FIRST MANDATORY TASK

Internet of Things

PART ONE – UNDERSTANDING OF IOT PRINCIPLES & DESIGN

INTRODUCTION AND PREFACE

The simple act of transferring information from one place to another is called communication. With the world constantly changing and evolving, the need for inventions for every single action increases. IoT, with other words Internet of things, is defined as:

> *a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over network without requiring human-to-human or human-to-computer interaction* (S.Gills, u.d.) .

IoT is a network of electronic devices that are connected internally in order to exchange information with the main purpose to operate from greater distances, with minimal assistance form humans (8 Examples of Internet of Things in Daily Life, u.d.).

NETWORK: STANDARD AND TECHNOLOGY

Network can be visualized as a "stack" of technologies resembling to Bluetooth on the bottom. On the top of the pile IPv6 technologies find place since they are the once who are routing network traffic. Technologies that are ran by these are usually at the top of these two layers such as "message queuing technologies" (Gerber & Romeo, 2020).

"The Open System Interconnection (OSI) is an ISO-standard abstract model is a stack of seven protocol layers" (Gerber & Romeo, 2020). The OSI-model is a reference model for data-communication. Provided from the first top layer they are: application, presentation, session, transport, network, data link and physical.

| OSI model	TCP/IP model
7 Application	Application
6 Presentation	
5 Session	
4 Transport	Transport
3 Network	Internet
2 Data link	Network access & physical
1 Physical	

Figure 1 OSI and TCP/IP networking models

If vaguely compared the TCP/IP-model includes four bigger portions as a result of merged layers from the OSI-model:
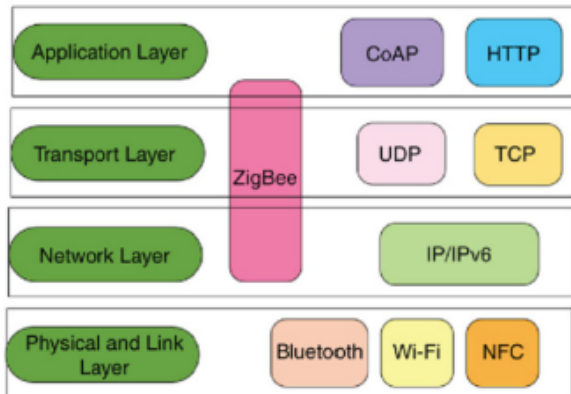
Source: Khodadadi, F., Dastjerdi, A. V., & Buyya, R. (2016). Internet of things: an overview. *Internet of Things*, pg 16.

Figure 2 IoT architecture (communications layer)
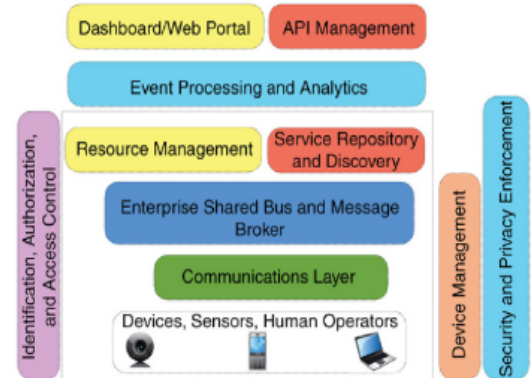
Source: Khodadadi, F., Dastjerdi, A. V., & Buyya, R. (2016). Internet of things: an overview. *Internet of Things*, pg 8.

Figure 3 IoT architecture

- **Network Access & Physical Layer**

    The TCP/IP layer is a merged result of OSI layers one and two. The first layer of the OSI model (1 Physical) controls how each device is physically connected to the network with hardware, like wires, radio and cables. At the second layer of the OSI device (2 Data link), devices and gadgets are marked and recognized by a MAC address. The protocols at this level are related with issues such as how switches deliver "frames to devises on the network" (Gerber & Romeo, 2020).

- **Internet Layer**

    The internet layers refer to the layer 3 of the OSI-model (network layer) The layer is related to the logical addressing and the protocol at this layer controls how different routers deliver humongous amount of data back and forth from the source and the "destination hosts identified by IP addresses (Gerber & Romeo, 2020).

- **Transport Layer**

    The fourth layer in the OSI-model (4 Transport) is focusing on the communication from end-to-end and it reassures features such as reliability, congestion avoidance, and guaranteeing that every data sent will be received in the same order. User Datagram protocol (UDP) are often adapted for socalled "internet of things transports for performance reasons" (Gerber & Romeo, 2020).

- **Application Layer**

Layer 5,6 and 7 in the OSI-model (the application-level) includes "application-level" messaging. A very common example is HTTP/S application layer protocol. HTTP/S, is a renewed version of HTTP (HypertText Transfer Protocol), and is a way of transferring information, and linking to other sources with information (HVA ER HTTPS?, 2015).

PART TWO – SECURITY AND PRIVACY

MALE (28) BACHELOR WITHIN SECURITY

Has a level knowledge of 4 and a concern level of 2. "The world is addicted to the internet. I usually use it to stay in touch with family and friends. Its easier to stay in tough with people across the world. Without the internet the world would not function as it does now, and we would not have this conversation either."

MALE (29) BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Has a level knowledge of 7 and concern level of 6. "I think it's good when we see those devices who are helping human beings in making their life easy. Example is CCTV camera surveillance. We can see our properties from anywhere

But it also place difficulties in human lives. We're having health issues like we don't go for walk to buy things but we can instead order it and in return it can be delivered through already automated systems. IOT is basically things with Internet or WIFI etc. Plus using artificial intelligence Internet is helping making to control, monitor and analyze things remotely

We're leaving behind the beautiful side of our heritage, culture and social life due these things. We're becoming more robotic. It is also effecting environment of our world because it will increase industrialization" because

MALE (30) BACHELOR OF COMPUTER ENGINEER

Has a knowledge level of 7 and a concern level of 4. "I think its good with IoT inventions. 99% good and 1% bad. Bad considering that children have become more busy and not so social anymore… they mostly stay online, and forget the world we live in. Otherwise all inventions within data are good.

WOMAN (30) - BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING AND MASTERS OF SCIENCES IN SUSTAINABLE MANUFACTURING

Well, it has it own pros and cons. In my case, I prefer both devices with internet and without internet! I choose internet, to work faster. As we have many references to look up to and make things easier to get work done. On other side, I choose without internet to work efficient. We have to do brain storming sessions and can work on creativity and personal development. That's why you can see me using both laptop/mobile and remarkable

That's the future 🙈 I work in that field. The devices that I work on/ make/ develop are part of Iot. The feasibility of these devices make them to take part of everyone's daily life. Properties like cost, connectivity, faster responses and learning pattern are key factors to get addicted to them.

For example, mobile phones. There is no one in this generation that lives without a phone. It became a vital device contradictory to olden days, where people communicate with letters and waited for days for the replies. The more the devices become important to people the more IOT will become mandatory in our daily life

In my view, IOT make things simpler and easy. This is the best aid in this fast growing generation. You can connect to anyone from anywhere around the globe, easy to access your data, learn anything at your fingertips, creates lots of opportunities, lot of eco friendly and cost saving solutions, helps economically, etc. There are never ending benefits.
At the same time, too much anything is also not good. We have to use and manage IOT in best ways and under control.g

WOMAN (28) BACHELOR IN WORK AND WELFARE SUBJECTS

Has a knowledge level of 6 and a concern level of 3. " IoT is widely used for efficiency as communication. A completely different workday with iot, the physical contact has disappeared with them.

Disadvantage for people with additional needs, such as technical aspects».

SURVEY CONDUCTION AND DEMOGRAPHICAL INFORMATION

The survey I made was performed through a very popular application call WhatsApp. The questions I sent everyone were:

1. What is your age and highest education?
2. Do you have any experience using IoT devices (everyone said yes)
3. What are your thoughts of IoT? Are you looking forward to the development of IoT or is there anything you are concerned about?

By adding the last question to the survey, I wanted to really get into the thoughts of the individuals and kind of see their set of minds. These answers would then help me determine how alike or different they think.

When it comes to the demographical information, I focused on age and education, and they are the most alike factors (Hayes, Potters, & Beer, 2021). The five people I performed the survey on are between the age of 28-30 and have a background from Asia. That means that even after their education they have had plenty of time to work up some experience. The survey is as equal as possible when it comes to gender (male and female).

A POSITIVE SIDE OF IoT FROM ALL FIVE PERSONS

All the five persons that took part of the survey considered IoT a positive factor since it brings people all over the world together. In fact, an article from Pew Research Center confirms that:

> *"In nearly every country, the young and the well-educated are especially likely to embrace all of these technologies. People under age 30 and college graduates tend to use their cell phones for more purposes than those in older age groups and those without a college degree, and they are also more likely to use social networking sites"*

(Global Digital Communication: Texting, Social Networking Popular Worldwide, 2012).

Communication across distances keeps people in touch and makes an unsocial life even more social. It is said by statistic organizations that: "

> *Cell phones are owned by overwhelmingly large majorities of people in most major countries around the world, and they are used for much more than just phone calls. In particular, text messaging is a global phenomenon – across the 21 countries surveyed,*

a median of 75% of cell phone owners say they text (Global Digital Communication: Texting, Social Networking Popular Worldwide, 2012).

IOT DEVELOPMENT LEADS TO UNSOCIAL LIVES

A common answer from the five people in the survey is that with increasing amounts of digital gadgets and technology, the individuals of a society become less and less reliant of each other, and therefore socializing.

> *"Research has demonstrated that social isolation leads to loneliness, depression, vulnerability, and subsequently to negative health consequences. Social isolation can be defined as a lack of quantity and quality of social contacts"* *(Alibhai, 2017).*

Social media and IoT devices may lead to psychological and physical issues, such as increasing difficulty focusing on everyday tasks. More generally they can lead to serious health conditions, such as depression and eating disorders (by peer pressuring on different applications). That's why it is said by professionals that the "overuse of technology may have a more significant impact on developing children and teenagers" (Johnson & Legg, 2020).

In conclusion from listening to different opinions and reading on different articles it can be concluded that IoT is not a bad thing. It has its negative consequences only when overused, such as the article from Medical News Today confirmed. IoT keeps reaching a peak in society and helps humanity develop tools and gadgets that help us, such as in hospitals, alarms, and banks.

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