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CSCI 101 Section A

Explore Response 2

a) **Effects**

The proliferation of the internet of things across western households has led to several societal benefits. One example of such benefits is found in the use of smart technology to increase safety at intersections [1]. The data provided by tracking metrics such as car speeds, traffic density and direction, and peak hours can be used to optimize traffic limits and reduce traffic accidents and deaths. Not only can the data be used from a statistical perspective, it could also potentially be used in real time to adapt traffic flow to current conditions. The Internet of Things also has a much application within businesses. It is even theorized that virtual assistants could reduce or eliminate the need for work meetings [2]. By compressing reports from each team member into a single briefing, devices like the amazon echo can allow team members and managers. This increases productivity across the board. This technology also has smaller scale applications within homes. Anything from door locks to thermostats to kitchen appliances can be controlled by this technology, totaling an estimated 25 million devices by 2020 [3]. The downfalls of this technology are real and dangerous, however. In addition to the data privacy concerns addressed later, internet of things devices are volatile and may malfunction, just as any other technology. Too much reliance on these devices can have disastrous effects on society. Proper backup systems are a necessity for any internet of things devices. A thermostat malfunctioning might have minimal consequences, but an oven or a streetlight might have disastrous consequences. Engineers must design systems that will not destroy anything, or have significant negative repercussions if they fail.

b) **Data**

Internet of Things devices creates, transmit and uses a massive amount of data in nearly every aspect of life. In order to properly function, most devices most constantly be creating data. For example, in order for a voice assistant device, such as Amazon's Alexa, to detect when a user says a keyword, they need to constantly be recording and analyzing its audio input. Most of the data created by internet of things devices is directly related to humans. This could be anything from what is being said in a room, to the temperatures that a household prefers throughout the day. On a large scale, RFID based sensors that communicate over the internet, track movements in and out of building. Wireless security cameras can store massive amounts of video to be analyzed. The fundamental difference between a normal device and an internet of things device is internet of things devices transmit data to cloud servers in order for the data to be processed and sent back to the device. This means most devices have to compress their data to send it to be processed and returned. The sheer amount of internet bandwidth and speed needed to move this much data has only been achievable in the last decade. The data that is returned to the device is usually much more specific. Whereas a voice assistant transmits all of the audio it receives to the cloud, it receives back only the necessary commands. It uses these commands, such as turning out the lights or up the volume of music.

c) **Concerns**

One of the biggest concerns regarding data in regards to the internet of things is that most people have no idea how much data is really being collected, and what is done with that data. Companies often do not divulge how much data they collect and what they do with that data. The people have very little control over what is done with their data. This becomes an issue when the amount of personal data that is collected is considered. The other major data security concern is in the transmission of the data. All the data that is created by an internet of things device is transmitted over the internet, processed in

a cloud server, and sent back. This leaves it vulnerable to being stolen in a cyberattack in any part of that process. This data could be used for anything from identity theft, to assisting in a physical theft.

d) **References**

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[2] T. Lang, “Why Amazon's Alexa Could Be the Death of Meetings,” Fortune, 12-Jun-2017. [Online]. Available: https://fortune.com/2017/06/11/amazon-alexa-echo-personal-assistant-skills-meetings/. [Accessed: 19-Sep-2019].

[3] “Eight ways the Internet of Things will change the way we live and work,” The Globe and Mail, 19-Jun-2017. [Online]. Available: https://www.theglobeandmail.com/report-on-business/rob-magazine/the-future-is-smart/article24586994/. [Accessed: 19-Sep-2019].