

TECHNOLOGY AND THE CURRENT COVID-19

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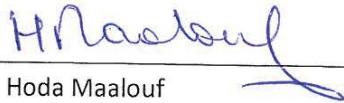
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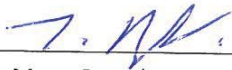
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ABSTRACT

The world is witnessing nowadays a virus that spreads in a very fast manner and it has infected a large number of people. Countries rushed to find ways to stop this virus from spreading and to minimize the risks of getting infected. One of these ways was to integrate technology in people's daily routine to help in containing the virus.

In fact, although several countries took a lot of legal measurements and law enforcement to prevent the spread of the virus, such as wearing facial masks, social distancing, using sanitizers and other forms of hygiene supplements, there were always the need to control the situation in a more practical way other than telling police officers to supervise the people whether they are abiding by the rules or not. For this reason, several inventions were made in order to serve the same purpose which was to help the world overcome the Corona virus. Robots, artificial intelligence as well as other technologies were updated and were used in several domains such as in the medical field, nursing field, tourism field, logistics, as well as other domains. In addition, cameras were upgraded in a way to detect individuals who were not wearing a mask for example, or to detect people who have a high temperature, or even carry the virus.

Although these technologies were employed to help the communities face this virus, some questions were raised concerning their privacy settings, their reliability, and efficiency.

1. INTRODUCTION

A new pandemic has hit the world in 2019 and is still invading many countries; the severe acute respiratory syndrome coronavirus 2 (SARS COVID-19). This virus was first distinguished in Wuhan- China in December 2019 (WHO, 2020; Hui et.al, 2020)

“SARS-CoV-2 affects individuals of all ages and spreads through droplets when the infected individuals cough or sneeze. The droplets can still be infectious even after deposition onto surfaces. Infection occurs when these droplets are inhaled or when the contaminated surfaces are touched followed by the touching of one’s eyes, nose, or mouth. “, stated by Singh et.al (2020, p.1).

With the spread of Covid-19 people were obliged to wear facial masks in order to decrease the infection between them. Therefore the person who does not wear a mask would be publicly shamed (Yan, 2020). An app was developed to track the persons infected by the Covid-19 virus and notify their surroundings if they have made any physical contact with them in Singapore. This app uses Bluetooth technology for tracing the users and the infected persons. A notification is being sent to the persons that have met with the patient of Covid-19, and many other apps are using this method with some changes to help in decreasing the spread of the Covid-19 (Baharudin, 2020; Choudhury, 2020; Ungku et.al, 2020).

Moreover, the Covid-19 pandemic has forced the employees to work from home in order to decrease the spread of the virus. Thus, the governments have been trying to find ways to ensure a good quality of performance with them working remotely. “ One opportunity on the horizon is expanding the use of immersive computing technologies, like augmented reality and virtual reality

(AR/VR), that create new modes for users to experience digital content through computers, mobile devices and headsets'' stated Harrisson (2020, p.1).

Technology can play an important role in the current situation that requires a less amount of physical contact between people. Such as the robots that especially in this current situation can help the humanity. The robotics experts are stating that robots can be beneficial in many ways such as in work automation- clinical care and logistics (Koss, 2020). Digital health technology enable people to overcome the pandemic with minimum losses in ways that can be impossible to realize manually (Ferretti et.al, 2020).

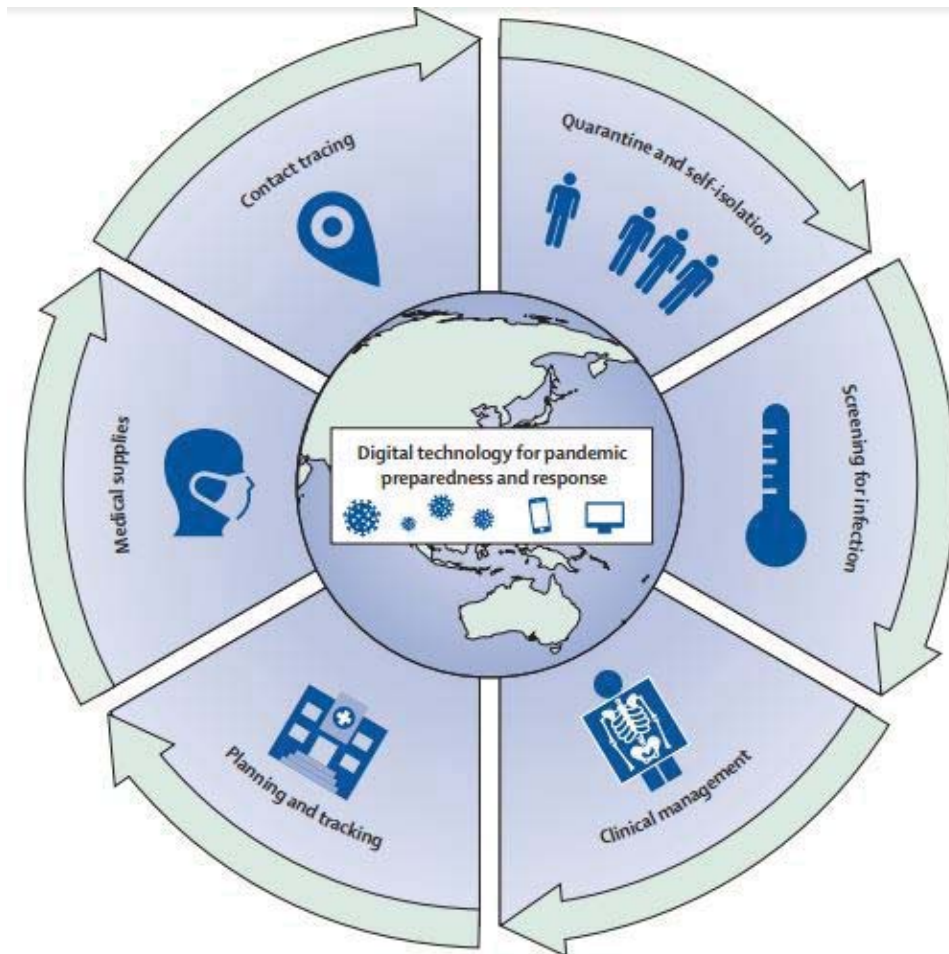


Figure 1: Digital technology as a tool for pandemic preparedness and response (Whitelaw e.al, 2020)

The artificial intelligence (AI) and the big data aided in decreasing the spread of the Covid-19 worldwide by helping in keeping in track the people who got infected. In this way, the surrounding of the person infected will get notified, therefore the spread of the virus will be limited. One of the tools used during the process; the migration maps. These maps have access to the mobile phones- mobile payment applications and the social media. This access will facilitate the collection about a person as the location of this person with its every movements. This process was done in China by the government in Wuhan after the pandemic hit its highest (Zixin H. et.al, 2020; Wu JT. et.al, 2020).

“With these data, machine learning models were developed to forecast the regional transmission dynamics of SARS-CoV-2 and guide border checks and surveillance” stated by Liu J, et.al (2020, p.5). Moreover there are thermometers that can indicate the real time of collection of the illness. Then, a smart watch application can recognize the Covid-19 outbreaks. All these current applications are either created by entrepreneurs or the government of the countries to minimize the impact of the virus. In conclusion, technology has an important role to play in the healthcare field if used correctly. The spread of the Covid-19 virus highlighted the importance of using technology to help the humanity. Following the introduction, Chapter two is the literature review.

2. LITERATURE REVIEW

The chapter two of the report is the literature review, readings and research are done to obtain the required data about the artificial intelligence. Nowadays, with the global pandemic of COVID-19, governments rushed to take several measures in order to reduce as much as possible the risks of getting infected. One of the best methods to prevent the rapid transmission of the virus is to wear facial masks whenever an individual goes out. Some governments require the usage of facial masks in indoor spaces as well as in an outdoor spaces, and other governments require that individuals can only wear the facial masks in indoor spaces. And in order to oblige people to stay committed to these rules, law enforcement have been applied in some countries and states such as Louisiana, Nevada, and Indiana (Yan, 2020). In order to make sure that the government can detect the people who are not abiding by the law enforcements concerning the need to wear facial masks, technology is used once again to help people, and facilitate their job.

In fact, and due to the fact that “Public shaming over not wearing a face mask started almost as soon as the COVID-19 pandemic itself” (Yan, 2020), and that COVID-19 was spreading at a fast pace, Akash Takyar, owner of the software company LeewayHertz in San- Francisco, decided to develop a software that could detect people who are not wearing facial masks, instead of waiting for people to supervise each other (Yan, 2020). This new developed software works by identifying the individuals who are wearing facial masks, and people who are not. In fact, it can be used inside businesses who wants to control the spread of the virus, and make sure that their employees are abiding to the safety measures inside the workplace.

This technology tries to identify the people by simply scanning a face mask. As a matter of fact, the camera scan the eyes, nose, and mouth and try to identify the individual through individual or

criminal database (Yan, 2020). Actually, the National Institute of Standards and Technology NIST, a company that implements Artificial Intelligence AI into face recognition, started to add photos of people with masks into the piles and photo stocks, so the software can use the algorithms and make the comparisons accordingly (Simonite, 2020).

However, Russian and Chinese companies were able to achieve faster results, faster than NIST, and they were able to launch their products as being a face recognition for a half-covered face. They worked in fact, on setting up lighter privacy settings and a more accuracy to this program (Simonite, 2020). In the China market, this technology has expanded and it was used for several purposes. In fact, it was used in stores, supermarkets, offices, buildings, and other facilities. However, in the US the market and selling of this technology was restricted and faced more severe usage (Simonite, 2020). This may be due to the fact that the Coronavirus was initially initiated from China, so they felt the need to control the virus as much as they can and restrict this virus with every power they have. Moreover, this technology has advanced in China in a rapid manner. In fact, people can now pay in stores and use the ATM through face recognition; which make it very useful especially during this COVID-19 pandemic, where there is no need to take off the masks to have a face recognition, and maintain and provide services without touching any surface (Simonite, 2020). The facial recognition technology was also implemented and used in the US airport. In fact, as CBP, Customs and Borders Patrol, spokesperson stated this technology is being used to match the person with his/her photo on his/her passport and travel documents. As a fact, the CBP's system checks each person's face at the departure gate through the "faceprints", and it works even if people are wearing their masks. However, some individuals might find it difficult, so they wait their turn until they manually check their identities on the counter (Simonite, 2020).

This technology can be useful if safety campaigns were needed to be raised in order to remind people that they need to abide by the rules, and restart wearing their masks. So, by setting this technology in any space, outdoor or indoor, the percentage of people wearing a mask will be compared to the percentage of people not wearing a mask, and by then authorities or concerned parties will be able to know if awareness or new rules should be applied once again.

However, some people believe that this technology is not useful as it should be, and that it can contain some errors up to 30%. In fact, since this new technology works using algorithm, sometimes any item could be detected and hence error occurs. For example, the process requires a photo of the person to be set while wearing a mask. The machine learning models will start comparing each individual detected on its lenses to the initial background. But concerns were raised about the fact that what if the camera detected the background for example instead of detecting the person himself. For this reason, a number of 30 percent error was given to this technology as Raji stated, a member of the artificial intelligence institute at the New York University (Yan, 2020). In addition, some citizens think that by using this technology, their privacy is hacked. In fact, in Portland, these technology of face recognition are banned, and the state is declaring that in these tough times where the pandemic has occurred, more awareness and campaigns concerning safety should be done, instead of increasing the pressure in individuals by letting them feel that their privacy is being hacked and that they are being constantly watched and supervised (Yan, 2020). So, the real question remains about what measures should be really taken during this pandemic?

Furthermore, artificial intelligence played a big part in developing this technology and trying to minimize as much as possible the errors. In fact, the face recognition measures for instance the width of a person nose, the distance between the eyes, and starts to recognize the person using

several “nodal points” and using a large network of surveillance cameras. While this new technology was used to implement law enforcements on criminals or drunk drivers for example, it was found essential to be used during this pandemic in China for instance in order to face COVID-19 (Zhu, 2020). In fact, China was one of the first countries that adopted this technology and seized the opportunity to develop this technology stating that it can be used as weapon against this viral pandemic. So, they developed the facial recognition, in order not only to detect the faces of the individuals to see if they are wearing a mask or not, but also to detect the temperature of the individuals as well as their identities.

This fact, kept the Chinese citizens very worried about their privacy. In fact, a survey was done in China on almost 6,000 individuals, and 80% stated that they are concerned about their private information might be used later for other purposes (Zhu, 2020).

The main issue is that this technology is relatively new, so the privacy settings and rules are not yet clearly stated on whether who is allowed to use the information detected and who is not allowed. And due to the fact that this technology does not cost a lot nowadays, it can be placed anywhere such as in the gym, or in private offices, which means that no one can really control the usage of the information later on (Zhu, 2020).

Another issue also came up concerned the facial recognition technology, which is that it might raise the question of racism and ethnicity. Meanwhile this technology is built on a system that is set on a collected information of the main picture (Zhu, 2020). But sometimes this system can give false positive results of the person that is a bad reflection.

So, in order to fix this issue, measures are taken starting by setting up some standards and rules.

In fact, China has now updated its guidelines, and is now taking the consent of the individuals through a pop-up window for instance when biometric data is collected (Zhu, 2020).

Moreover, many individuals questioned the fact that if the face recognition is accurate if someone is wearing a mask. In fact, when this technology started to rise, it was very difficult to detect the face if one fifth of it as covered. But, when the pandemic occurred, all software companies had to update their technologies in order to prevent people to take off their masks whenever they need to open their cellphones for example. Luckily, and after a hard work, companies managed to achieve their goals successfully, and now face recognition can be done even if the person is wearing a mask, a scarf, a fake beard, etc. (Zhu, 2020). Nevertheless, this progressive technology is taking a great place, but some people are attempting to hack the software by giving it false information, and sometimes they are succeeding. All it takes is to project images on their faces, or wear futuristic-looking brass frame that will complicate the measurements between the individual's features which results in canceling the facial recognition (Zhu, 2020).

Furthermore, while several individuals have concerns about the privacy settings of this technology, companies are working in order to make it more advanced. In fact, it is estimated that this technology will observe a total growth of 14.3% from the year of 2009 and 2020. As a matter of fact, companies as well as authorities are including more and more this technology into their daily lives in order to improve their surveillance and security systems. So starting from this concept, companies such as Watrix in China, improved this technology, and it can detect and recognize a person from a distance of 50 meters (Zhu, 2020). Other companies, also improved this technology, and it can now recognize an individual even if their face is not shown, but from the way they walk, or even their heartbeat they can identify the person (Zhu, 2020).

So, as stated above, companies are constantly trying to improve the technologies and implement them in people's daily lives. It can be used in the offices, buildings, hotels, and other facilities and for different kind of usage. The Artificial intelligence is reaching great outcomes with time, especially in the business world. As a matter of fact, Artificial Intelligence is now being used in order to achieve the different goals of the individuals according to their needs and requirements over the years and in their businesses.

This technology has changed the way companies function and work. It is oriented to please the customer's needs and provide him the best service possible by tracking real-time data and analyzing the outcome in order to achieve the client's requirements (Wirth, 2018). After analyzing the given set of information, Artificial Intelligence tries to predict the future needs of a client. This is what makes this technology the future and basis of our society later on (Verma et al., 2021).

Due to the fact, that the world is now witnessing a huge advancement in technology, it is now interconnected, which makes Artificial Intelligence more wanted nowadays in several domains such as marketing, business, law, education, hospital, and others.

In fact, it is clear that the consumer of any artificial intelligence system is enjoying it since it can facilitate their lives in a very simple manner. When writing an email, for instance, the sentence is automatically corrected. Moreover, Siri- Bixby and Cortana help people in creating their schedule, and there are more apps such as the GPS system while driving (Verma et al., 2021).

Few years ago, people did not quite understand the true meaning of artificial intelligent. They thought that it meant a robot that is able to walk and talk and accomplish the activities that human can do, just as seen in the movies. But over the years, people started to comprehend the true meaning of this technology. And what characterize the Artificial Intelligence is that it

accomplishes the repetitive activities that human are bored over the days to do. In addition, another important feature is Data ingestion (Verma et al., 2021). In fact, Artificial Intelligence is capable of gathering a large amount of information and analyze them. It collects information about people and collects the sources and keep them in store. So basically this type of technology is very beneficial for large companies such as GOOGLE where it is impossible that a human collects and preserve all the needed information. Next, the AI systems interact with its environment. It can identify what could happen next. For example, if a machine could break, the AI technology alerts its users in order to take actions before breakdown (Verma et al., 2021).

Moreover, over the years, the world have witnessed several technologies. But the problem in these machines was that they does not function outside their given code. Hence, with the Artificial Intelligence, the machines are now capable to analyze all the given models and codes, and then adapt accordingly to any new situation just by analyzing and comparing new sets of data to the old ones.

Several individual wonder about the true concept and foundation of Artificial Intelligence. And in fact, this technology can be explained by simply just saying that it is the interpretation of human thoughts into machines. So, it interprets the simplest and most complex tasks and activities. In addition, the three concepts of AI are machine learning, deep learning, and neural networks (Verma et al., 2021).

Machine learning is the fact of accepting, analyzing, processing and learning new information. As for the deep learning, it is inspired by the neurons in the human's brain. So, it inspired by what we find in the people's biology. It is based on computer science and math, so it interprets information, learn and then commend to get into action, just like a human in action. So, instead of an individual acting, it is a machine that acts using nodes as neurons (Verma et al., 2021).

And concerning the neural networks, it is composed from three different layers which are the input, hidden, and output layer. The concept of this function, is that it allows the machine to interpret the given materials and interact with its environment in order to act accordingly just like a human would have done (Verma et al., 2021).

After learning the concept of Artificial Intelligence, it is suitable to understand its role and function in marketing and its experience with the customers. In fact, AI analyze the behaviors and its environment and it determines the liking, disliking, purchases, habits, etc. of the customers; and this feature is very helpful in the customer service management department as it allows the companies to better understand what most and what the majority of its clients' needs and want. And in order to have better outcomes, several stores shifted the traditional stores to smart stores which are equipped by this technology and it can track the five senses of the people. These types of shops witnessed a better relationship between the customers and the stores, and this resulted in a better outcome in sales (Verma et al., 2021).

Furthermore, because of its characteristics, Artificial Intelligence can also be used in planning and in strategy. As a matter a fact, AI will work by using positioning, targeting, and segmentation. In this way, it will eventually help the marketers in better viewing the strategic orientation of the company (Verma et al., 2021). This technology, that uses algorithm, can be used in different sectors and domains such as in the banking and finance field, tourism, art marketing, and other fields. In addition, Artificial Intelligence is also witnessed to have a big part in product management. Due to the fact that this technology can analyze, memorize information, and adapt to any environment, it is acting nowadays as a very helpful service for the customers whenever they want to choose a product they would like to purchase. In fact, to narrow down the options of products to the most suitable ones and it offers all needed information and details about these

products, in order to help the customers in their decisions. In addition, it collects information about what are the most wanted products which can be very beneficial for the companies in knowing what kind of products they should more develop or not for example (Verma et al., 2021). Furthermore, this technology improves also the pricing management. In fact, pricing is a very complex task since it has to take into consideration several factors such as the demand of the customers, and the prices of its competitors. These two factors mainly affects the pricing, but thanks to this new technology, the Artificial Intelligence system analyzes the demand of the customers, as well as the strategies of its competitors for example, through the algorithms, and it will automatically generate new price lists accordingly (Verma et al., 2021).

Moreover, place management, which take into consideration product availability and product access, is a job that depends on several other activities such as logistics, transportation problems, warehousing, and other networks which complements this kind of work. So, mainly this is considered as a repetitive job to do. In order to solve this problem, Artificial Intelligence was also introduced in this type of work and management in order to facilitate the work done. In fact, it was introduced for example through drones that are being used for delivery, and through robots for packaging the products, and IoT in order to track the items ordered. Hence, it made all the process much easier for both the clients and suppliers (Verma et al., 2021).

Next, not only did this technology help in the above mentioned activities, but it also helped improve the communication and satisfaction between the customers and suppliers. As a matter a fact, AI generates robots that greet the clients whenever they visit a website and ask them if they need any assistance. However, this service need to be complemented by the intervention of the employees to continue the discussion with the clients and assist them in any further service.

On another hand, marketing cannot be completed without promotion management. So, nowadays and due to the fact that a lot of competition exists, advertising and promoting each business became very important in order to attract customers and clients and increase the outcome of the businesses. For this reason, Artificial Intelligence intervened in this field and it helps people by collecting proper information, optimize the search engine, and transform the physical tactics into digital ones. Once this is done, it can send private messages to each individuals according to their surrounding and environment (Verma et al., 2021).

On a second hand, and as stated earlier, Artificial Intelligence not only helped in one domain but in several others domain. So, other than marketing, it has also contributed enormously in the medical field and evolved especially after the spread of the Coronavirus. In fact, and as it is clearly known, that for more than a year now, the world faced and is still facing this pandemic. All the countries were affected excluding Antarctica. What promoted also the wide and fast spread of this virus, is the lack or very few symptoms during the first four days of infection, and it was found later on that some people were asymptomatic but still they were able to infect other people if safety measures were not taken.

So, the medical staff felt that they were the firsts to be exposed to the virus since they are dealing with patients carrying this virus as part of their jobs. For this reason, and to minimize the risk of them getting infected while performing their duties, technology intervened, and robots were displayed under their use. In fact, robots helped in the hospital by being assigned the chores of cleaning for instance in places that were highly infected, or food preparation on another hand (Khan, Siddique, & Lee, 2020). For this reason, a study was made in order to analyze how the healthcare sector can be improved by using the intervention of robotics.

Because everyone is now aware that robotics is starting to play a major role in the healthcare area, it is estimated that more facilities will demand this medical technology, and it will witness by the year 2022 a 9.1 billion dollars. In fact, robots will start helping physicians and all the medical staff which will increase the efficiency of the work being done in these facilities since the robots are now taking in charge some activities instead of the employees.

Some of the tasks assigned to the robots are transporting, nursing, rehabilitation, sterilizing, and cleaning. But in order to perform these activities with reliability while minimizing the errors and maintain a high precision, the designers of the robots should allow an enough number of degrees of freedom for the robot to move in all the needed axes (Khan, Siddique, & Lee, 2020).

To better understand how the robots can execute these tasks, few examples will be given below.

Concerning the sterilization task, the robots that are responsible for this job should be constantly sterilized themselves in order to prevent the transmission of any bacteria or virus if they were in contact with any contagious patients. But as for the cooking robots, they were designed in a way to get washed without being damaged after use.

And in order to prevent any mistake and avoid any threats for the medical staff as well as for the patients, and respect the codes of safety, robots should be designed according to the safety requirements. And as for the performance of the robots, they should follow the standard IEC 80601-2-78 (Khan, Siddique, & Lee, 2020).

For a proper function, a constant power should be provided. In fact, AC/DC power should be provided all day long without interruption. Power is always required for the patients in the hospitals, it is definite that there are other reliable power solutions, so it should not be a main

concern concerning the power requirements for robots. One of the trendiest solutions that is being developed, is the wireless transfer for robots to reduce the frequent need for charging.

Moreover, this technology, which uses artificial intelligence, is considered relatively expensive since they are not feasible in most countries. In addition, the solutions of these robots are also expensive since they are made due to high technologies and an addition of video systems that enable the performance of the medical staff. (Khan, Siddique, & Lee, 2020).

Also, robots are able to act as receivers. In fact, due to their large capability of processing several information, thanks to the Artificial Intelligence systems, robots are eligible to work as receptionist and guide the clients to their rooms and take in all their personal information. Plus, kids can find the robots amusing which makes the work environment more pleasant.

Next, robots can also work as nurses. As a matter of fact, human nurses should always accompany the doctor, and it is the same case for robot nurses. However, in some cases like in Japan, there is a high percentage of elderly individuals. These aged people need a constant care, and since they are a majority in their society, constant care is not always provided due to the busy life and jobs of their younger ones. For this reason, Japan for instance, is searching for alternative solutions like the robots that could provide a constant care for the elderly individuals and take care of them.

Taking the above idea as a starting point, there is a fear now that Humanoid nursing robots (HNR) may replace the existing human staff of nurses. In fact, due to the advanced technologies, robots are designed in a way to respond and provide services according to each patient's illness. For instance, some robots that are assigned for Alzheimer patients, constantly show different images of the patient's relatives and friends and ask them to match the pictures with the corresponding names.

But, meanwhile, there are a lot of people who does not approve of the dominance of these robots in the medical field, stating that human nurses and human interaction will always be needed in this field as well as their intervention (Khan, Siddique, & Lee, 2020).

Next, in order to reduce the number of death, ambulance robots are newly introduced in the medical field. In fact, in the European Union, almost 800,000 individual per year suffer from cardiac arrest, and only 8% survive. This low number of survivals is due to fact that emergency services and ambulances take for about ten minutes to arrive whereas the most needed medical intervention in these cases is between four to 6 minutes. So, the faster the intervention time of the ambulance and the medical equipment, the higher the number of survivals. Hence, in order to achieve this goal, robots were used as lifesaving strategies. In fact, they could be designed as compact and lightweight and they will be transported by a drone with medical equipment and supplies for a life support (Khan, Siddique, & Lee, 2020).

As for the serving robots, their main duties is to provide food and beverages for several patients, remove the dirty laundry, provide fresh bed linen, transport waste, and other activities. By doing these tasks, they are reducing the work stress on the human nurses, it will increase their work efficiency in a significant manner, and decrease the risks of them getting infected by diseases.

As for the cleaning services, cleaning robots were also being used nowadays. They can use either mopping or dry cleaning. But what characterizes these robots from the industrial machines, is that these robots disinfect the surfaces while cleaning, which is essential in order prevent the transmission of any disease, bacteria, or virus.

Furthermore, technology has also evolved significantly in the transportation sector, and specifically after the pandemic of COVID-19. In fact, in some countries, they started to adapt

autonomous vehicles, cars that self-drive, in order to reduce the human contact. However, there are still many debates concerning this subject.

The use of these vehicles serves several functions. In fact, in China, a delivery company called Neolix used self-driving vans in order to provide for the greatest ill cities infected by the covid-19 virus. In addition, other self-driving vans were used to disinfect the city all by themselves. And in Florida as well, this technology was used in order to transport COVID-19 samples to a nearby hospital (Baeli, 2020).

While these vehicles were used to transport food and products around the cities, they can also be used as a public transportation. In fact, after the quarantine era, governments and cities are starting to look at the public transportation from a different perspective. In fact, they want to reduce the overcrowded spaces. For this reason, several cities are adding bicycle lanes on their roads to encourage other ways of transportation. Plus, they are also encouraging the private taxis for example. From this perspective, they are coming up with the idea of having self-driving taxis, which are actively being used in China, to reduce the contact between people and reduce the risks of getting infected.

But then, it remains the question of safety. Will the people and citizens trust a self-driving vehicle or not? (Baeli, 2020)

As a fact, the citizens are worried not only about these vehicles, but also to the fact of sharing the roads with such a technology, without the human reaction while driving.

In order to make sure that the best solutions are provided for the public and that the best safety measures are being taken, the roads are being designed through a simulation program, where they

allow the designer to decrease the road safety and risks on the software to come up with the best possible outcome.

One of these software being used is called PTV Vissim. This software can test the reaction and behavior of the self-driving vehicles, taking into consideration several factors such as weather conditions, and surprising events. And by using different types of roads and different types of vehicles along with a reduced risk, the best outcome and solution will be provided to the public, hence make sure that these autonomous vehicles can be safely used (Baeli, 2020).

Moreover, in order to prevent the transmission of the COVID-19, China as well as for other countries integrated technology into their daily lives as mentioned also earlier. Not only did they use robots, or self-driving vehicles, or Artificial Intelligence, but also they created a very simple method that is the most common technology in the world, and this is the cellphones. In fact, an app has been invented and downloaded that helps detect any person who carries the virus. So, every time someone gets close to another individual who is carrying the virus, the app notifies the first person. In this manner, the virus can be prevented from being transmitted in a very easy and simple way. So, by just downloading an application on the cellphones, people are now able to identify who they can communicate with safely (Jakhar, 2020).

But once again, this technology raised the question concerning its privacy settings, since this app ask for the phone number, national identification, and name of its users. Moreover, there is a gathered data about each one that have a phone- the firms owned by the government and the health problems. For this reason, citizens are worried that these information could be leaked on the internet which will form a hack of people's privacy.

In addition, there is also a fear of discriminating the people who carries the COVID-19, and a fear that China is using the virus as a reason why they should update their surveillance system and forget all about privacy (Jakhar, 2020).

In addition, India also faced the same problem. In fact, this country is known for leaking sometimes some of the quarantined information about certain people on WhatsApp for example. So, it will be crucial to leak an information about someone as being false-positive in a society where discrimination and fear governs. As an example of such discrimination would be the refusal of providing some of services for the people who might carry the virus (Banerjee, Raman, & Sharma, 2020). For this reason, the use of these kinds of technologies should be used in a certain country with a certain culture.

Moreover, some of the features asked in these apps is the location of the infected person. And this is another issue that raised a serious concern among the citizens, about how to control the usage of these locations after the spread of the virus, since it would cause a dangerous threat to the privacy and civil liberty (Banerjee, Raman, & Sharma, 2020).

Next, reliability was also in question concerning these applications. In fact, in a dense gathering of people or in overcrowded place, there will be a need for a higher resolution other than the ones of the GPS and Google maps on our phone in order to trace a person who is false-positive or a person who is infected with the virus.

Also, since the coronavirus can be transmitted though surfaces, for example if someone sneezed on a certain surface, the app will need also to detect the virus on large surface area and perimeters in order to fully protect an individual. But due to the low resolution on our cellphones, which is

unable to detect this virus at a lengthy expense, mistakes are detected by having false positive results (Banerjee, Raman, & Sharma, 2020).

Moreover, other solutions were also promoted to make sure that there is a public safety. A number of police officers were asked at first to stay on the streets and make sure that everyone is abiding by the rules, and that everyone is taking all the safety measures such as wearing their facial masks. But in some countries, different measures have been taken using advanced technologies which made easier on the authorities to control the transmission of the virus, and the detection of anyone who is not abiding by the rules and wearing their masks. For example, in Tunisia, authorities used unmanned vehicles that drove through the streets wired with a video, audio, and a sensor to make sure that no one is breaking the law. Next, in China and Spain, flying drones were used to disperse crowds, and giving instructions concerning the virus. These drones had zoom cameras and megaphones patrol. In China for example the cameras of the drones with thermal imaging can sense the high temperature of a person (Koss, 2020).

People are rethinking of the ways they can mix information, and analyze data while using the artificial intelligence. Artificial intelligence is referred to machines that are able to receive the stimulation led by the beings while giving back the precise instruction or result (Shubhendu et.al, 2018).

Artificial intelligence is created to produce decisions by using the input real data. This artificial intelligence differs from the passive machines used daily which only have reactions that are set while creating them. For example, the passive machines can react to sensors or digital data and act accordingly.

“Machine learning takes data and looks for underlying trends. If it spots something that is relevant for a practical problem, software designers can take that knowledge and use it to analyze specific issues. All that is required are data that are sufficiently robust that algorithms can discern useful patterns. Data can come in the form of digital information, satellite imagery, visual information, text, or unstructured data.” stated by Harris (2018, p.5).

Moreover, Shabbir et.al (2015, p. 2) said that, “the term intelligence refers to the ability to acquire and apply different skills and knowledge to solve a given problem. The artificial intelligence nowadays has the capacity to mimic the human intelligence, therefore it can produce multiples tasks that require the use of logic with solving problems to take the right decision. (Feuerstein et.al, 2002) (Milford et.al, 2015) (Fragkiadaki et.al, 2015). Artificial intelligence is used to develop various robots that have human intellectual characteristics, behaviors, learning from past experience, have abilities to sense, and abilities determine meaning of certain situation (Turan et.al, 2017). Artificial intelligence refers to the intelligence of the computers and software have a robotic thinking illustrated through their performances. An example of artificial intelligence is the robotics cars that do not need supervision or any control from the human being, it includes smart machines that can analyze and memorize a large amount of data that a human being cannot. The human beings are afraid of the artificial intelligence because it can sometimes replace them in the working space, but it is still free of any emotion and cannot communicate with the humans. The machines are still in need for the human to control it and process the data required for any function (Martinez et.al, 2015).

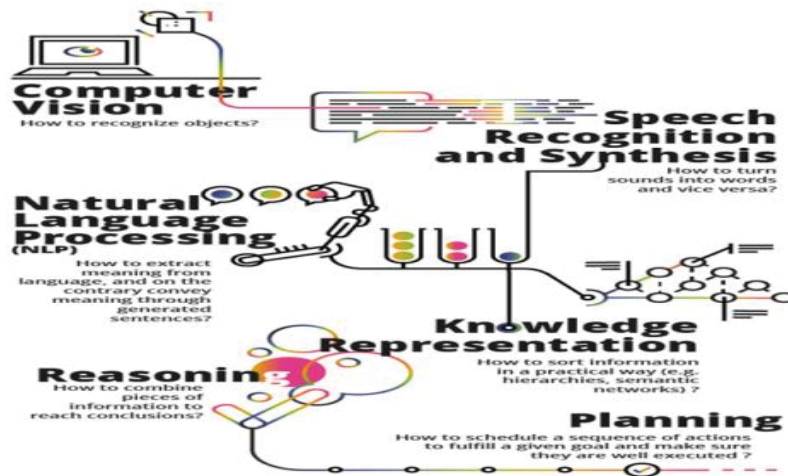


Figure 2: Abilities of Artificial Intelligence - Source: Shabbir et.al, 2015

“The origin of artificial intelligence goes back to the advances made by Alan Turing during World War II in the decoding of messages” (Shabbir et.al, 2015).

“What we want is a machine that can learn from experience,” and that the “possibility of letting the machine alter its own instructions provides the mechanism for this.” stated by Turing in London (1947).



Figure 3: Illustration of the inability to create a thinking machine

In the mid-20th century the artificial intelligence was first created by the British pioneer Turing. During the world war he was thinking of the machines and how it can perform in order to help the humans in different tasks. Turing was discussing and trying to explore how the computers can solve new tricky or difficult tasks while using the guidelines; this process is called the heuristic problem solving (Sharkey, 2012).

Turning referred to the artificial intelligence by comparing it to the chess game, it requires resolving problems with defined methods and moves.

Rodney Brooks was the creator of Herbert the robot. Rodney inserted 30 infrared devices in this robot and a magnetic compass which helps in recycling the soft drinks cans by collecting them.

The Covid-19 has spread all over the world causing a pandemic with a high number of affected peoples who were diagnosed with respiratory failure. The countries are trying to figure out vaccines to stop the spread of the virus (Guo et.al, 2020). But the concerns are not only related to the medicine part but also to the data collection required to proceed in evaluating the virus.

The Artificial Intelligence encouraged many fields to find solutions such as in the engineering- medicine- economy and the psychological (Jamshidi et.al, 2020) (Mintz et.al, 2020) (Parikh et.al, 2019) (Schork et.al, 2019).

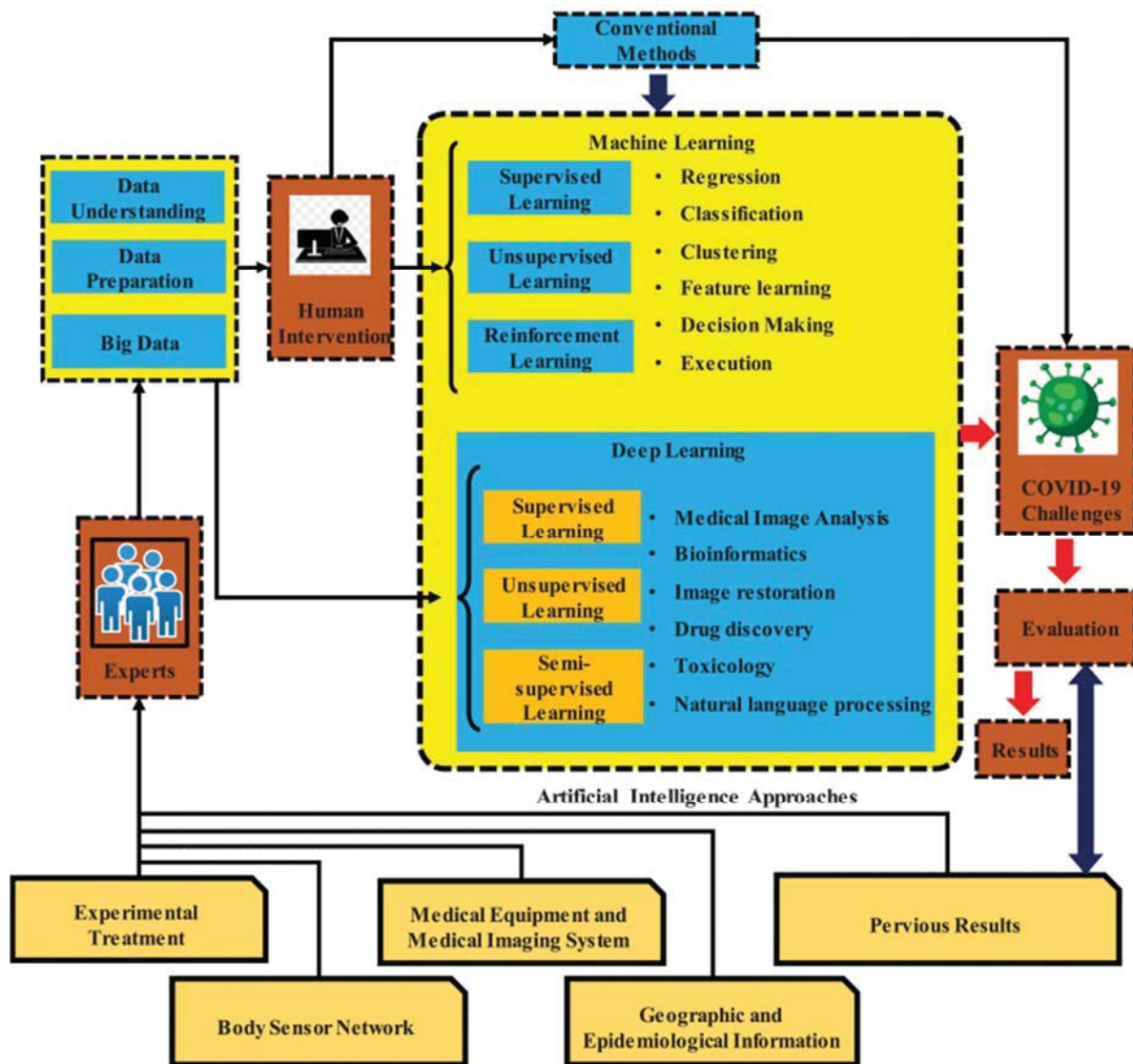


Figure 4: Deep learning and machine learning

A study done by Jamshidi et.al (2020) is represented through the figure above regarding the ways to overcome the Covid-19 crisis. The main objective is first to understand that the human contribution is very important first for the data input. Furthermore, the Deep Learning (DL) is a process used when faced with problems in the processing of the data. To note that the DL are independent from the human interference (Jamshidi et.al, 2020).

“AI could be extensively applied for COVID-19; however, we aim at finding the best possible solutions COVID-19 related issues that have put the biggest challenges ahead of health care systems. Accordingly, these solutions have been categorized into 3 parts, including high-risk groups, outbreak and control, recognizing and diagnosis.” Jamshidi et.al, (2020, p.3).

Fast and accurate diagnosis of COVID-19 can save lives, limit the spread of the disease, and generate data on which to train AI models. The Artificial Intelligence are being developed in order to detect the presence of the Covid-19 virus while using chest radiography (Bullock et al, 2020).

3. METHODOLOGY

The chapter three of the thesis is the methodology. In this chapter, comparisons between different technologies will be discussed as well as their advantages and disadvantages. In fact, as stated earlier, one of the technologies used to fight against this pandemic are the self-driving vehicles, known also as autonomous vehicles. This technology was enhanced during COVID-19, and the companies in charge were encouraged to further develop the vehicles in order to decrease the human interaction, therefore decreasing the spread of the virus.

Nevertheless this problem gained the people's attention. So, the advantages and disadvantages of this technology will be discussed and will be further elaborated comparing the human driving cars.

First, companies in charge of this technology states that these vehicles will not only reduce the human contact and hence limit the spread of the virus, but also reduce the number of accidents. In fact, a study has been made concerning the capability of human driving a car versus the capability of the machine, hence the self-driving vehicles, in function of the time. It was found that the machine has a much longer capacity in driving than human as the time increases.

In order to achieve such results, a comparison was made between the autonomous vehicles and the human driving a car. A bunch of capabilities was set, and they were subjected to same conditions. And after several tests, it was found that these self-driven cars had a long capacity of enduring driving than the capability that the human has.

Below, a simple graph shows the exponential growth of the capability of the autonomous vehicles in function of the time versus the capability of the human over time.

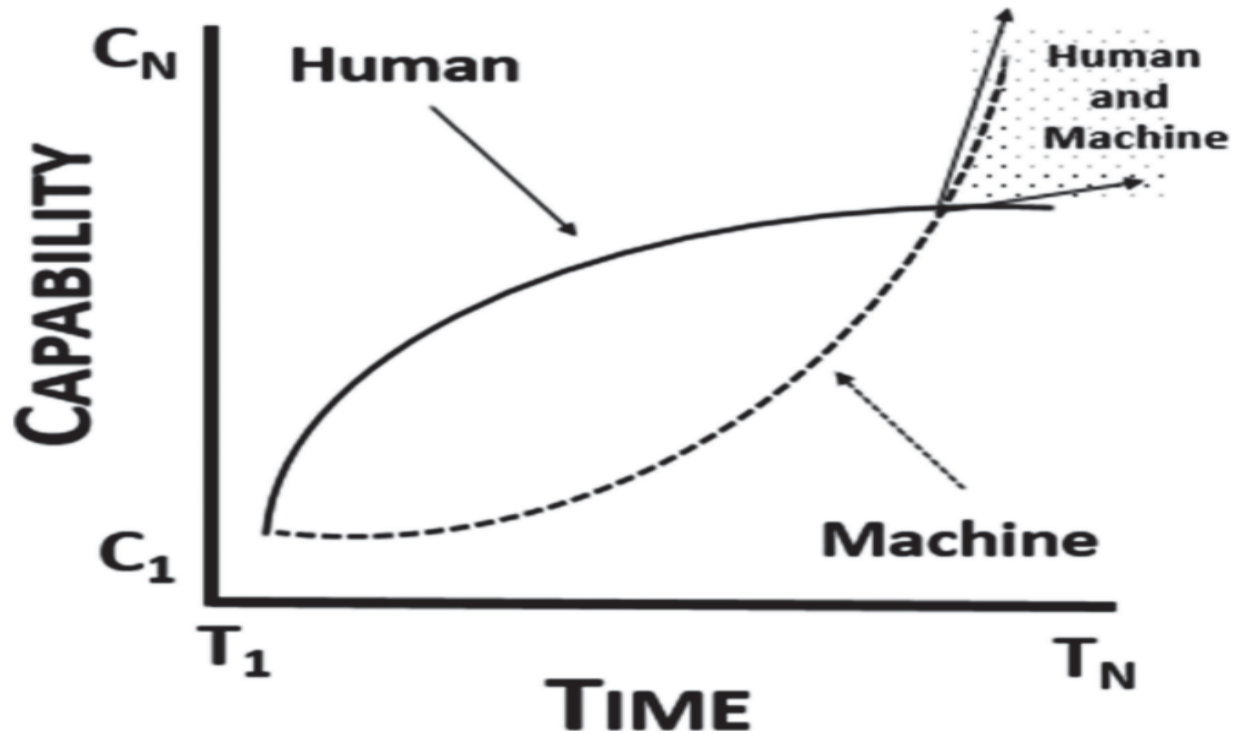


Figure 5: Machine capability versus Human capability

In addition, these vehicles could help in reducing traffic and may serve as a useful technology for people. As a matter of fact, researches have shown that during traffic, around 30% of the drivers are looking for a place to park their cars. So, they keep circling around the streets until they find an available parking spot (Hancock, Nourbakhsh, & Stewart, 2019).

Hence, by introducing the autonomous vehicles, people are even not required to own a car. So, by asking for a self-driving vehicles through a very simple manner such as by ordering a car through a mobile application, the car will come pick the person up and then take them to their required end point. So, people will be able to reduce their traveling time just by saving the time looking for a parking spot. In addition, this advantage comes also with another benefit which is the following.

By using the autonomous vehicles and introducing them into people's daily lives as a way of transportation, after few years, there may not be a need to build parking facilities, but instead, urban planners could use this free space in order to build other facilities such as houses, hospitals, hotels, and other structures. By doing this, the space will be serving a more useful purpose (Hancock, Nourbakhsh, & Stewart, 2019).

Furthermore, more advantages have been proposed concerning the self-driving vehicles. In fact, a lot of accidents are caused due to texting and driving, or by the inability of human to fully concentrate due to fatigue or emotional feelings. For this reason, machines are considered the most suitable replacement and solution for such hazards.

As a matter a fact, if people start using the autonomous vehicle as a way of transportation, they will be able to work, text, use their phone freely without the risk of having any accident. The vehicle will avoid several dangers to ensure a safe arrival to the destined place. Next, if people had a rough day or they feel tired, or they feel emotional due to any situation, their capability of concentrating will reduce, and hence increase the risks of having an accident. So once again the self-driving vehicles are the perfect solution for this problem. Therefore, people will no longer worry from any accident on their road, instead they are only required to sit till they get to their destination.

Furthermore, these autonomous vehicles are designed and programmed to react in a fast manner whenever an obstacle comes up or whenever it senses any disturbance change. So it has been tested that the computer's reaction is faster than the human's reaction. For example the self-driving cars reacts in 0.2 seconds to hit the brakes, unlike the human who takes about two seconds to process the information and then hit the brakes. The difference in both reactions is demonstrated in the below graph.

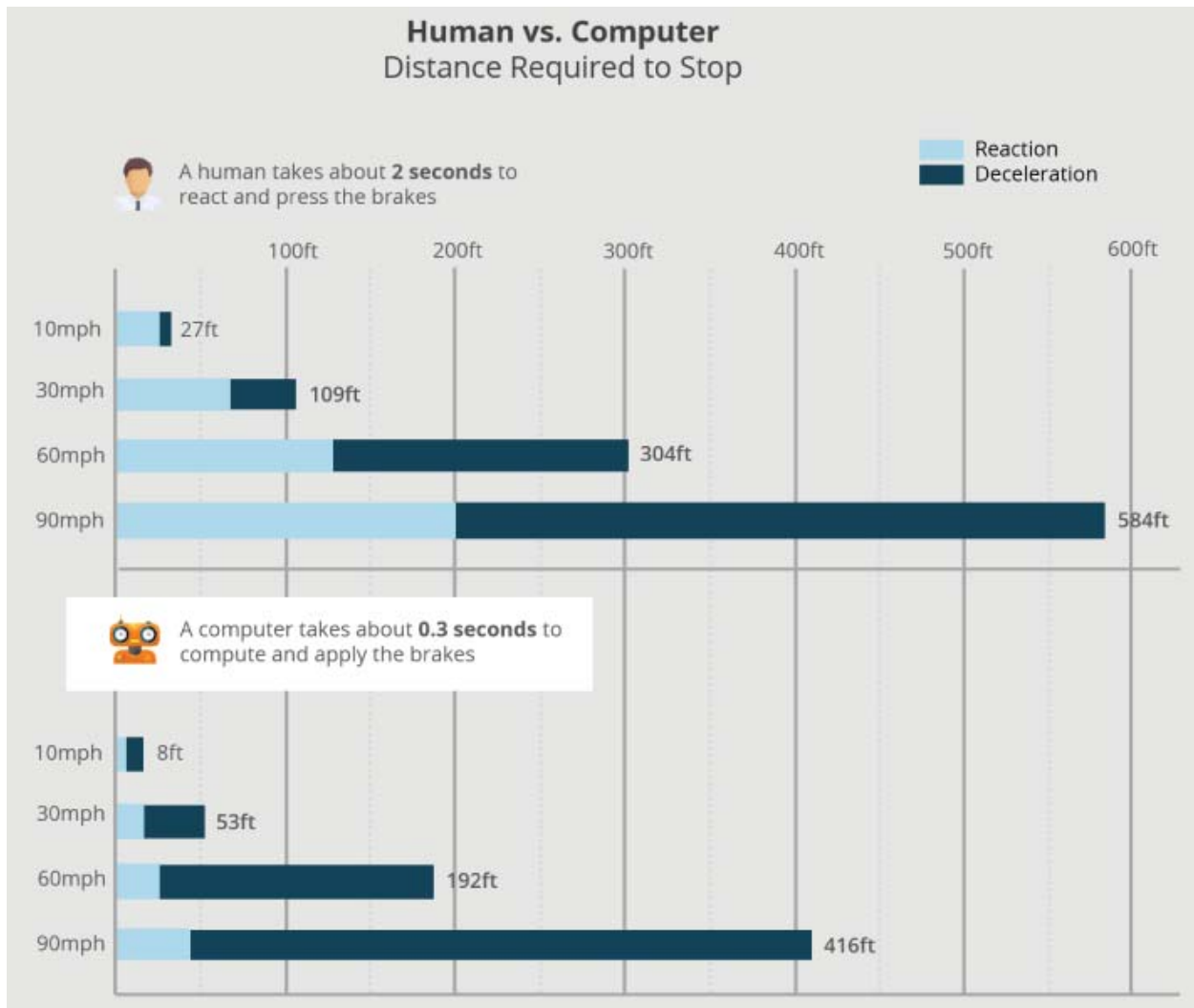


Figure 6: Human reaction versus computer reaction

In addition, the companies concerned in these technologies are currently paying a lot of money just to make sure that they reach an ultimate safe and practical design that is accessible to all people and citizens. In fact, in order to reach their required goal, companies are subjecting this technology to six stages in the United States. They start by having a full drive assistance and progress to have at the final stage a fully autonomous vehicle that is capable of operating all by itself. Below a figure that explains better how the progressive stages of this technology is presented in a clear manner.

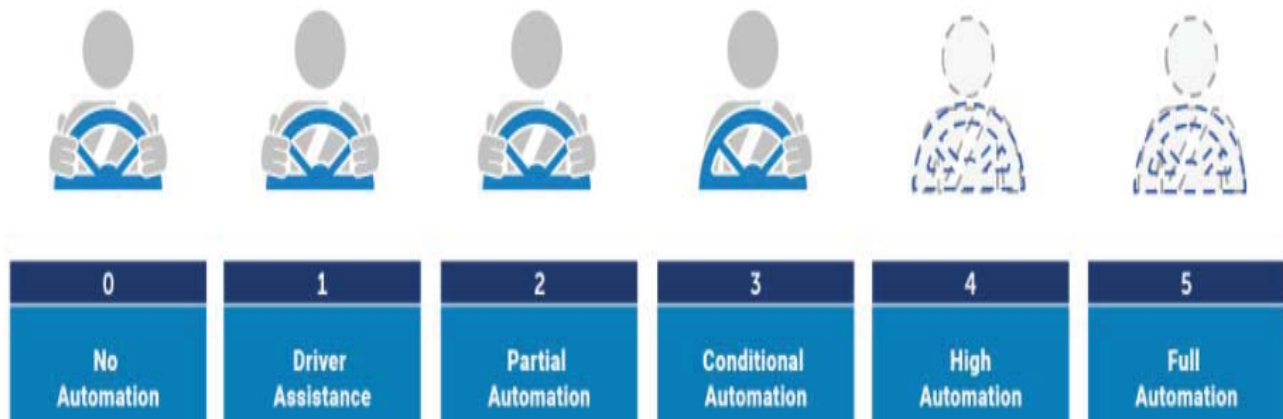


Figure 7: Six stages to develop a fully automated vehicle

The motorized engineers clarified these steps as follows:

The first step is when the human is fully taking control of the car, and he is doing all the required tasks. As for the second step, the human is still taking control of the vehicle, but some features are added in order to handle some activities. In the partial automation, which is the third step, the more automation is added to take care of steering and the acceleration for instance, however the intervention of the human should be needed, and therefore the supervision of the situation is required. But, in the fourth step, the human is not required to monitor the environment, but he should be ready to take control when needed. And when it comes to the high automation, the presence of the human is not a must, but he could stay if he is interested in performing a certain job. When the vehicle reaches the best performance on its own without any further help, then it is a full automation. The National Highway Traffic Safety Administration have set rules to follow.

So, these vehicles will be designed in a way to respect the traffic rules and rules set by the government while also paying attention to the spans. This fact makes it a more reliable technology even more than human, since sometimes some individuals tend to break the traffic rules in case if they are for instance in a hurry, or drunk. So, by knowing that these vehicles will not break any rule, it will lead to a safer ride and a safer transportation.

This solution is useful for the tourists when visiting a country and not knowing the traffic rules and its road regulations. So having a self-driving car to transport them anywhere they would like without having to deal with any rules and law enforcement seems like a pretty good solution to their worries (Hancock, Nourbakhsh, & Stewart, 2019).

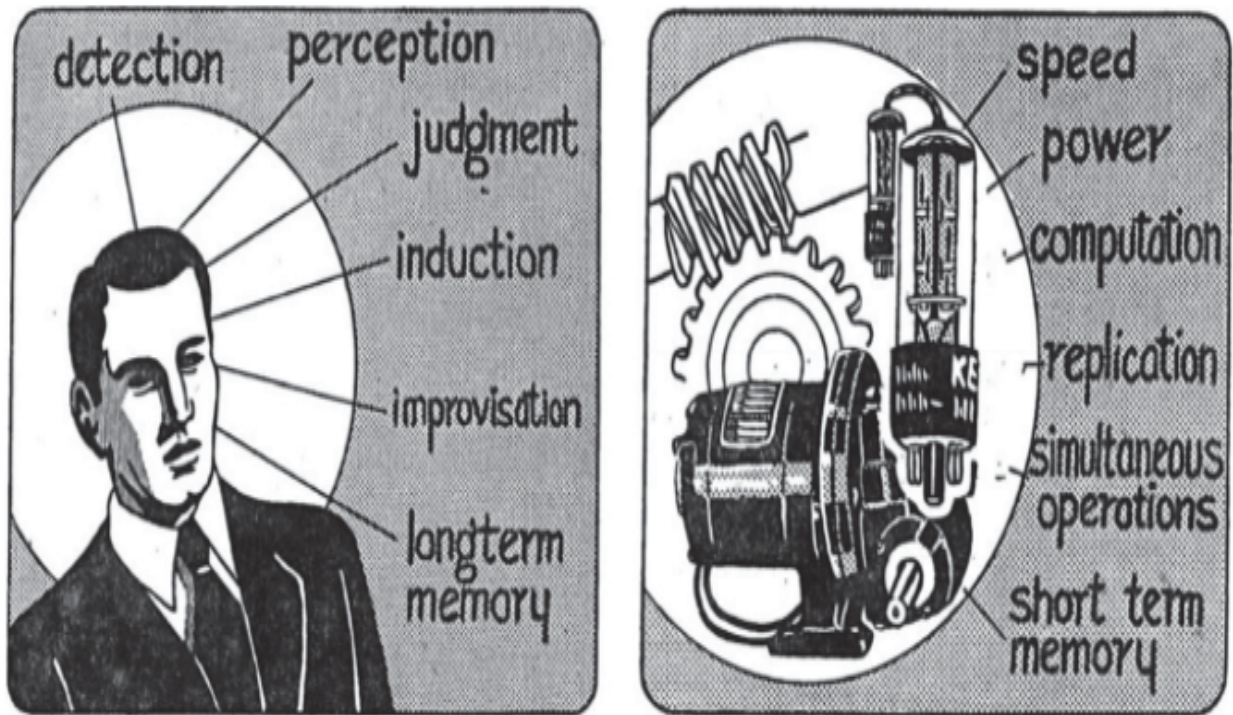


Figure 8: Human drivers versus self-driving cars

Moreover, and as stated earlier, these vehicles are designed to be accessible for anyone. And since a lot of people don't know how to drive or own a car, these cars will make their traveling time a lot more personalized since they will be alone in the car and a lot more easily than just waiting for the train, metro, or a taxi to come and pick them up.

Next, the last few years, an awareness concerning the environment has been more and more active. So substitutions for current non-environmentally friendly products have been invented or currently being invented in order to preserve the world for future generations. And a known fact, vehicles

contribute a significant percentage in the air pollution. So over the years electric cars for example have been invented and have been encouraged to start using them in several countries. So, based on what have been discussed above, the autonomous vehicles are also currently being designed in a way to be environmentally friendly. And this is an additional reason for why these vehicles should be more employed and used nowadays. In fact, by reducing the percentage of air pollution, and reducing the usage of fuel these cars can play a part of ensuring a better environment as well as a better world later on.

However, even though this technology could bring a lot of advantages into people's lives, it could also have several disadvantages.

In fact, by introducing these vehicles in the market, it may eliminate the need of having a taxi driver or a bus driver for instance which will lead to an increase in the unemployment rate. In fact, knowing that this technology exists, city transit agencies, taxi agencies and other forms of transportation agencies should now consider how their future career might be affected and start by thinking about alternative solutions. In addition, a lot of questions were also raised such as is there any need to maintain the public transportation such as the train for example and pay for their high maintenance cost with the existence of such vehicles that facilitates the transportation of people and is accessible for everyone even the ones who does not drive such as the kids and the disabled individuals? (Hancock, Nourbakhsh, & Stewart, 2019).

For this reason, a lot of people will not accept this technology and they will not agree on introducing into in an intensive way in the market in a way that will allow these vehicles control the roads as a majority and not allowing individuals to be a part of a driving society. The specific aim of this condition is that if these vehicles becomes the majority of the "drivers", it will obligate the countries to take measurements to facilitate the work of these technologies such as reducing

the number of parking, or eliminating some buses or metros, which may make a negative difference in some people's life.

In addition, another disadvantage of the autonomous vehicles is that their maintenance is costly and expensive. In fact as all new rare technologies, if something is damaged, limited companies could help in such situation which makes the cost of their services more expensive. Plus, such technology requires an enhanced technology and enhanced materials in parallel to keep up the same level of productivity and efficiency.

Moreover, a lot of safety issues should also be concerned. In fact, since safety is considered to be one of the primary reasons for why one should use the autonomous vehicle, then they must be providing a lot more safety than the human driving a car.

In fact, a study has been made concerning the accidents in the United States in 2016. It was found that 37,461 individual died during car crashes on the roads. So will these vehicles will be as twice as safe of the human driving a car, so it will reduce the number of accidents and hence have only 18,000 die each year? Or ten times much safer? People are wondering about the real number that reflects the safety of these autonomous vehicles, but the concerned companies are still working on it and there is no specific measurement of how much these vehicles could be safe (Hancock, Nourbakhsh, & Stewart, 2019).

In addition, with the spread of the autonomous vehicles, people might unlearn how to drive manually, and will start to depend on the self-driving cars. This issue will cause an issue since it is necessary nowadays for one to know how to drive. In fact, these cars might be used only in specific countries or in specific areas, but what will happen if someone needs to go to a certain destination or a certain country where the autonomous vehicles are not used? They will make their

life and travel more difficult than renting or owning a car for example and go to anywhere they desire.

Moreover, the advantages and disadvantages of several other technologies used to fight the coronavirus will be discussed in order to better understand how they function, their objective, and to better analyze and conclude which technology is the best during this pandemic.

Starting with the most commonly used technology nowadays is the Artificial Intelligence. This technology has witnessed a lot of improvement over the years and it was recently updated in order to fight the coronavirus.

In fact, one of the many tasks that were handled using the Artificial Intelligence technology is the lenses or cameras which detects whether an individual carries the virus or not or if the individual is wearing a facial mask, or even to detect whether a person has a high temperature or not. As a matter of fact, with the pandemic rising and spreading all over the world, an immediate intervention by the authorities have been taken. At first it started with the lockdown and obliging all the people to wear facial masks as well as maintaining social distancing. But, in order to achieve a much better result later on and reduce the number of infections, some law enforcements took place. However, it was impossible to control all the country at once, so for this exact purpose, the cameras with Artificial Intelligence were employed to detect any person not wearing a facial mask for example.

However, generally speaking the advantages of the Artificial Intelligence are numerous. First, they eliminate or reduce the number of errors made. In fact, this technology works by gathering a large range of information and a large range of data and it is capable of analyzing the environment as well as the given information in order to react in a correct manner. So, having said that, if the

program is given the right codes, than the number of errors made while working will be significantly reduced or even eliminated when compared to the errors made by human.

Next, using the Artificial Intelligence, people will now be allowed to reach definite set goals that the human alone could not accomplish. What is meant by the previous sentence, is that some projects requires a lot of risks, physically or mentally, which is sometimes impossible to be done alone without the help of technology. For instance, going to another planet as a very simple example, could be done using a programmed robot instead of sending a human and endangering his life in order to attain the necessary outcomes (Kumar, 2019).

Furthermore, by using the Artificial Intelligence, services will be provided all day long. As a matter of fact, the average human is able to work around six to eight hours a day and have some time as a break in order to refresh himself before tackling another busy day or another activity. Unlike the robots or a machine built using Artificial Intelligence, which will never get bored or tired from doing a certain task. So, by using them in the workplace, the service of a certain company such as a helpline for instance, could be available 24/7 (Kumar, 2019).

Next, the Artificial Intelligence technology also helps when it comes to performing repetitive jobs. During the day to day work, some tasks may be repeated several times which makes it a loss of time in some cases, and it also makes it frustrating to perform the same activity repeatedly. As an illustration of what is discussed, when writing an email, some sentences might be written several times, so by introducing the Artificial Intelligence in the mail, it will auto-generate the sentence that should be written (Kumar, 2019). This feature, helps a lot the employees whenever they are doing their jobs, and it helps them to be more at ease which will boost their efficiency in the workplace.

In addition, this technology also serves as a digital assistance. In fact, nowadays a lot of companies are using Chatbot or a Voice bot that will assist the clients with any service they like. And it is sometimes hard to differentiate between the robots and the human. Hence, service will be quickly provided in a friendly manner, and it will be provided whenever a customer needs any assistance, hence all day long (Kumar, 2019).

Besides all the advantages that come along with Artificial Intelligence, some disadvantages also exist. First, this technology requires constant maintenance which requires a high cost. As well as, it requires a constant update of the software and the hardware to meet the latest requirements. And since it is a very complex technology, these updates and upgrades are very expensive.

Next, even though Artificial Intelligence serves as a purpose to facilitate human lives and make their daily tasks, for example, easier, it is causing a higher rate of unemployment. As a matter of fact, when Artificial Intelligence is handling activities that people can do, and maybe perform this activity in a more precise and better way than the human would have done, this means that there might be no additional or further need for the human's assistance in some jobs, which will cause a problem in the future with the increase of the unemployment rate (Kumar, 2019).

Moreover, if people get used to the fact that Artificial Intelligence performs their tasks on a daily basis, they will become lazy and they will lose their will to work harder in order to achieve a certain purpose which will cause a problem for future generations. In addition, not only will the people get lazy, but they will stop thinking out of the box. They will be content with the provided service and they will stop using their analytical skills whenever they face a problem, but instead they might rely on this technology to handle the situation. But in fact, Artificial Technology has a risk of crashing if handled a new situation (Kumar, 2019).

Furthermore, there will be a lack of emotions. In fact, even though it was proven that machines are better than humans when it comes to efficiency, but it could never replace the human interaction which is essential in any business or in any team management (Kumar, 2019).

Concerning the drones, this technology was also used to fight the coronavirus by detecting people with a fever, or helping in the medical field by attaining people with a heart attack for example and supplying them with the needed medical equipment. It also has advantages and disadvantages that will be discussed below.

First, drones can be a cheaper method to attain air coverage for a certain company than renting a helicopter for instance. In fact, in case of news coverage, aerial mapping, emergency response, and police surveillance, the drones could come handy. Instead of renting a helicopter for 600\$ or 800\$ per hour, a drone could be purchased for almost 2,000 \$ along with all of its supplements. It will be considered as a one-time cost, which will make a significant difference for agencies and companies who has a lot of aerial coverage (pilot institute, 2020).

Second, due to the small size of the drones, they can reach areas and places that were unreachable by a helicopter, by foot, or a vehicle.

This characteristic is very helpful and especially when it comes to the police using drones. In fact, the police use the drones in order to have a live surveillance which keeps them ahead of any situation. Next, this feature also allows the police officer to rescue people and help them in a faster manner even at night. The drones have been updated and it can now identify humans even in darkness thanks to thermal imaging. And in many cases, if someone is stuck anywhere, drones are used to supply the people in danger with the equipment needed as well as food in order to keep them alive until they manage to come and help them (pilot institute, 2020).

Moreover, and especially nowadays, an awareness concerning the environment is now increasing and spread all over the world. The pollution is causing a significant impact on global warming which will lead to a several problems and issues later on. For this particular reason, substitutions of currently used technologies, things, or even materials are being used and invented just to protect the environment.

And since the drones are employed in different functions and domains, they were also used as a delivery technology that delivers packages, food, and other products. This characteristic was seen as a very clever idea since it reduces the time of delivery. But a study was made concerning the drone's delivery and the motorcycle delivery. And it was found that not only will the drones decrease the time of delivery but also they reduce in an important way the percentage of pollution, which reflects positively on global warming.

In this research, two parameters were calculated. The first in the global warming potential (GWP), and the second parameter is the particulates matter.

The GWP was analyzed and measured for both the drones and the motorcycles by using the TOTAL software, and as for the environmental impacts and in order to find the particulates matter, the study was made by analyzing eight different environmental impacts such as the ozone layer destruction, acidification, and eutrophication

A significant difference between the values of the drones and the values of the motorcycles were spotted. For instance, the measured environmental impact of the drone delivery was $4.37E \times 10^{-7}$ and as for the motorcycle delivery it was calculated to be 1.46×10^{-6} (Park, Kim, & Suh, 2018).

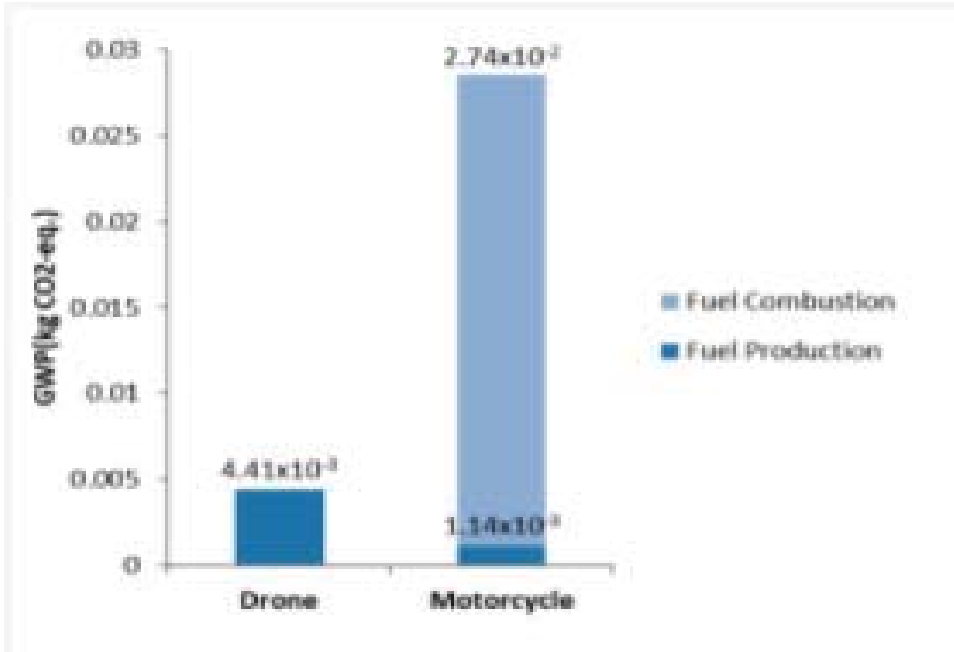


Figure 9: Global Warming Potential emitted in 1 Km delivery using a drone and motorcycle

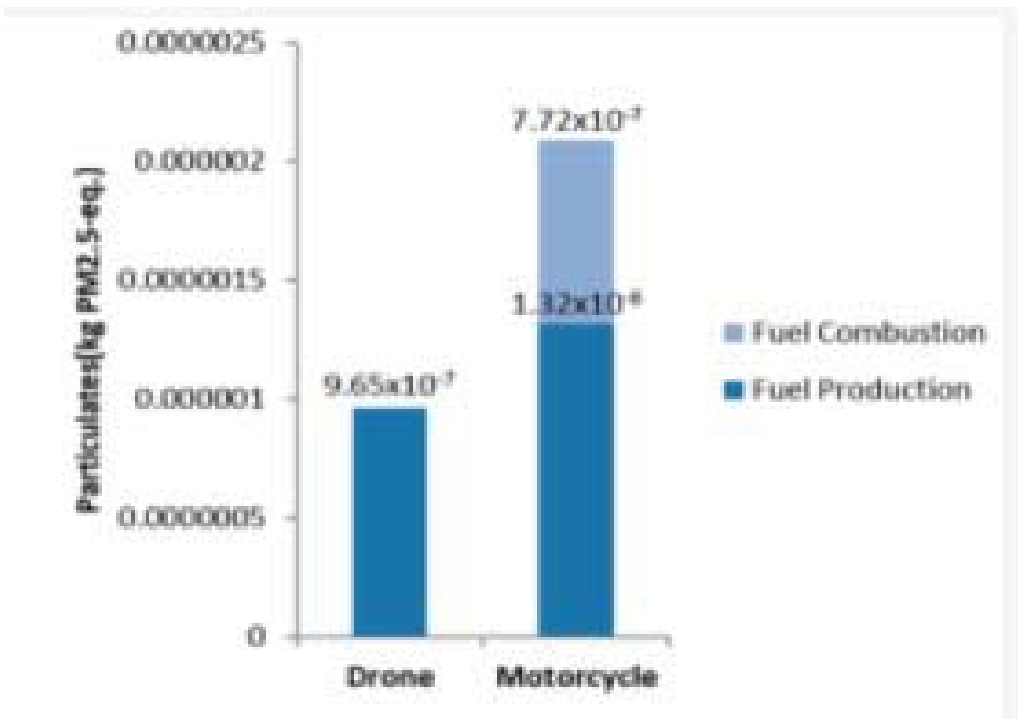


Figure 10: Particulates matter emitted in 1 Km delivery using a drone and a motorcycle

To perform the analysis, the energy options used are electricity and gasoline respectively in each of figures 9 and 10 (Park, Kim, & Suh, 2018).

By examining the two above figures, it is clear that the drones are much more environmental friendly than the motorcycles. So, for this particular reason, it is beneficial to use drones when it comes to delivery.

However, drones also have some disadvantages. As a matter of fact, one of these cons is that people feel that their privacy is being hacked. A lot of stories were told concerning people shooting a drone above their land, because they feel that their private life is being hacked. Next, drones are used as a camera that takes aerial shots. However, unfortunately and in a lot of cases, this technology is being used to record people, and save their images. For instance, in 2016 a man in Utah was found to possess a drone that has a lot of images and recorded videos of people in their own apartments, and they were filmed from the window of their houses. This scenario was also repeated in 2018, where a family noticed that they are being recorded on a beach in New Zealand without any authorization (pilot institute, 2020).

Moreover, drones may also cause property damage and cause injury. As a matter of fact, the drones are intended to be unmanned and lightweight. So crashes are more frequently to happen, due to several factors such as change in the wind direction, loss of signal between the individual in control, or death of battery, and other factors. For instance, a reporter in the Brooklyn paper was injured by a drone in 2014, when it suddenly crashed and hit her face which caused her a nose injury (pilot institute, 2020).

Furthermore, the mentioned above technologies are the most commonly used nowadays and especially during the pandemic. So, it is important to identify which one is the best technology and

which one should be the most frequently used and updated now that the comparisons have been stated along with the advantages and disadvantages of each one of them.

In order to identify which invention serves the best its community and country, the decision and analysis should be made based on the functions and advantages it promotes, and the proportion of the pros and cons.

In fact, when it comes to the autonomous vehicles, the advantages stated earlier may not qualify this technology as the best solution to serve the countries during this pandemic, and especially when a lot of people refuses to accept this new idea, and it will take a lot of time to be implemented in people's daily lives.

Moreover, as it concerns the drones, this technology has a lot of beneficial advantages and it could help the citizen in some ways, but somehow, their functions could sometimes be limited and there is no sufficient ability to help in a large number of sectors and domains. So, it may not also be the ultimate solution for the reduction in the spread of the coronavirus nowadays.

Hence, this takes us to the Artificial Intelligence technology. This invention, is now known to be a big part of people's lives. It can integrate any domain and field and make the individuals' work a lot easier. It can provide services that other technologies can't, and it is the essence of some other inventions such as the robots which depend on the Artificial Intelligence in order to function properly. And even though it has some disadvantages, the proportion between the pros and cons, leaves this technology as the best and ultimate solution to be used and updated nowadays, as it serves the community in a lot and different ways.

4. CONCLUSION

As a conclusion, a lot of technologies are being used nowadays and they are invented in order to increase the efficiency of people's work, to make their lives easier, and to help them achieve their goals and purpose in a faster and more reliable manner.

With the pandemic that is being spread in a fast manner between countries nowadays, there is a bigger urge to update these technologies in favor of limiting and reducing the spread of this virus.

In fact, different technologies such as autonomous vehicles, Artificial Intelligence, drones, robots, as well as other inventions have been employed more frequently. And even though they are made for a good purpose and bring a lot of advantages, they also propose some disadvantages that could cause problems in the future such as unemployment, fear of a lack of privacy and safety.

And as stated above, and after a lot of analysis, it was found that the Artificial Intelligence could be the most useful and practical technology to be used, specifically when it comes to fighting the COVID-19.

In fact, since technology is getting advanced with time in a very fast manner, it could reach after several years a point where it can perform all the activities of the human, which leaves a lot of damage behind including as a primary result the increase in the unemployment rate. So, one of the many existing solutions, is that the law enforcement and authorities limit the percentage of the use of these technologies in order to allow people continue their job. Hence, for instance they could assign that 30% of the customer service to be the robots and the other 70% to be formed from human interaction.

The firms and establishments will still need the help of human, and the technologies will be a set percentage by the government in order to improve the efficiency in the work of the employers. In

addition, more rules and regulations should be also fixed and provided by the government concerning the privacy settings of these technologies along with the safety measures, so nobody misuse any invention.

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