COMPUTER NETWORKS

HOMEWORK 3

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1. HEALTH AND SAFETY ISSUES

a. What are the potential health and safety risks of emerging new Internet technologies that are briefly described above?

With the automatic flow of information and connection between IoT devices comes a new set of cyber security risks. If you can access all your data remotely, a cybercriminal might be able to as well.

- The very nature of the IoT is connectivity, but with so many devices on one network, hackers could have multiple access points to your information. That's why security settings can be important. For example, a thermostat connected to your home network that is not properly secured could be a gateway to your identity, money, your address and other devices.
- Not only is a breach of information a risk, but also someone taking control of a device and its functions. For example, someone hacking your smart lock system may not steal information, but they may be able to unlock the doors and steal your belongings.
- IoT devices connect to each other, to your business network and to other devices on that network, back to the IoT supplier, and even to the devices of your customers and employees. Due to such interconnectivity and automation, a cyber incident could affect multiple levels of your business; from the head office, to the supply chain, and even to the customer.
- Whether a targeted incident on a certain device, or an indirect incident through viral threats like malware, IoT cyber incidents have downstream effects on your IT security which could weaken your entire IT infrastructure. For example, if your business has a fleet of Intelligent Transportation System (ITS) delivery trucks and the developer/manufacturer of the trucks is affected by malware, your connected trucks could be indirectly affected by the malware incident as well.
- With every connection comes an increase in vulnerability. If you do not control who and what connects to your network you cannot protect the information that traverses it.

https://www.getcybersafe.gc.ca/cnt/rsks/ntrnt-thngs/bsnss-en.aspx

b. Can these emerging technologies be used in healthcare and safety applications? What are the possible applications?

Yes, These emerging technologies can be very helpful in healthcare and safety issues. But, of course there is possible network attacks to be considered as cyber security issues. On the other hand, these applications will make our life a lot of easier and healthier. Here some possible application list;

-Some healthcare applications

1) Glucose Level Sensing
2) Electrocardiogram Monitoring
3) Blood Pressure Monitoring
4) Body Temperature Monitoring
5) Oxygen Saturation Monitoring
6) Rehabilitation System

7) Medication Management
8) Wheelchair Management
9) Imminent Healthcare Solutions
10) Healthcare Solutions Using Smartphones

http://ieeexplore.ieee.org/document/7113786/

-Some safety applications

1. Data collection, retention, and destruction policies

2. Device and system vulnerability assessment

3. Employee training on IoT privacy practices

4. Regularly updated consumer privacy rules

5. Uniform cybersecurity standards and policies

http://usblogs.pwc.com/emerging-technology/evolution-of-iot-is-security/

2. ENVIRONMENTAL EFFECTS

a. Investigate the environmental effects of the emerging new Internet technologies.

I will explain this with a few example;

- Autonomous Vehicles

The increased connectivity required to facilitate automation of vehicles would significantly improve the degree of monitoring of the performance of such vehicles. Individual owners would be able to better maintain and enhance their vehicles with improvements in fuel efficiency and safety. An increased ability for vehicles to communicate with each other could also lead to vast improvements in terms of traffic flow, particularly at road junctions. This could also provide further benefits such as reduced pedestrian exposure to pollution and lower risk of road-traffic and pedestrian incidents occurring, particularly in urban areas.

There could also be impacts upon our environment and our modes of transportation. How will our use of public transport change if we have individualised versions of public transport and it would this effect public investment in transport services in a bad way. Moreover, given AVs are likely to be an electrified form of transport, localised vehicle-exhaust pollution could thus be significantly reduced. And the distance from workplaces or transport hubs could become a less significant factor for decisions on where to live then how should future development be planned.

- Graphene

It has been foreseen that more flexible screens could be manufactured using graphene. There have also been proposals to use graphene to create night-vision contact lenses. In both case the thinness and light weight of graphene is the enabling factor in developing these technological applications. Graphene alters the structure of copper being used to allow heat to flow more readily and hence design faster circuits, making it possible to build more powerful computer systems using more transistors.

Graphene could also have unexpected impacts the production of highly toxic chemicals. If large-scale production were to take place, it would affect the physical environment and human health. It is also expected that graphene will be used successfully in combination with 3D printing and additive manufacturing. Some health and safety issues could arise from the widespread use of 3D printing. On the other hand, graphene could also be used to deploy cheaper, more efficient and more versatile photo-voltaic (PV) cells on almost any surface. This would democratise the use of renewable energy and what would the implications be for decarbonisation of the EU power sector.

http://www.europarl.europa.eu/EPRS/EPRS_IDAN_527417_ten_trends_to_change_your_life.pdf

b. What is green networking? Provide several methods for greening the Internet.

Green Computing is a computing paradigm where:

(a) IT resource efficiencies are maximized,

(b) resources (in particular, energy) are re-used whenever possible,

(c) sustainable products and manufacturing practices are adopted,

(d) green initiatives in other industries are supported through monitoring and management tools

We present the “Green Computing” paradigm in this article from the perspective of emerging IT technologies and their green initiatives. We select

(a)cloud computing,

(b) mobile computing,

(c) Internet of Things (IoT),

(d) big data analytics,

(e) software-based networks as emerging IT technologies.

https://link.springer.com/article/10.1186/s13174-017-0060-5