Big data has similar characteristics to both microscopes and telescopes in what is provided by the equipment and its interpretation by the end user.

Microscopes and telescopes both provide a lens for a world imperceptible to the naked eye, by providing depth and detail never before imaged before their creation. In a similar fashion, big data provides a lens into individuals by providing multifaceted information on a person.

As pointed out by the PBS documentary vast quantities of information is being gathered about individuals on a daily basis, this includes data from toll booths, internet searches, and social media activity just to name a few. Piecing together this information can provide a good picture of an individual via microscopic details and zoom in on their personality much like a telescope would.

Microscopes and telescopes merely act as tools and the end information gathered must be interpreted by someone, similarly big data isn’t useful unless its correctly interpreted, it should also be noted that big data can be contorted in many ways to produce different outcomes so the person drivng the big data tool ultimately dictates the quality of the insight. The PBS documentary explains that Copernicus discovered that the sun is at the centre of the universe, not the earth, after meticulously studying the astronomical dataset, this may not have been the same conclusion reached by another philosopher.

With such vast amounts of data available, it’s crucial that this data is properly treated in order for it to be of any use.

Arguably big data is far more complex than the output by telescopes or microscopes, this is due to the variety of data types including structured and unstructured data and the processing required for each type, the validity of the data sources and the usefulness of every data item.

Question 2

The PBS documentary discussed many great examples of how big data is used to improve and optimise situations humanity has struggled with, one that I found particularly interesting and dear to my heart was the use of big data to predict the onset of potentially deadly infection in premature babies.

Dr. Carolyn McGregor explained that Initially vital signs for premature babies were collected once an hour, this collection of incomplete small data proved to be insufficient in **pre-empting** possible problems with the baby.

Realising that there was the lack of vital information on a continuous scale, this procedure was modernised so that it collected data continuously and was able to capture all significant changes in vital signs.

Using the big data relating to the baby vital signs enabled the prediction of serious infections before physical symptoms appeared, thus saving precious lives.

This is a perfect example of where small data wouldn’t suffice for a solution. Having only 24 data points in a day for an at-risk premature baby simply didn’t provide enough detail or capture the rate of change in signals, without this detail a sophisticated and life-saving analysis couldn’t be performed.

The introduction of big data for neonatal data was required to enable the prediction of infection in babies and allow for life-saving early intervention.

The documentary also draws attention to the fact that gathering and using big data has risks. What are those risks? Draw out as many as you can, and illustrate with examples. (5 marks)

The PBS documentary provided a balanced view of big data by communicating that not only does big data provide opportunities for good, but it also provides opportunity for evil. It shows the significant improvements big data can make to our lives and planet but also highlights the risks and damage that it can cause.

The Human Face of Big Data pointedly explains that not only can big data connect people like-minded with good intensions, it can also be used as a tool to connect activists and terrorists. This is shown via the story of the Tunisia uprising. In Tunisia, **Little uprisings were happening all over the country, these were quickly quashed by the government however a** photo of uprising in a small town was shared on Facebook, this was then picked up by Al Jazeera and in turn caused activists all over the country to connect, leading to the uprising in Tunisia.

One of the biggest risks associated with big data is misuse. The documentary raised the issue that big data can come at the cost of democracy by highlighting the fact that we are connected to everything, that our location and movements are being captured by businesses like telco providers and that it is essentially impossible to be anonymous. It goes on to describe that with careful profiling of individuals people can become vulnerable to manipulation and persuasion, an example of this occurring is given in the Netflix documentary *The Great Hack* Amer, K., & Noujaim, J. (2019) that showed how a profiled vulnerable group of Facebook users were manipulated via the use of big data and fake news.

The documentary highlights the risk that we’re trading our privacy for convenience, it elaborates further by explaining that all our movements, messages and activities are being captured and it’s becoming increasingly easier to retrieve and leak this information. Having such rich data about a person can lead to malicious attacks, such as surveilling when people are absent from home in order to rob them or hacking highly sensitive information about a person with the intension of destroying that person’s reputation or blackmailing them. A prime example of this is the Wikileaks scandal that hacked and leaked thousands of confidential documents, including government files which in turn caused harm to a broad range of people and remanifestation of government agency strategies (Myre 2019).

The program reiterates that although social media and related technology are seemingly ‘free’, we’re paying a price, if not now then later. The price we pay could be as serious as job loss, divorce and even death should the wrong information get into the wrong hands.

The repurcussions of this were seen by a former high school teacher publicly tweeted about her partying lifestyle and drug possession (The Daily Dot, 2013) who was unceremoniously fired from her job.

Another risk of big data is the misinterpretation of data. As identified in question one, big data can be contorted in many ways and the interpretation is reliant on the person in the drivers seat who may be inexperience with data analysis or have imbed biases.

The Daily Dot. (2013). *“Crunk Bear” teacher out of a job after tweeting near-nude photos*. [online] Available at: https://www.dailydot.com/news/carly-crunk-bear-fired-photos/.

myre (2019). *NPR Choice page*. [online] Npr.org. Available at: https://www.npr.org/2019/04/12/712659290/how-much-did-wikileaks-damage-u-s-national-security.