Autonomous Vehicles:

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There has always been a goal within engineering and technology fields to create a ‘driverless vehicle’. As of the 31st January 2018 there were 19.2 million motor vehicles registered in Australia (ABS, 2018) with most of these vehicles having small forms of automation already equipped. The end goal is to create a fully autonomous vehicle. The state of California (2019) defines an Autonomous vehicle as a vehicle that has the ability to be operated via technology without a human having any input into the operation or physical control of said vehicle.

The motivations behind introducing autonomous vehicles into society are due to a varying and broad range of reasons. Mainly autonomous vehicles are favored to increase the safety of a motor vehicle by reducing the provision for human error. A report into the benefits of autonomous vehicles by Damen, Hillier, Wright. (2015) states that “90% of all motor vehicle accidents have a human contributory factor” it also cites that the National Road Safety Strategy believes that the reduction in seriously injured Australians from road accidents will most likely be due to the implementation of autonomous technologies rather than changing the behaviors of humans.

Environmental and lifestyle impact is also considered to be a massive benefit to the introduction of autonomous vehicles to our society. Supporters of Autonomous vehicles have a vision to reduce the number of vehicles on the road by implementing a “mobility on demand” model whereby there will be autonomous vehicles on the road that will be shared. The Australia & New Zealand Driverless Vehicle initiative (2019) base this on the research results that show on average a car is parked 95% of the time, the implementation of a system very much similar to a taxi or uber where the user summons a driverless vehicle on demand will take the user to their selected destination. The utilization for such a system would also provide independence for many people whom have impairments restrict their ability to drive a piloted vehicle.

The way in which vehicle automation is currently used is by incorporating technologies into vehicles as “assistance technologies”. Vehicle manufacturers incorporate ADAS (Advanced Driver Assistance Systems) such as stability control, adaptive cruise control, electronic brake-force distribution, lane keeping technology, self-parking and other technologies that are utilized by autonomous vehicles every day, the main difference is that these technologies currently do not completely override the driver’s input and can be switched off (Weeratunga, Somers, 2015). These ADAS systems use a plethora of technologies such as long-range radar, Light detection and ranging, camera, short-/ medium range radar and ultrasound and that is just the technology involved in reading the environment the vehicle is in. Sophisticated software analyzing all input data then must be processed immediately and synthesized into outputs that will actually execute the driving of the vehicle through the ever-changing environment.

Testing of fully autonomous vehicles has been steadily progressing in controlled environments. In November 2018 Tesla started to introduce a feature known as ‘Navigate on Autopilot’. It gave the driver of the vehicle the ability to surrender control of the vehicle to the autopilot system which keeps the vehicle within its lane and at safe distances from vehicles around it while the driver removes their hand from the steering wheel. The driver must still monitor the system as there are many variables that the technology hasn’t got the ability to interpret currently.

The short-term future of autonomous cars relies not only on technology improving but in the regulation of the technology. There are huge issues within legislation about how a robot is to be regulated in terms of liability for accidents and personal and property liability. An incident in March 2018 involving a Volvo Xc90 where a woman was killed whilst the vehicle was being operated in autonomous mode really shook the industry and made apparent that there is a very real argument about who is liable for the operation of an autonomous vehicle. Improvements in technologies such as GPS, data mapping, Wi-Fi communications to collate environmental data, traffic data, weather and roadwork data are all factors that need huge amounts of man hours to bring more widespread roll out of autonomous vehicles.

The potential impacts of the implementation of autonomous vehicles on the road are mainly eradicating the shortcomings of human input to the operation of a motor vehicle. Factors such as the ability for vehicles to be connected via frequencies and radar to travel in closer proximities and without the need for reaction times are expected to reduce congestion, traffic incidents and improve traffic flow. This technology will impact the way we think of cars. They will essentially become vessels that we board instead of tools that we control. These vessels will be accessible to everyone as there is no longer a set of skills to operate, the disabled, young people and even the elderly will be able to have personal modes of transport and become more independent without reliance on public transport.

Another impact will be the need for greater investment in infrastructure and technology to support their operation on public roads, they will need heavily encrypted technologies to be able to protect the integrity of the overall communication and accuracy of the interpreted data that controls the vehicles. The environments that these vehicles will operate will need to be closely monitored to ensure that the desired safety of passengers and the greater public are actually advantaged by the introduction of this technology.

As far as jobs are concerned there will be a massive amount of people involved in implementation, maintenance, monitoring and improvement of these vehicles, infrastructure and the technology systems utilized by them. By impacting the number of motor vehicle accidents and thus reducing personal injury, other areas of society such as emergency services will become less stressed freeing up resources for other purposes. Autonomous vehicles are only a small progression from what we currently have. The main impact will be upon humans relinquishing total control to an artificial intelligence.

The affect of autonomous vehicles on my daily life will be very similar to many others where my commute to work will be a case of entering a vehicle and relinquishing control to the ai, where I would just be a passenger and keep myself occupied within the constraints of the vehicle. Would this be life changing for myself? … probably not, but if my commute was through dense traffic and longer than the 15 minutes it currently is, then yes. The ability to use your own vehicle to find a way home whilst intoxicated would be a big advantage not just for reasons of convenience but also for the safety of other road users.

If an autonomous fleet was to be rolled out, I wouldn’t always have to have 2 or 3 automobiles parked outside my house and within my garage. It would also mean I wouldn’t have to pay for parking at my workplace which would be a huge positive. By not having to store the cars on my property, I could make better use of my land and increase the size of my living quarters by utilizing the garage as living space which would reduce the need to purchase a bigger property later in life.

By utilizing autonomous vehicles, family and friends would again be able to travel with the same advantages stated above. Another positive to utilizing autonomous vehicles would be the ability to transport dependents without the need to personal drive them somewhere. Daily events such as school drop offs, sport training, medical appointments and other commitments could be carried out without the need for personally taking them saving the time taken to commute to and from the destination.

In conclusion Autonomous vehicles have many advantages but the sheer complexity of the technology, infrastructure, the legislation and the ability to put complete faith in technology to safely transport a living being will take many years to come to fruition.

References:

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