TECHNOLOGY & INFORMATION SYSTEM

APPLICATION OF 5G IN SMART CAMPUS

Security Application

INDUSTRIAL TALK 5: [29 NOV. 2021]

"Emerging Technology on Network Infrastructure" (CommScope Malaysia)

INDUSTRIAL TALK 6: [2 DEC. 2021]

5G, Wifi6 and Emerging Network Technologies (HUAWEI)

NUR ATIFAH [A21EC0216] | HO WEI CHUN [A21EC0184] | HANIM IZZATI [A21EC0182]
ALVIN LEOW YAN KAI [A21EC0157] | HANA HUMAIRA [A21EC0181]

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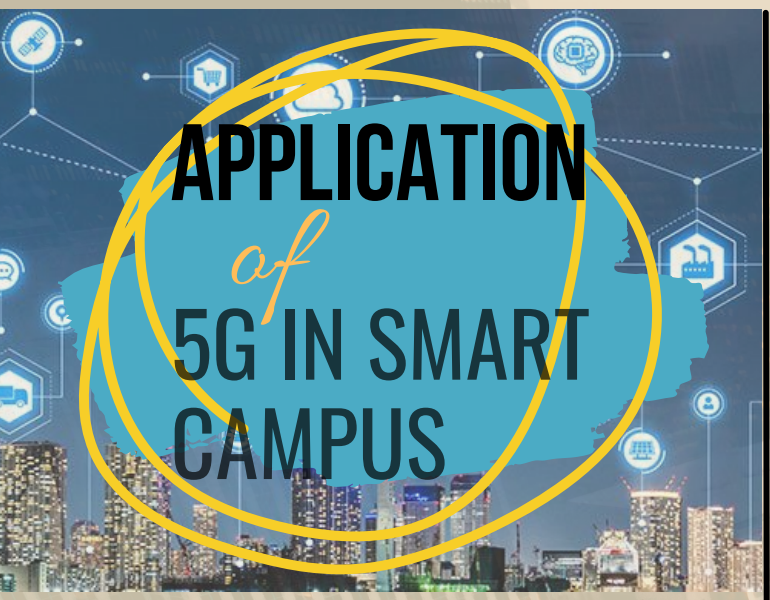
APPLICATION *of* 5G IN SMART CAMPUS



APPLICATION of 5G IN SMART CAMPUS

What is smart campus ?

Smart campus is a campus that places physical infrastructure on its network infrastructure. It creates situational awareness for new services, lower costs and public safety. Smart campus uses Internet of Things to connect buildings, vehicles, people and things. Smart campus attracts and retains students by combining smart living, smart learning and smart safety to let students to have a greater experience.

Picture Source : https://www.rosenbergerap.com/ueditor1_4_3_3-utf8-jsp/ueditor/jsp/upload/image/20200617/1592369811630066787.png

Security Application Using 5G

Picture Source : Canva

There are so many applications of 5G that can be used in a smart campus. Today, we are going to talk about one of the applications which is how university can use 5G to ensure the safety inside the campus. 5G is the fifth-generation technology standard for broadband cellular network. It provides greater bandwidth and higher download speed. Therefore, it is very suitable to use 5G in security application in a smart campus. The application of 5G in security of a campus is important. It can help the education institution to identify any people that walk in the campus. This helps to improve the security of the campus and the safety of the students inside the campus.

How it works ?

Usually, smart campus will install CCTV around the campus. These CCTV will record and collect the images or videos of the person in real time.

Picture Source : Canva

Then, the images and videos will be sent to the cloud through 5G network and the cloud-based facial technology will check the faces with those stored in the database.

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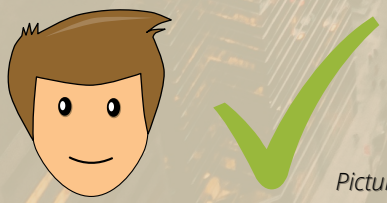
This process can be done in a small amount of time so that the education institution can identify strangers or visitors and prepare to do something if anything happens.



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Reflection

Security is a very important part in any system. This application helps the security department of the education institution to ensure the safety of the people in the smart campus. The need of manpower is reduced as the system can automatically detect and identify all the people around the campus. So, the excess manpower can be distributed to other places that need more of it. From this application, we can see that 5G plays an important role in our life as technology is advancing. Most of the industry will use 5G application to improve their security and of course, productivity and efficiency in these few years. Application of 5G is going to be a trend in the near future.

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EXCLUSIVE

INDUSTRY TALK 5

BY: TS. GOH BIH DER

"EMERGING TECHNOLOGY ON NETWORK INFRASTRUCTURE" (COMMSCOPE MALAYSIA)

NETWORK INFRASTRUCTURE

In this talk, some of network infrastructures involved in networking are explained. The first one includes the end-users (as a student or staff) with their devices like smartphone, laptop and tablet. They are connected through Wireless Protocol (Wireless Edge) to access the Internet through Wi-Fi. While from big universities, hotels or companies perspective, it includes IoT devices like Smart Pipes, Light Bulb, Door Lock and Sensors. They may connect through their own IoT Protocol or Wireless Protocol.

The next one is, Access Point (AP) which connects the Wi-Fi and IoT devices to the Internet. Usually, could be found in the classroom or corridor. While switches, connect all of the APs (Wi-Fi, IoT devices and our printer, fax, Smart TV or telephone) in one platform. Core Switch connects all switches through the Uplink (another cable) and normally located in Data Center. Data Center is where internet got terminated and where you can access through the internet.

INDUSTRY TALK 5

Emerging Technology on Network Infrastructure

NETWORK INFRASTRUCTURE

On the other hand, server used to store all data information in server storage. Server and firewall are both located in Data Center. What about the new term 'Multigigabit'? Multigigabit drives refresh of aggregation and core. Nowadays when we have a good AP, the old bottleneck between clients and AP is now shifted into new bottleneck which is between AP and switches. So, 1Gbps is not relevant anymore today. Therefore, it's time to consider upgrading beyond 1 Gbps connections (2.5Gbps or 5 Gbps preferably).

The importance of WLAN Controller is to centralize all of the APs. So, if we have 500 APs and we want to change their passwords, we don't have to change each 500 of them, instead we need to change only once at the controller. However, if we use NETWORK Controller (Unified Network Management), we could centralize all of the Access Points and switches.

IOT DEVICES USED IN SMART CITY

Every month, billions of IoT devices are being deployed. IoT devices are divided into 3 aspects in our life; Smart Living, Smart Learning and Smart Safety & Security.

In Smart Living, IoT provides us with Smart ID cards so students could purchase food and book or gain access to library facilities. IoT also provides us with In-building LTE, Smart Lighting, Smart Parking or Transit, Wayfinding, Personal network and IPTV.

From Smart Learning wise, IoT provides us with Flexible Learning Spaces, Digital Portals, Virtual Labs, Distance Learning, Lecture Capture and Library of The Future.

While. in the aspect of Smart Safety and Security, it includes IoT Automation like Motion, Smart Locks, LED Lights and CCTV Cameras. Moreover, it also includes Closed-circuit Television (CCTV) & Vendor Management System (VMS), Connected Entry, Tracking Assets, Sound Detection and Motion Detection.

When all of these are applied, students will have a greater experience.

REFLECTION

For our fifth industrial Talk, we were given a speech titled, "Emerging Technology on Network Infrastructure" by a system engineer of CommScope, Mr Goh Bih Der. A lot of new knowledge was shared with us. Some of the main content that was shared with us are Wi-Fi 6, Internet of things or also known as IoT, and Smart Campus. Nearing the end of the talk, Mr Goh also shared some role that was played by Ruckus, which is a brand that was owned by CommScope.

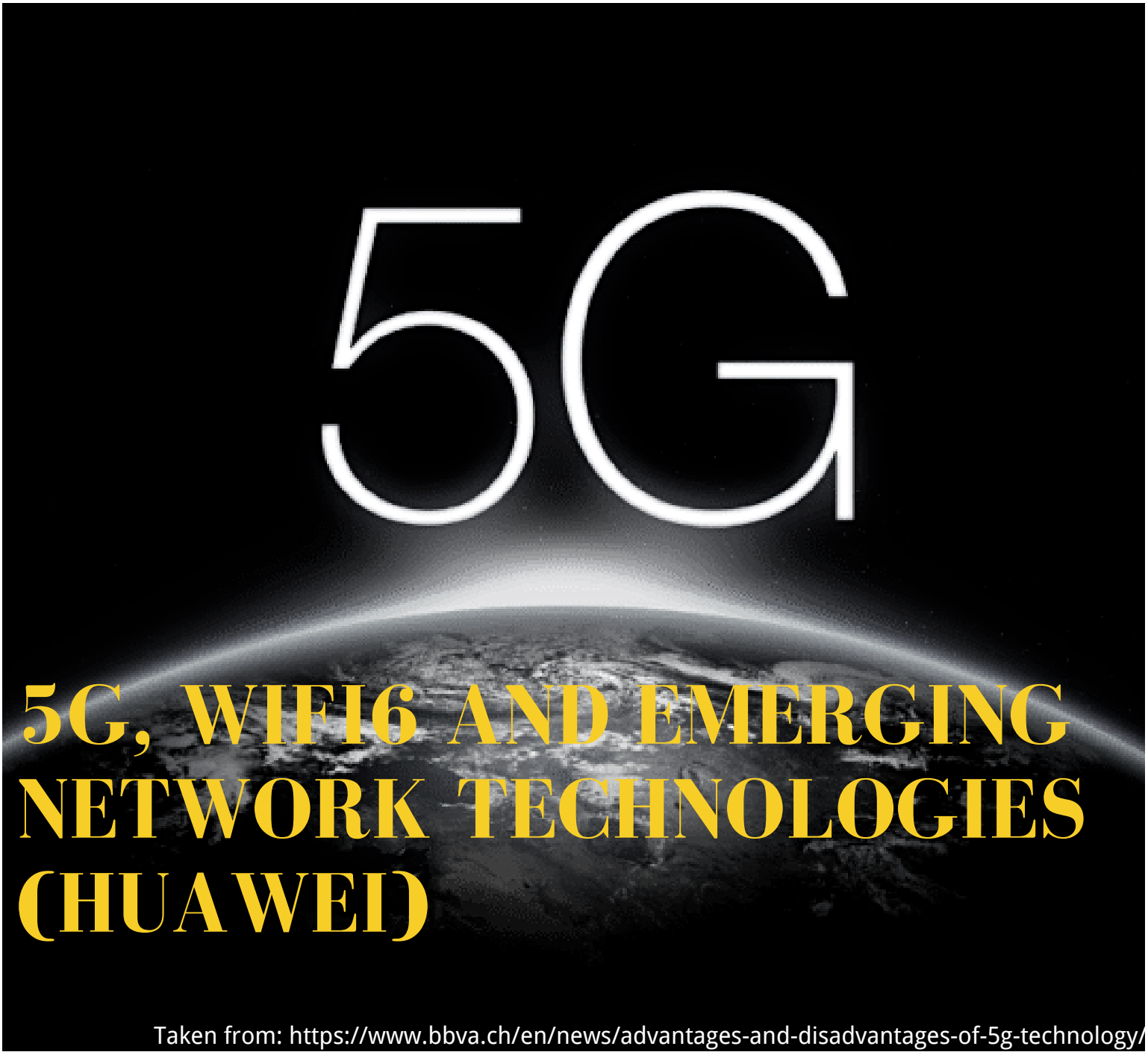
Before talking about the main content of this talk, Mr Goh, talked about what have occurred during and after the pandemic of Covid-19. The main reason he chooses to talk about it because, he wants students to understand the aftermath or consequences that results from this pandemic. Thanks to this, students managed to understand what kind of world we are living right at this moment.

Photograph by **Aubrey Garner**

For Internet of Things, or IoT. In my opinion, we, students need to familiarize ourselves more with IoT. This is because, even though IoT have been created and used for quite some time, there is still a lot of challenges or hardships that come from it. But of course, the main challenge will be the vulnerability of IoT towards cyber-attack. With more data of IoT stored on cloud storage, the more vulnerable the data is. This is because, on cloud storage, data can easily be attacked or hacked, especially for cloud storage that are lack of encryption, protection and software that is up to date.
However, there is also a lot of opportunity or advantages of IoT. Some of these advantages are the cutting of cost, the increasing flexibility, efficiency, productivity of work, and the chances in business. Therefore, it is important for us students, to learn more about IoT. Not only that, but we also need to use some of our free times to learn how can we decrease or maybe even help to solve all the challenges of IoT and decrease the advantages of IoT.

For Smart Campus, based on the explanation that was given by Mr. Goh, I think it is a good idea for more campus, college, or university to adopt the application of Smart Campus. This is because, there is a lot of benefits that college students can gain from it. Some of the benefits are students can have a better experience on their campus life or collage life. This is because, with all these smart learning and smart living technologies, the life on a campus will be better. Not only that, with smart security, the campus safety will also be increased. This is because, with these technologies, students or maybe even the lecturers and other employees of a campus, will be more aware with all accidents or crime that is occurring around the campus. Thus, they will become more careful with their surroundings, and their safety will also be ensured.

As a conclusion, as the future generation, we need to increase our awareness towards the technologies and applications that is being created or used in this nowadays. This is because, we need to prepare ourselves so that later in the future, we will be able to use all of these technologies and application.



5G, WIFI6 AND EMERGING NETWORK TECHNOLOGIES (HUAWEI)

Taken from: https://www.bbva.ch/en/news/advantages-and-disadvantages-of-5g-technology/

DESCRIPTION

In this talk, Mr Nicholas Sim has shared a lot of information about ICT and emerging network technology from Huawei. His sharing session mostly focus on 5G and Wi-Fi6 technology. 5G is the most recent wireless technology system that provides faster internet and makes it convenient and easy to exchange information. Because of its lower latency and reliability, transmission of data has become faster and could streams larger data. 5G is also more flexible than Wi-Fi as it can support wider range in its radius.

Wi-Fi6 has been launched and verified for more than three years to consumer, has been the most recent Wi-Fi technology. Because of its higher bandwidth, wider coverage, lower latency and multi-user access, many internet users have changed to Wi-Fi6 to experience great internet services. Even though we see 5G and Wi-Fi6 the same, but both are different technology that hold many benefits. The key difference is the internet access and coverage. Wi-Fi6 usually for indoor such as house network, mall, universities, and stadium while 5G outdoor such as street, highway and urban coverage

THE DEVICES USED

Mark Zuckerberg once said that VR will be a killer application of 5G. One of the reasons is its low latency as it will allow user to have a great experience using this device. The process of motion to photon is faster to avoid motion sickness. It also has high throughput that suitable for human's retina which is 5037X5707 resolution per eye to get better view. One of the Wi-Fi6 application is its high revolution video streaming. Wi-Fi6 support multi-screen IPTV, cloud VR interaction, E-sports acceleration and any related to video streaming the best. Its technology allows multi-user experience better network connection as it can maintain high speed despite how busy the environment.

EXAMPLE OF ANY DOMAIN

One of the 5G domains is focus on IoT. These days, 5G is being developed for industrial automation system as it will require the best communication system that have high availability, high security, and low latency. As IoT is still new and immature in nature,5G seems the best solution to adapt with its challenges and vast problems. While 5G involve in Fourth Industrial Revolution's technology, Wi-fi6 focus more in education sector. In this pandemic era, most of the class held online and with the Wi-Fi6, students can have better study session. By providing high streaming video and faster speed, user can easily communicate, engage, and learn.

REFLECTION

In this talk, we learned how to distinguish between 5G and WiFi6. Simply put, the biggest difference between them is that 5G tends to be outdoors while WiFi6 tends to be indoors. For example 5G will support use cases that require longer ranges like remote surgery using AR technology, while home and office environments will rely on Wi-Fi 6. From this we can see that these two new technologies will not eliminate each other, but complement each other. In my opinion, these two technologies will undoubtedly bring many conveniences to our entire society and daily life, such as remote shopping and higher-quality online courses. But at the same time, they will also bring us many unexpected disadvantages, such as extreme cyber crimes. However, I believe that with the development of new technologies and the supervision of relevant new laws, these disadvantages can be minimized, enabling people to trust these new technologies more.