

Autonomous Vehicles

April 15

RMIT IIT ASSIGNMENT 2
ALEX VORRARO

```
mirror_mod = modifier_ob.  
Set mirror object to mirror  
mirror_mod.mirror_object =  
operation = "MIRROR_X":  
mirror_mod.use_x = True  
mirror_mod.use_y = False  
mirror_mod.use_z = False  
operation = "MIRROR_Y":  
mirror_mod.use_x = False  
mirror_mod.use_y = True  
mirror_mod.use_z = False  
operation = "MIRROR_Z":  
mirror_mod.use_x = False  
mirror_mod.use_y = False  
mirror_mod.use_z = True  
  
selection at the end -ad  
_ob.select=1  
ler_ob.select=1  
ntext.scene.objects.active  
["Selected" + str(modifier  
mirror_ob.select = 0  
bpy.context.selected_obj  
data.objects[one.name], sel  
  
rint("please select exact  
OPERATOR_CLASSES  
  
types.Operator):  
X mirror to the selected  
object.mirror_mirror_x"  
error X"  
  
context): object is not
```

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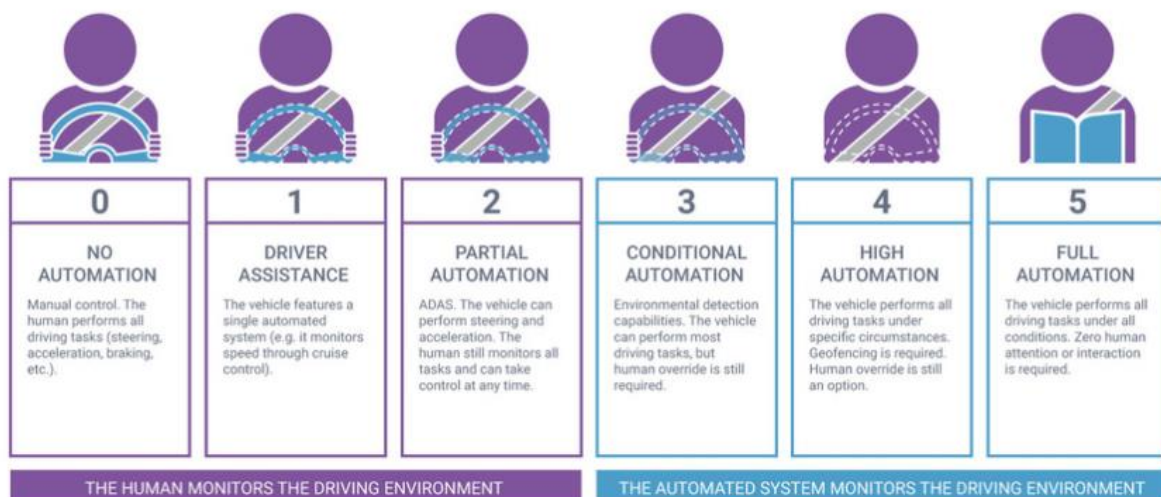
What Is It and What Does It Do?

An autonomous vehicle is a vehicle that is capable of sensing the environment that surrounds it and operate without any human involvement. This means that a person does not need to take control of the car as a driver at all, their only interaction with the vehicle is as a passenger. These vehicles are based on usage of complex algorithms that are made up of more than 100 million lines of code, machine learning systems, powerful processors that execute the software and many sensors like video cameras that detect other vehicles, pedestrians, traffic lights and read the road signs. There are also sensors for measuring distance that work through light bounces and radars that monitor the positions of the other nearby vehicles.

Many vehicles today are “semi-autonomous”, which means that the driver has different features that assist him during their driving experience like assisted parking and braking systems or autonomous steering, breaking and parking. There are 6 different levels of driving automation, where the first level (the 0 level) includes vehicles with no automation, while the last level (level 5) vehicles with full automation, that perform all the driving tasks under all conditions, without any human interaction and attention required. In the first three levels the human monitors the driving environment, while in the last three the automated system monitors the driving system. Only the last level does not require the attention of the passengers.

SYNOPSIS[®]

LEVELS OF DRIVING AUTOMATION



In the last decade many car companies like Tesla, Toyota, Ford and several others invested a lot of money on robotics, AI technology and into the creation of Autonomous Vehicle Research centres to implement their products, trying to get closer and closer to the fifth level in the current decade. Many of these companies though haven't reached their expectations with the spread of autonomous cars in daily life. In fact, there has been a lot of pessimism throughout these years especially when on the 18th of March 2018 a self-driving car ran over a woman that was on her bicycle, killing her. Even the CEO of Volkswagen said that fully self-driving cars might never happen.

However, at present there are some autonomous vehicles in service. An example is the autonomous bus in Berlin that travels 600m but the most advanced case is in Phoenix (Arizona, US) where the dream of autonomous technology is getting closer and closer to reality. Just a few months ago in fact, Waymo, the leading Autonomous Vehicle Company, launched a public ride-hailing service. This service was available since 2018 but only for a small group of people and with a supervisor that would take control of the car if anything went wrong. Now this service is available for anyone in Phoenix by simply downloading the app and booking a car. This is possible because Phoenix offers perfect land and weather conditions, but to launch these products worldwide it's important to find a way to overcome a few challenges and find an answer to some issues.



What happens when weather conditions like snow, water or oil covers up the road lanes and signs' making cameras lose track of the road? Who is liable for any accidents caused by one of these vehicles? How will the car behave if an animal suddenly runs on the road? Will these vehicles be able to replicate or substitute the signals like body language and eye contact? These are only some of the challenges that autonomous vehicles need to confront before any worldwide change begins. Currently the companies involved in autonomous vehicle development and research are training their vehicles to obtain as much knowledge as possible and with the progression and improvement of the current code (that may reach more than 300 million lines) hopefully the vehicles will get closer to level 5 over the next few years.



What Is the Likely Impact?

The autonomous systems offer humanity many benefits. These vehicles will have an impact on the entire population, eventually ensuring transport for everyone. Initially costs may be high limiting the vehicles to the wealthier, but as time progresses, they should become accessible to all. The concept of driving licenses will not exist anymore, so kids, old people and people with disabilities will be able to go anywhere on their own without any complication. The vehicle could simply deliver packages or any object to someone without needing a driver. It would “create” more free time that had previously been used for driving. Besides the convenience, safety is also an issue. Human error, for example speeding, drink driving and distraction, is the main cause of car accidents. In fact, The National Highway Transportation Safety Administration shows that 94%-96% of car accidents are caused by them. This means that autonomous vehicles will drastically reduce accidents, saving many lives. Even the earth will benefit from this change, seeing that the urban emission of CO₂ would reduce by 80%.

When autonomous vehicles will become normality worldwide, many jobs won't be needed anymore or will change. This is a common occurrence when something introduces itself to the world. In this case taxi drivers, couriers, bus drivers and food/shopping delivery drivers would not be needed anymore because the cars would move on their own for private and business reasons. Even police officers that check for speeding, drink drivers or road pirates would not be needed anymore as the vehicles would be programmed to follow road rules. However, there would be an increased need for people in the IT field, like programmers for the code the car uses and their future upgrades and cybersecurity specialists to avoid possible hack attacks the car system.

How Will This Affect Me?

Presently vehicles, that can be private or public, are basically a necessity for society. Currently I have a car that I use for various essential tasks, like going to work, going out and driving my sister to school. With the introduction of autonomous vehicles to society, I would organise my life in a different way. The time spent concentrating on the road while going to work or anywhere could be used for any preparation, studying or relaxing. I now have a P-Plate which gives me some restrictions, but with autonomous vehicles this would change. There would not be limitations on the speed and I would not need to worry about the alcohol limit because I would not be actually driving the car. Driving my sister to school would not be necessary anymore, she would be able to move on her own without needing anyone's help by simply telling the vehicle where to go.

Many times, when a family shares a car between its members, the car will not be available for someone, limiting their movements, but with a simple app an autonomous vehicle could be used for transportation. Similar services that currently exist with humans driving would eventually be replaced. This means that my friend who is a taxi driver would lose his job as would my friends that delivers food.

My grandparents would not need to worry about losing their license as they age because they would always have access to automated transport. This would really affect the quality of life of the elderly as they would be able to reach amenities autonomously.

The evolution of automated vehicles would change not only my life but those around me. Having access to automated transport means that all age groups would have freedom to travel however, this change would also mean a loss of employment for some sectors but an increase in demand for IT specialists.

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