by human errors, we can remove these factors through technology. The benefits are immense, as illustrated by USA’s National Highway Traffic Safety Administration data below:

In 2015, there were more than 35,000 traffic deaths in the U.S. alone. Want to know how many of those were caused not by vehicle malfunctions or poor weather, but by the drivers themselves? 94 percent. Humans are prone to distraction, beholden to sleep schedules, and biased overall. Autonomous vehicles, meanwhile, don’t glance at their phones or get on the road after a few beers. They’re programmed to do one job: drive safely. Sensors can see in all directions at once, and machine-learning algorithms can take weather, traffic, and pedestrians into account to make important driving decisions in a split second.

(Source: https://curiosity.com/topics/to-make-driving-safer-humans-should-get-out-of-the-drivers-seat-curiosity/)

Due to recent and widely publicised cases of injuries and fatalities, driverless car technology lacks a wide acceptance and user confidence from the general public and law makers. According to a recent USA poll that canvassed drivers’ opinions on fully autonomous cars:

![Cartoon of a driverless car being stopped by the police](https://cloudtweaks.com/wp-content/uploads/2015/10/driveless-car.png)
80%, said humans should always have the option to drive themselves, 64% expressed a need to be in control of their own vehicle……, while 51% said (they) wanted to stay in the driver seat, safer streets be damned. Opinions like these will become increasingly relevant as self-driving cars become more mainstream. Right now, they are floating in limbo between hype and skepticism. (Source: https://www.theverge.com/2016/9/28/13076948/self-driving-car-poll-autonomy-kelley-blue-book)

Clearly, there will be a great need for supporting STEM professions to help people adjust their opinions and buying behavior towards the driverless car revolution. It cannot be solely driven by AI.

In my opinion, autonomous cars are a standard bearer for AI. They are visible and relatable to most people and ultimately, will help drive the wider acceptance of AI. Currently, negative perceptions of AI are supported by popular media such as The Terminator movies.

Based on current spending, USA and China are leading the world in advancing AI. Other economies that are significantly active in this area include the UK and Israel. Ideally, Australia will position itself to join these countries and provide me with opportunities to work in this field.

There are already masses of data available in motor vehicles, ranging from sensors and radar, to tracking methods such as Google Maps. Making sense of this information requires more than just lines of human-generated code – it requires a move to self-learning. Looking for patterns in neural networks, rather than sifting through lines of programming, will allow systems to recognise items rapidly. This is referred to as Deep Learning and works similarly to the human brain in a neural network. Multiple layers process separate features and each layer extracts its own piece of information. For example, one neural net could process images for steering a self-driving car. Each layer of the net processes a different feature. The first could be detecting edges for the sides of the road. A second layer could be detecting the lane lines in the image, and another layer, the other cars in the field.

This revolution in the use of data applies knowledge of how people think, so my scientific thinking will need to call upon humanity-based disciplines to help me develop these neural networks.

I have a real interest in this area that will transform AI to improve people’s lives. I see myself working for companies that are similar to Google, who are now advancing Deep Learning, in areas such as its Android software.
I have included a graphic to explain the position of Deep Learning within the field of AI.

Artificial intelligence can deliver on industry expectations through machine learning and deep learning.

According to Toyota Australia (GoPlaces, published July 2018),

Three types of artificial intelligence will be critical to the success of this brave new world: advanced recognition and predictive decision-making functions, vehicle-to-vehicle and vehicle-to-infrastructure communication, and technology for involving passengers, including the transfer of control between driver and vehicle.

I see an exciting future for my career in STEM by collaborating within multidisciplinary STEM teams to advance driverless vehicle technology. Over the coming decade, there will be real opportunity for humankind to achieve revolutionary AI advancements— with autonomous transportation being one of the first visible steps.

By 2030, I expect that the next Age of Enlightenment will be upon us and that I will be working professionally in AI engineering (with the support of many cross-functional STEM colleagues) to contribute to this next wave in scientific revolution.