Technology and Information System

EMERGING NETWORK HI TECH

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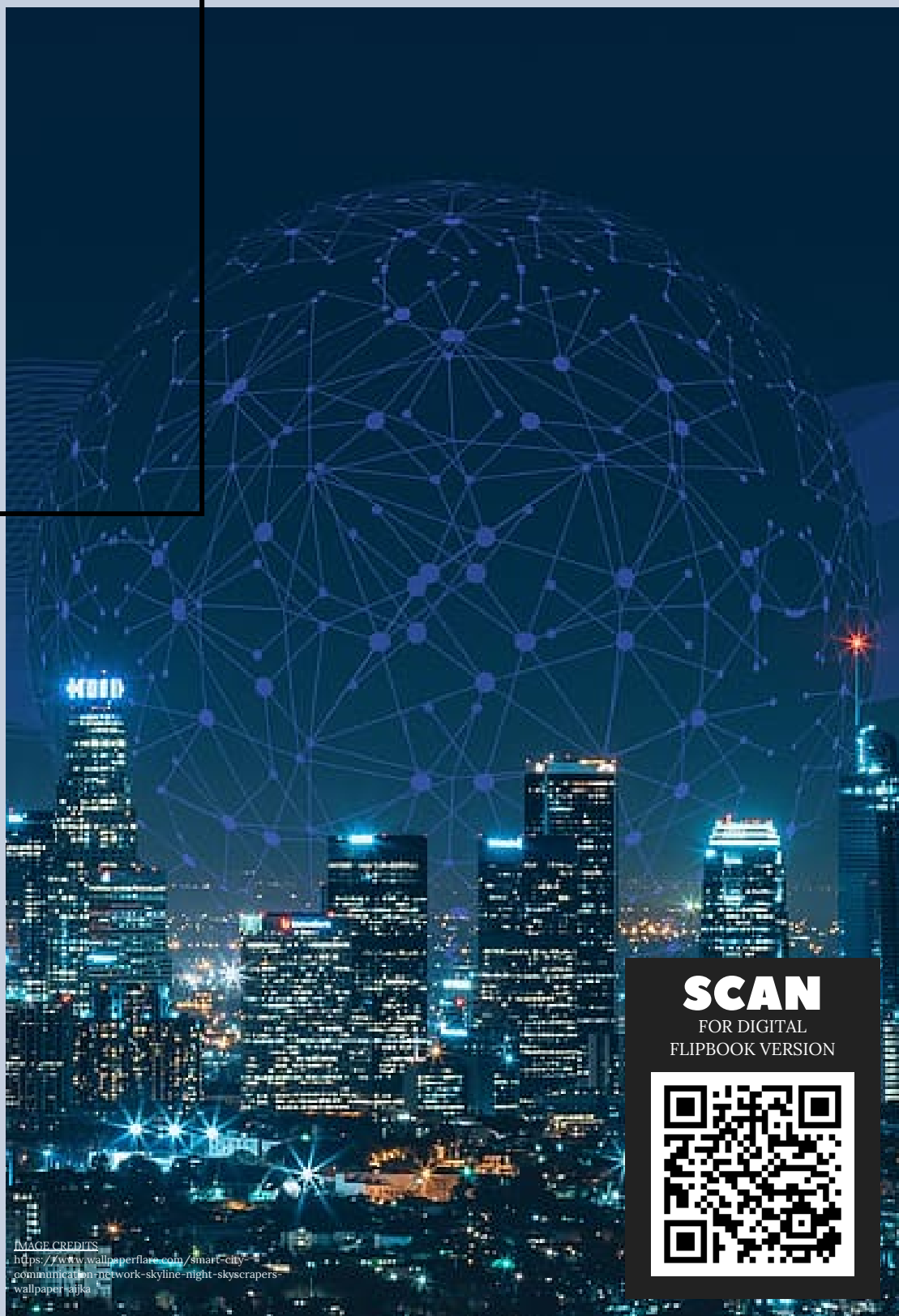

IMAGE CREDITS
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SCAN
FOR DIGITAL FLIPBOOK VERSION

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IoT, 5G & Smart Campus

/ A K M SHAFIN ALAM

IoT

The Internet of Things (IoT) relates to physical items that are equipped with sensors, processing capacity, software, as well as other technologies and may transmit data and processes over through the Internet or other communication networks. Smart city projects throughout the world are being facilitated by emerging Internet of Things (IoT) applications. It enables remote monitoring, administration, and manipulation of devices, including the collection of fresh insights and actionable data from large amounts of real-time data.

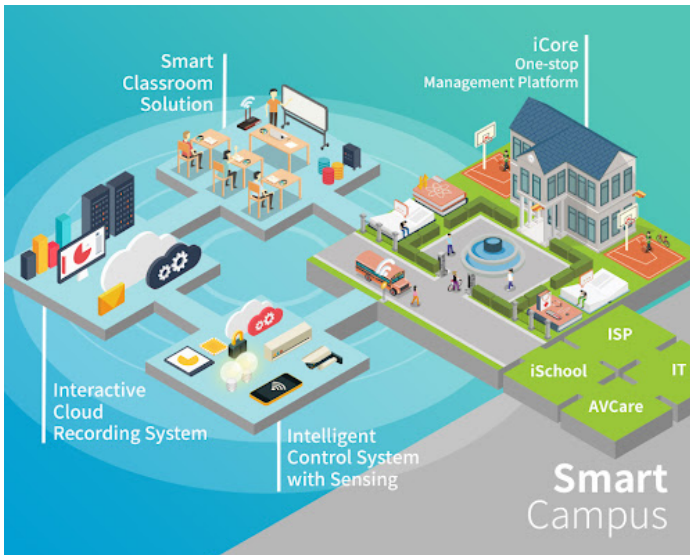
5G

The fifth-generation technological standard for broadband cellular networks, 5G, is the projected replacement to the 4G networks that link most existing cellphones. 5G wireless technology is designed to provide multi-gigabit per second peak data rates, ultra-low delay, greater stability, massive network capacity, greater range, and a more consistent user experience to a wider range of users. Higher performance and efficiency allow for different user experiences and professional connections.

Smart Campus

A smart campus employs information and communication technology (ICT) to boost operating effectiveness, share data with the people, and enhance public service and public satisfaction. The Smart campus goal is to promote economic growth and increase people's quality of life by supporting local area development and utilizing technology, particularly technology that leads to Smart results. We describe a smart campus as one that is efficient, safe, sustainable, responsive, and pleasant to live and work on, and that is supported and improved by digital/internet-based technology.

APPLICATION OF 5G IN SMART CAMPUS



Reflection

Smart Campus is a campus where every device is connected and can communicate for enhanced services and work experience. For this, we need a strong network and other requirements that 5G can fulfill. 5G network is more powerful, more reliable, more efficient which will be used to interconnect the whole campus. We all know, IoT will be used in various ways to create a smart campus. So for this IoT, we will use 5G network which will improve the workability of the IoT along with giving a better Smart campus.

Application Of 5G

IoT is a part of the Smart campus. Data from millions of devices and sensors will be collected by IoT apps. For data collection, processing, transmission, control, and real-time analytics, and efficient network is required. For this, we need 5G, which will provide the requirements of networks. IoT is used in Smart homes and for device connectivity and application monitoring, the smart home idea will rely on 5G networks. In Logistics and shipping, for products tracking, fleet management, centralized database administration, personnel scheduling, and real-time delivery tracking and reporting, may benefit from smart 5G technology. Traffic control, instant weather updates, local area broadcasting, energy management, smart power grid, smart street lighting, water resource management, crowd management, emergency response, and other smart campus applications may all benefit from a dependable 5G wireless network. For efficient automation of equipment, predictive maintenance, safety, process tracking, smart packaging, shipping, logistics, and power management, future industries will be equipped with smart wireless systems including 5G and LTE advanced. These ways using 5G in IoT we can implement 5G in smart campus.

WIFI & ACCESS POINT

Wi-Fi is a hardware device or configured node on a local area network (LAN) that allows wireless capable devices and wired networks to connect through a wireless standard. Devices used for this infrastructure are wireless communication and Wi-Fi 6. It involved in converged communication device to display message and also allow people to call or get a call. Besides that, it also involved in converged access point to allow device connect to each other by using internet.

UNIFIED NETWORK MANAGEMENT

one that integrates wired and wireless components, which share network elements and services where feasible, rather than existing as two separate networks. Appliances involved in this development are WLAN Controller and Network Controller. A Network controller manages flow control to the switches and the applications and business logic to deploy intelligent networks. consolidate and mediate between different controller domains using common application interfaces.

MULTI GIGABIT TECHNOLOGY

is a unique innovation to the new Ethernet Access Switches. This creates a need for a technology that supports speeds higher than 1 Gbps on all cabling infrastructure. multigigabit technology allows to achieve bandwidth between speeds of 1 and 10 Gbps over traditional Cat 5e cabling or above. It uses bottleneck and multigigabit ports. Sits between modem and devices. Think of it as a small computer dedicated to routing network traffic to and from devices. If it's overloaded like a traffic cop during rush hour, connections will become very slow.

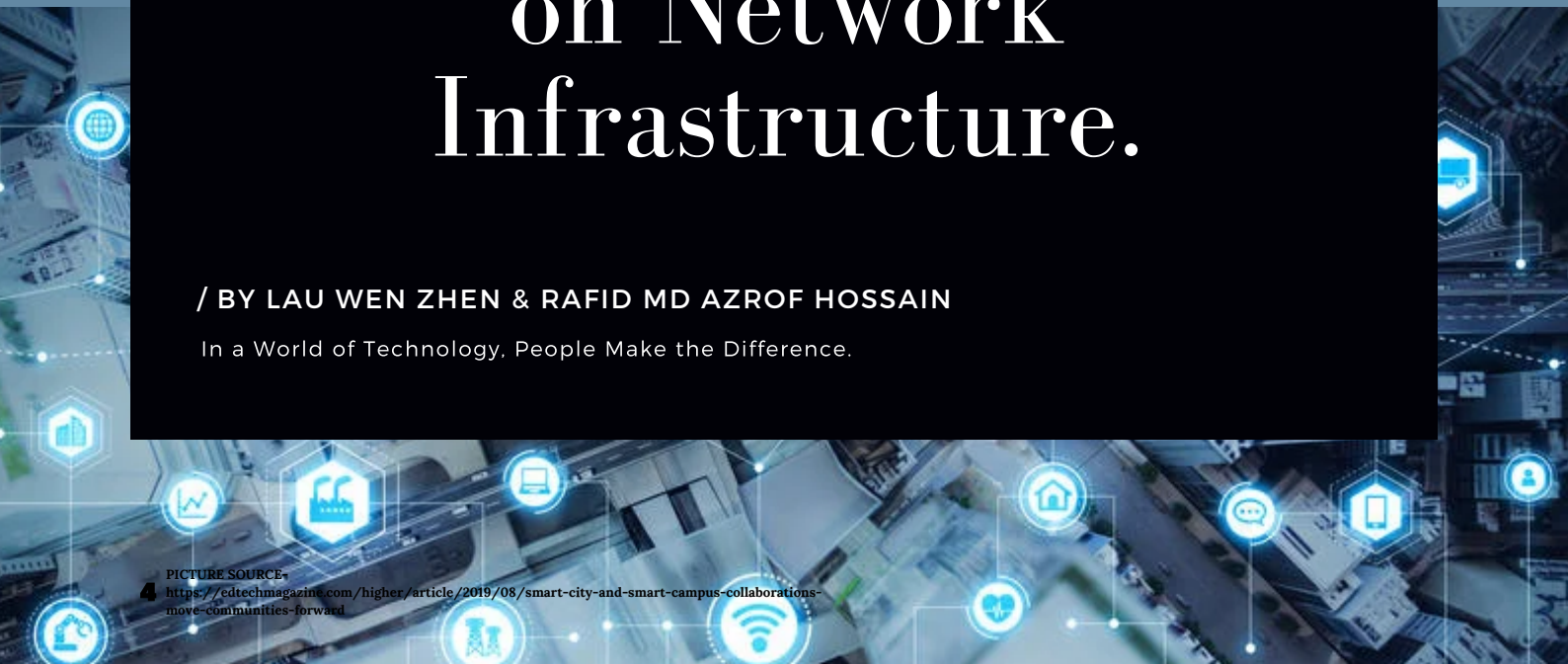
INTERNET OF THINGS

network of physical objects—"things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. It includes smart lighting and smart sensor. it can detect the presence of vehicle traffic, enabling cities to adjust street lighting on idle streets and off house. Besides that, Crime prevention efforts might include camera-based surveillance while connected audio detection can direct police to areas where gunfire is detected.

Emerging Technology on Network Infrastructure.

/ BY LAU WEN ZHEN & RAFID MD AZROF HOSSAIN

In a World of Technology, People Make the Difference.



PICTURE SOURCE:
https://edtechmagazine.com/higher/article/2019/08/smart-city-and-smart-campus-collaborations-move-communities-forward

“ANY SUFFICIENTLY ADVANCED TECHNOLOGY IS EQUIVALENT TO MAGIC.”

-Arthur C. Clarke

cloud analytics

is a service that runs data analysis and business intelligence operations in a public or private cloud. Cloud analytics companies help enterprises scale quickly by reducing the costs and administrative burden of on-premises hardware. It includes server analytics, incident analytics, etc. Cloud analytics even provides enterprise-grade semantic data models for business reports and client applications such as Power BI, Excel, Reporting Services reports, and other data visualization tools.

smart campus

is an emerging trend that allows educational institutions to combine smart technologies with physical infrastructure for improved services, decision making, campus sustainability and more. Some devices involved in the smart campus development are CCTV, connected entry, tracking assets and digital protal. This infrastructure involved in smart security like CCTV, sound detection, motion detection can determine whether the thief enter your house or not and also can prevent the thief to enter our house because of sound detection. For example, when the thief want to enter your house, the sensor will detect it and come out a loud sound to notify the owner of house.

REFLECTION

Technology enables teachers to be up to date with new techniques and help their students to be updated with latest technologies such as use of tablets, mobile phones, computers, etc.

The doors for traders and common people to do online purchases. Banks keep records of all the transactions and accounts through computers.

PICTURE SOURCE
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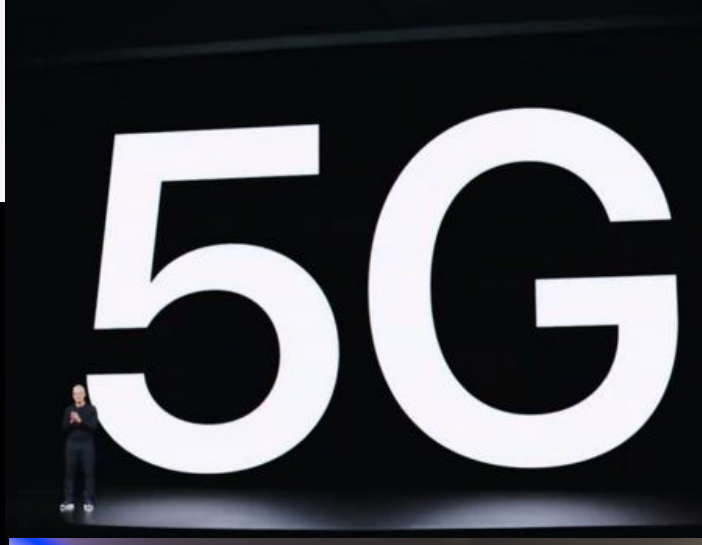

5G & VIRTUAL REALITY

As real as reality itself.

/ BY AIMAN HAIKAL

5G is a fifth generation of wireless technology systems that gives better performance than any generation before it which some of them delivered through fiber optic cables. In the early of testing, 5G shows 700 - 3025 Mbps real-world speed compared to its previous generation, only 35 Mbps [1].

There are three main reasons why 5G will make a big change to the world. Firstly, 5G devices are low latency and has higher bandwidth that enables faster transmission of larger data stream. Latency refers to end-to-end communication delay time that is measured between the process of sending information for a corresponding response [2]. Bandwidth determines the amount of data that can be transmitted at a time. This is important to make sure there is no time difference of receiving response from a point to another point. This problem usually can be seen when we are playing video games or being on a call. If the latency of a network is high, the in-game ping will be high and it will cause some seconds difference for the element in the video game to move. Next, 5G is more reliable in transmitting data in extreme conditions like heavy rain. This is a typical issue that usually occurs among Malaysians where the signal of network will be unstable during heavy rain. Thus, 5G can help avoid this problem from constantly disturbing the performance of the network. Lastly, 5G is more flexible than Wi-Fi and can support a wider ranger of devices, sensors and wearables within 1 square km. This makes sure that the signal maintains its strength without any inference or getting blocked by any obstacles.

Along with the innovation of wireless technology system, there comes a new, killer technology that evolves throughout this development. Virtual Reality, or VR is a computer-generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings [3]. By using a Virtual Reality headset or helmet, we could bring a fantasy to real life. Gaming experience will be more real and stand out. We can have a virtual simulator and live the way we imagined.

Thus, 5G and VR are very connected to each other as VR needs a more reliable network to make sure it works at it peak. The network connected to VR resolves the resolution and frame rate of the image. Low latency from 5G will help VR to avoid motion sickness that can cause user feels dizzy as the image gets lagging and delayed.

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WIFI 6

WAY BETTER INDOOR PENETRATION

By Aiman Haikal

Wi-Fi 6 has been verified and used by many international brands years ago since August 2017 but it officially entered the mature commercial use phase in September 2019 when The Wi-Fi Alliance initiates Wi-Fi 6 Certification appropriately. In October 2018, The Wi-Fi Alliance specified a new name for different Wi-Fi standards which is 802.11ax. It was an open door of digital revolution towards a better IT future.

This improvement provides us tons of benefits that we could not imagine. Firstly, Wi-Fi 6 supports Gigabit broadband promotion to mobile phone and PC. It also brings a faster download and cloud backup experience to the user. This ability has been successfully brought out by improving the size of the bandwidth by 2.8 times from previous generation of Wi-Fi. For Wi-Fi 5, the data transmission is only 3.2 us per terminal and uses 234 subcarriers to carry the data while Wi-Fi 6 transmits 12.8 us data per terminal and involves 980 subcarriers. It makes such a big difference to be compared with. Wi-fi 6 also offers high-speed upload and download experience with an actual rate of over 1 Gbit/s.

Next, there is a new technology for Wi-Fi 6 which is orthogonal frequency division multiple access, or OFDMA. This technology helps delivering data to multiple devices at one transmission. This scenario is like a multiple lanes road with a traffic light where it allows multiple user to use the road with proper sequential scheduling. Thus, more data can be transferred at a time subsequently. This technology makes Wi-Fi 6 having low-latency and performing better.

A feature called Target Wake Time will reduce power consumption by 30% as it lets routers schedule check-in times with devices. This features allows devices to plan out communications with a router hence reducing amount of time for their antenna to stay active to transmit and search for signals. Thus, the battery will lasts longer and having less drain.

Lastly, Wi-Fi is upgraded to make sure it can have wider and stronger coverage. Wi-Fi 6 can penetrate more wall with same signal quality. In a 120 square meters house, a 5Ghz Wi-Fi 6 can maintain its signal strength all over the house with less interference.

REFLECTION

In this 21st Century, we can clearly see there are many improvement have been done in term of technology to ease our daily life. This improvement will always be developed from time to time with IT Specialists' research and efforts. We, as a user should be smart and use it wisely. Those who are studying in Computer Science major should be putting all of their effort so that they can continue the technology development and push up fresh ideas.

During this Covid-19 pandemic, most of us are still working or having class from home. Thus, this infrastructure will give a big impact in education and work sector as they might be using the Internet all time. Wi-Fi 6 and 5G will ease students and employees' life to upload their work on Internet or maybe even cloud, and download materials from the Internet. With this advancement, they will get to save their time and finish their task in just few seconds.

Virtual reality would make our imagination becomes reality in a way we can't even think. It even helps creatos to make prototypes with clear vision and easier way. With VR, gaming experience would be more realistic, thrilling and exciting. With VR, people are making a new world of another level of reality!