



TECHNOLOGY INNOVATION

"The future of technology starts here"

**"Emerging Technology on
Network Infrastructure"
(CommScope Malaysia)**

**5G, Wifi6 and
Emerging Network
Technologies
(HUAWEI)**



**Application of 5G
in Smart Campus**



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VIDEO RETRIVAL & FACIAL RECOGNITION

Facial recognition is a concept of recognising or verifying a person's identification using their face where the patterns based on a person's facial details are being processed through 3 steps which are ;

1

Face Detection

The key is to detect and find human faces in digital images and videos by using artificial intelligence (AI) based computer technology.

2

Face Capture

A method where it will convert analogue information (a face) into a set of digital data based on the person's facial traits (age, gender and emotions)

3

Face Match

To determine and detect whether the two faces belong to the same person.



A campus is a basic unit of cities and plays an important role in economic development and public services and helps us enter the intelligent world.

Fast 5G network will allow millions of surveillance cameras, many equipped with state-of-the-art facial recognition software to monitor people continuously in real-time. People can save time and effort by using a facial recognition system that uses biometrics to map facial traits from images or videos. For example, a smart campus can use the facial recognition machine outside every classroom which will facilitate students' smooth movement between the classroom and mark their attendance every morning automatically. Furthermore, the facial capture can be compared to the database listing to establish whether a person is on the blacklist or the approved list. This new kind of biometric system, when coupled with RFID technology in Smart-ID cards given to students and CCTV cameras guarding the campus, will also ensure that the students are safe, not just in classrooms but on the campus as well. The chip in the card will accurately indicate the students' location on the campus.

Benefits

Facial recognition implementation powered by 5G technology sets itself apart from other similar approaches in biometric identification in a number of different ways.

One attractive aspect is the **ease of deployment and implementation**. Clients and users only have to dole out initial expenses to adopt and acquire the necessary tools of the technology (e.g. cameras, sensors, 5G connectivity). After that, its is fully operational and no further physical interaction with the end-user is needed, essentially an automated, seamless experience for all.

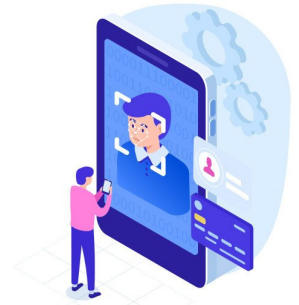
Moreover, this technology is evidently **more secure** as facial detection and face matching processes for verification or identification are speedier and generally more accurate than their human counterparts. Also allowing for 24/7 operation without sacrificing effectiveness.

Another useful aspect facial recognition technology is its **adaptable and useful** nature. One can implement it in a number of different use-cases from attendance keeping, granting access for entry/use, tracking potential threats etc. Compared with traditional key lock & password, or even fingerprint and retina verification, this method is a passive and efficient alternative.



Reflection

There are many benefits that facial recognition provide for smart campuses. Such as improving overall safety, enhancing the quality of life and reducing human workloads. The use of camera sensors paired with the help of computer algorithm can instantly capture anything and can provide the data to improve campus lifestyle. In a nutshell, with the help of this technology, it will greatly enhance student lifestyle in campus .



Cost

The cost of deploying facial recognition solutions can vary significantly but almost always come from three sources: the development of business logic, integration with facial recognition solutions, and product costs. The business logic varies significantly depending on your use case and requirements and can impact cost greatly. The next expense is integrating with a facial recognition solution. This cost tends to not vary widely across different solutions but, like the development of business logic, is impacted by your requirements and specific use case. However, when you have your business logic well-planned and developed, the integration with a facial recognition solution can be relatively painless

With the rapid development of video monitoring, the massive information of the monitoring image has far exceeded the effective processing range of human resources. Intelligent video retrieval technology has become an increasingly indispensable part of video monitoring system. Intelligent video retrieval technology integrates video processing, computer vision and artificial intelligence, which greatly improves the efficiency of monitoring and the accuracy and linkage of monitoring system. According to the last semantic features, the information of the input data is obtained to accurately realize the face detection under the non ideal condition.

Emerging Technology on Network Infrastructure (CommScope Malaysia)



COMMScope®

What is Network Infrastructure ?

Network infrastructure refers to all or any of the resources of a network that make network or web connectivity, management, business operations and communication possible. Network infrastructure includes hardware software, systems and devices, and it allows computing and communication between users, services, applications and processes. something concerned within the network, from servers to wireless routers, comes along to form up a system's network infrastructure. Network infrastructure allows for effective communication and repair between users, applications, services, devices and so forth.



DEVICES

2 Switches



ICX7250

Switches is used to connect various devices into one central point. COMMScope offers various models that fulfill the clients needs.

3 Control & Management



Zonedirector 3000 series

This device is used to proactively monitor and maintain WLAN. COMMScope Zonedirector series delivers several features that don't exist in other central-managed systems such as automatic traffic redirection, adaptive wireless meshing, rogue AP detection, and advanced Wi-Fi security features, and extensive authentication support.

1 Access Point

Outdoor Access Point



T750

Indoor Access Point



R850

Access point is a device to create WLAN (Wireless Local Area Network) to connect all devices that's usually in a building or office. Access point connects to a wired router or switch via ethernet cable and can project Wi-Fi signal to connect to the Internet. COMMScope RUCKUS offer indoor and outdoor wireless access point to fit clients' budget in about any budget and various scenarios.

Smart Everything!

Creating A Smart Campus

Improving upon the existing Network Infrastructure is crucial in the development of a fully fledged "smart campus". A smart campus integrates IoT applications vertically across all aspects of campus life. Thus, it is easy to see why the capability to maintain a deeply integrated, centrally managed, and high speed system of networking system is key to this sort of project's success. This is where solutions providers like CommScope come into play, with their global expertise and international certifications, they equip campuses with the required state of the art apparatus and software. This may range from locality-specific access points, switches, a variety of control & management services as well as useful software for administrators/clients.

The Smart campus is essentially a catch-all phrase that includes components of "Smart Living", "Smart Learning" and "Smart Security" all in one package, and specifically in campuses be it at a university, workplace, venue, etc. A "Smart Campus" is usually the stepping stone in expanding this digital integration into larger scales i.e. "Smart Cities" and implementing digitally enabled alternatives nation-wide like e-payments, digital banking, and even facial recognition



Reflection

There are some difference between home access point and enterprise access point. Enterprise access point can support more devices which have a different type of protocol there and which can use for different purpose. Also, the architecture inside the access point is different. The networking of home Wi-Fi routers is simple. They can be directly connected to a cable modem or DSL network port, and managed wirelessly or through a network cable to the router.



5G

5G is the next-generation cellular system where the International Telecommunications Union (ITU) is called IMT-2020. There are a lot of reasons why 5G is needed nowadays because it can upgrade the network energy efficiency, enable faster transmission of larger data streams, and enable better transmission of data in extreme conditions. It can also support a wide range of devices, sensors, and wearables, including higher flexibility than Wi-Fi. Moreover, it gives an impact in business through the addressable market such as Augmented Reality, Automation in the vehicle and Delivery drone.

Example of Devices



- Smart home devices
- Telematics
- Huawei 5G CPE 2.0 (mmWave)
- Huawei 5G CPE 2.0 (Sub-6 GHz)
- Huawei 5G CPE Win

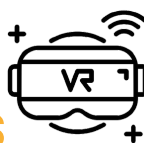


- Iphone 11, 11 pro, 11 pro max
- Iphone 12, 12 pro, 12 pro max, 12 mini
- Intel laptop with 10th generation CPU
- Samsung S10 series

WI-FI 6

Wi-Fi 6, also known as "AX Wi-Fi" or "802.11ax Wi-Fi," is the next generation of Wi-Fi technology that improves on the current 802.11ac Wi-Fi standard. Due to technology like orthogonal frequency division multiple access (OFDMA), which allows for larger data rates at a given range to boost network capacity, Wi-Fi 6 has a much higher speed leap than Wi-Fi 5. Wi-Fi 6 has various benefits, including increased bandwidth, reduced latency, IoT-oriented energy savings, and anti-interference. It also supports gigabit broadband promotion, allowing for quick downloads and cloud backups. The better the subcarrier optimization or frame length, the higher the bandwidth. Aside from that, the spatial stream, subcarrier quantity, symbol duration, and coding method are also few parameters that determine the Wi-Fi rate.

VIRTUAL REALITY In Smart Campus



Virtual Reality (VR) has made significant progress in the marketplace for these past few years where it is a sort of computer technology that uses 5G networks to give the impression or ability to be in another environment. The purpose of VR Technology in education is to address the issue of insufficient integration of higher education teaching and information technology in our country, as well as the building of a secure campus by increasing the management level and efficiency to invent a smart environment of teaching and learning in the future. This new revolution will also combine exciting activities where it allows students to be more flexible in their studies. Besides, using the 5G which provides lower latency (to avoid motion sickness), improves the bandwidth, and upgrades the reliability of transmitting data that will allow the VR to become more easily accessible in the education system.





HUAWEI AIRENGINE

- It is one of the most comprehensive IoT applications where it will be used by creating two built-in slots for the IoT module to increase the capability of Wi-Fi 6 network
- It provides the dual-signature boot or hardware encryption to ensure the security of the Wi-Fi 6 network is highly secured
- It also generate higher performance and most stable experience to connect the users and devices such as Dynamic Turbo, Smart Antenna and etc



REFLECTION

With the existence of 5G and Wi-Fi 6, daily tasks can be done swiftly. Especially in this pandemic era, where several changes has to be made to ensure that everyone can fulfil their tasks without interacting with others, some of our everyday responsibilities must be handled online. For example, learning in school have to be done online, engaging with coworkers or customers, interviewing someone, or even purchasing essential needs. Therefore, it will allow additional benefits and opportunities for the next generation where new technology applications can be developed.



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