**3) Contextualisation**

**How Computers Learn To Recognise Objects Instantly**

**\*\*Travel And Tourism\*\***

In the context of travel and tourism, computer algorithms can be used in such industry to help identify certain locations of interest that a user may have and may also help in travel agencies to market specific advertisements of such locations to the user. For example, perhaps a user may post a picture onto social media of Niagara Falls. By using computer algorithms to recognise that the photo was Niagara Falls, this may help other users know the location and the photo. This would benefit the travel and tourism industry, as they may see an increase in customer interest of popular locations, due to it being easier for users to find the locations of popular tourist destinations. However, for complex photos

of certain locations, these algorithms may be hindered, as they may not be able to recognise these locations. Furthermore, many tourist destinations may be seen from various views, which algorithms will need to recognise by using vast amounts of data. The risks of using such algorithms in identifying tourist locations, could be that one location can be easily identified as a different location, which could lead to confusion, especially in politically sensitive tourist locations.

**\*\*Gaming and Entertainment\*\***

In the entertainment industry, computer algorithms could be used to identify and class whether the such content published is sensitive or not. It could also be used to classify and sort different games and entertainment into different groups, depending on what objects can be recognised, by the computer algorithms. Another use could be in virtual reality, and augmented reality which is used for some games and entertainment, where sensors can track and identify the surrounding environment of a user, and place images accordingly to where objects are. The benefits of such detection algorithms are incredibly helpful in the entertainment and gaming industry, especially as they can be used to make it easier for creators to create content, whilst also helping publishers maintain good control over what content is published, by having these algorithms identify when certain content are not suitable for users. However, these recognition algorithms are limited by the fact that as time progresses, games become more power intensive and complex, which means that this recognition software may require more and more power to identify content in such entertainment, thus will need large amounts of data when recognizing things in games and entertainment, especially when the amount of content being produced every day increases more and more. The risks of using recognition in these fields, is that some content can be misclassified as something else, or sensitive content may not be recognised and flagged by algorithms which may cause some users distress if such content becomes published.

**\*\*Education and Learning\*\***

In the education sector, computer recognition may be used to help educate and identify what objects are to users. Perhaps, they could be used in a phone camera app, whereby the algorithm is constantly running and displaying the objects to the user. This would largely benefit the sector, especially for people who may want to learn what objects are in a new language, or for young children who want to learn and interact with the objects around them, which makes an interactive environment for them. This may reduce the need for other humans in teaching users what objects are, which may make it easier for the user to learn and identify objects for themselves. However, learning cannot be solely placed on software alone, especially as such software may be unavailable for users who are less advantaged. Furthermore, by using recognition software, it may seem unethical to educate young children, as it may seem that this loses the sense of human interaction in education. Moreover, if recognition programs are poorly trained, this could lead to miseducation and identification of certain objects to users, which may be catastrophic.

**\*\*Transport and Navigation\*\***

In the transportation sector, computer recognition can be used in a wide range of computers, especially in the self-driving sector. For example, nowadays, Tesla has become a prominent business in developing algorithms which can identify objects through multiple sensors in a car, and allow the car to manoeuvre through a course. This would largely benefit this sector of transportation, because it may be the future of transportation, by limiting the risks that a human may bring to driving, and to allow robust programs to efficiently transport people. This may also benefit trafficking, especially as computer recognition allows the digital monitoring of traffic on roads, informing traffic officers and the general public on where to avoid busy areas, helping to provide a more efficient trafficking system. However, in order for computer recognition algorithms to have a meaningful impact in this sector, it would need a large amount of data and rigorous testing, especially as transportation could be dangerous. Also, these programs are often limited by legislation put in place by governments, protecting users' data as well as limiting the power that deep learning

algorithms have. The risks of using computer recognition in transportation, is that they could easily be hacked, if left unsecure, and may not be able to recognise objects when needed, ie. person in front of self-driving car.

**\*\*Medicine and Healthcare\*\***

In the context of medicine and healthcare, computer recognition algorithms can be used for a great deal of benefit. For example, by using computer technology, it could make it easier and more accurate for doctors to identify dangerous cancers in an x-ray scan, by using complex algorithms. This could perhaps allow doctors to identify areas of cancers in a patient’s body, which might not have been spotted, if a human inspected it. Perhaps, there could be a time when these algorithms become widely accessible to the public, whereby a simple scan could help diagnose multiple diseases in a patient, and advise on treatment based on such diagnostics. This is limited by the fact that such technology would need to have large amounts of data in order for the algorithm to be reliable. Also, because the human body and biology is so complex, computers would require large amounts of power to process these algorithms, which is limited by the technology we have today. The risks are that, by implementing computer recognition into disease diagnostic and treatment, it could mean that many jobs of hard-working doctors could be lost, affecting their livelihoods. Furthermore, it opens the new risk of cyberattacks on these computer algorithms, leaving various patients at risk.

**4) Abstract Thinking**

Steps to take in identifying whether a word is a palindrome.

An example where the word is a palindrome:

R A C E C A R reads racecar from beginning to end. When racecar is flipped, so that I begin to spell the word backwards starting from r, it spells R A C E C A R. This word is identical both in the forwards direction and the backwards direction, so it is a palindrome

An example where the word is not a palindrome:

D E F I E D reads defied from beginning to end. However, when defied is flipped, so that I begin to spell the word starting from its last letter, it spells D E I F E D. This word is not identical when flipped, therefore the word “defied”, is not a palindrome.

In general principles, identifying a palindrome would be to first:

* Label each letter with a number, in ascending order, starting from the first letter to the last letter. Let x be the number of letters in the word.
* Spell out the word from beginning to end (letter labelled 1 to letter labelled x in ascending numerical order), and note down what it reads.
* Flip the word inversely, so that you begin to spell the word from letter labelled x to letter labelled 1 in descending numerical order, and note down what it reads.
* If in both directions, the outcome of the word is identical to each other, then it is a palindrome. If otherwise, then the word is not a palindrome.

Research:

Examples of abstractions:

Only considering the duration of the microwave turning on and the power wattage of the microwave, and not considering the temperature of the food inside or the humidity of the microwave inside.

When coding a project for a game, the developer would not need to consider the marketing of the game, the price of the game nor the places the game is available. Instead, they would just focus on developing and writing code for the game.

Another example of abstraction could also be for developers, who take out unnecessary repeated actions in their code, and replace it with a function, which removes unnecessary bits of code. Developers can also use loop functions, which means that developers can remove the unnecessary repeated code of a program, making the program more efficient.

**6) Logical Thinking – Pattern Recognition**

* Draw a straight line that is x cm in length.
* From the clockwise direction draw an angle of 135 degrees and draw another straight line of the same length
* From the clockwise direction, draw another angle of 45 degrees and draw another straight line of the same length
* From the clockwise direction draw an angle of 135 degrees and draw another straight line of the same length
* Adjust your ruler by 36 degrees
* Repeat steps 1-5 10 times

import turtle

flower=turtle.Turtle()

for i in range(999):

flower.forward(100)

flower.right(45)

flower.forward(100)

flower.right(135)

flower.forward(100)

flower.right(45)

flower.forward(100)

flower.right(135)

flower.right(36)

turtle.done()

**7) Research and Critical Thinking**

“AI doesn't have to be evil to destroy humanity – if AI has a goal and humanity just happens in the way, it will destroy humanity as a matter of course without even thinking about it, no hard feelings." – Elon Musk

Elon Musk, who is the successful CEO of various technology companies, including Tesla and SpaceX, once said a statement proclaiming the inevitable destruction and the possible dictatorship that artificial intelligence could have over humans. It was mentioned in a documentary by an American filmmaker Chris Paine named “Do You Trust This Computer”, which explored the possibilities and the impacts that Artificial Intelligence could have on society and the world. In this essay, I will briefly explore the validity of Elon Musk’s statements, and weigh up both sides of the argument, to produce a backed-up evaluation and conclusion on his statement.

On the one hand, Elon Musk is indeed correct, by saying that AI has the ability to destroy humanity without even thinking twice. This is because of how much power that AI has over society, as well as how much society has begun to rely on AI. According to Gartner, almost 37% of all organisations have implemented artificial intelligence in some form in early 2019 in the US alone, which is a total increase of 270% over the last four years. Furthermore, in the same survey, around 52% of telecommunication organisations already deploy chatbots for customer service. Such chatbots are powered by AI. From such evidence, it can be logical to conclude the overarching imminent power and authority that AI has and can have over society and human life. This is because, as society becomes more and more technologically advanced, and as the reliance of society on Artificial Intelligence increases, the demand for Artificial Intelligence also increases. Arguably, this rate of demand could exponentially increase, to the point where 100% businesses implement artificial intelligence. With such possibility of artificial intelligence being implemented throughout society, it brings into question the overarching power of AI. Perhaps if Artificial Intelligence is implemented throughout society, such as healthcare and medicine, it could mean that the AI decides to implement a wrong action, costing the lives of many. The ramifications are clearly outside the ethics of a human being, however for AI, they are unable to discern what is morally right and wrong. Without limiting Artificial Intelligence, it will be unable to control the authority and power that AI could have in the future. Thus, it can argued that Elon’s musk statement against Artificial Intelligence is logical. Therefore, Elon Musk’s statement of the evilness and foreboding power of Artificial Intelligence is correct.

On the other hand, Elon Musk is not correct, because it can be argued that Artificial Intelligence is vital for the survival of human kind, because of the complex tasks it can perform and calculate, which may solve some of the biggest crises that human kind is facing. A good example of this happening is the AI tool provided by the Nature Conservancy, which was developed to track, detect and identify the surroundings of an environment, to help better preserve it. It could even identify the number of birds that were struck by power lines, from audio data alone. Another example of where AI has helped mankind is in self-driving vehicles. According to US Department of Transportation, up to 94% of fatalities could be eliminated, if the car was fully autonomous, because it removes the possibility of human error. Such evidence are only two examples of where AI has brought good impact to society, showing how the world could be much more efficient and safer, if we implement and use AI. The issues I mentioned here are small things, but who knows how much AI could do in the future in extinction-level threats, such as asteroids and climate change. AI could provide us humans a solution methodically calculated to give the best outcome. However, for AI to be effective in helping solve extinction-level threats to humans, AI would require a vast amount of data to be trained into giving the best outcome. AI is dependent on good, and a large varied amount of data. It is a question on whether or not society is willing to trust AI with such big data before it is too late.

In my opinion, from considering both sides of the argument, I think that the statement posed by Elon Musk is correct to a small extent, and does not consider the wider benefit of AI. I believe that AI is an essential risk that humans must be willing to take, in order to save the wider mankind from extinction level threats. However, this stance is dependent on what control we allow AI to have and whether or not humans will put safeguards in AI, as a back door to kill AI. I quite like a quote that Stephen Hawking said concerning Artificial Intelligence. “Success in creating effective AI, could be the biggest event in the history of our civilization. Or the worst. We just don’t know. So we cannot know if we will be infinitely helped by AI, or ignored by it and side-lined, or conceivably destroyed by it,” – Stephen Hawking. Such a quote puts the truth of AI, is that we are yet to know what it will do in the future, but I believe that it is a risk that we must take, rather than waiting for an extinction level event without doing anything about it.