

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 1, December 2024

Analysis of 5G with Wi-Fi Analyzer

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Abstract: Currently, 5G is widely implemented in many countries especially developed countries. It is important for many users in their daily routines. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices. The 5G connection gives higher performance and improved efficiency for empowering new user experiences and connecting new industries.

Keywords: 5G Communication, Wi-Fi Analyzer, Cellular Communication, Connection Speed, Cell Tower

I. INTRODUCTION

5G represents the fifth generation of mobile technology, marking a significant advancement in the field. Unlike previous generations, 5G introduces entirely new elements, such as updated spectrum frequencies, new radio technologies, and an overhauled core network infrastructure [1]. While 4G has already driven the expansion of mobile video and the app economy, 5G serves as a foundation for groundbreaking innovations. According to Accenture, businesses that embrace advanced network technologies like 5G are projected to experience revenue growth 2.5 times faster over the next three years.

Earlier network technologies were not designed to meet the needs of today's highly distributed environment, which includes the cloud, edge devices, and remote workforces. Powered by 5G, cloud-enabled networks, along with complementary technologies such as edge computing, open radio access networks (O-RAN), and software-defined wide area networks (SD-WAN) or secure access service edges (SASE), create seamless connectivity across the Cloud Continuum, linking everything from public cloud to edge devices. As more organizations transition to the cloud, the true business impact of 5G is just beginning to unfold [2].

5G offers a more unified and capable air interface, designed to handle increased capacity, deliver next-generation user experiences, and support new deployment strategies and services [3]. Thanks to its ultra-fast speeds, remarkable reliability, and near-zero latency, 5G will unlock new possibilities for the mobile ecosystem. It will revolutionize various industries, enabling innovations in areas such as transportation safety, remote healthcare, precision farming, and digitized logistics, making them a tangible reality.

II. METHODOLOGY

Analytics is the process of drawing conclusions and understanding from data by employing data, statistical formulas, and technology. Analytics are utilized in business and industry to enhance decision- making, streamline procedures, and generate new revenue streams [4]. In business and industry, various types of analytics can be used, including descriptive analytics that entails summing together past data and spotting trends. It can be used to analyses prior performance and pinpoint areas that need improvement. The second one is diagnostic analytics and this method entails analyzing data in-depth to determine the root cause of a specific issue or problem. It can be used to pinpoint the source of an issue and provide potential fixes [5].

Another method is predictive analytics. This technique uses machine learning algorithms and statistical models to create predictions about upcoming events or behaviors. Potential hazards can be found, processes can be improved, and new business opportunities can be made. The last one is prescriptive analytics which the technique uses analytics, optimization, and data to suggest courses of action or choices. Real-time process optimization and recommendations can be made using it.

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DOI: 10.48175/IJARSCT-22637



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The analysis has been done using the Wi-Fi Analyzer application and the results are discussed in the following sections. The results also are combined with further explanation regarding to the application used. The related figure also included to explain briefly about the analysis. The Wi-Fi Analyzer application is shown in Fig. 1.



Fig. 1Wi-Fi Analyzer Application

III. RESULT AND DISCUSSION

Based on the scanning using Wi-Fi analyzer application, the result is shown in Fig. 2 below. The list of available signals near the location also shown in the figure. The available signals are from the networks located in the nearby area [6]. There are a lot of available networks from the surrounding area and it will keep shown in the application as long it is detected by the application.



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There are several Wi-fi signals were detected in the analyzer. Based on the graph shown the strongest Wi-fi signal is my personal mobile hotspot tethering which is named as 'CNK' With -45dBm and download speed of 96Mbps. The weakest signal is from server named 'Danheng' which is about -85dBm and speed is not calibrated. This is due to the distance of the server and the device. The personal hotspot tethering is in around 1m distance and 'Danheng' is 176m away from my device. The list of available networks is shown in Fig. 3.

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Internet Sp	eed	Connected Devices	Ro	uter Settings
UTHM MAC: 9c:8c:d8:ea:a3:e1 Freq: 2412MHz (20MHz) a[ESS] [Hewlett Pa]	176m CH 1			-85. dem
edutoam MAC:9c:8c:d8:ea:a3:e0 Freq: 2412MHz (20MHz) @[WRA2-EAP/SHA1-CCMP	176m CH 1 [[Hewlett Pa]			
UTHM MAC: 9c:8c:d8:ea:f3:21 Freq: 2437MHz (20MHz) @[ESS] [Hewlett Pa]	49m CH 6			-74 S
eduroam MAC: 9c:8c:d8:ea:13:20 Freq: 2437MHz (20MHz) @[WPA2-EAP/SHA1-CCMP	35m CH 6 [[Hewlett Pa]			-71 -71 -80
Mathi2584 MAC: 22:64:85:d7:27:0c Freq: 2437MHz (20MHz) @[WPA2-P5K-CCMP]	25m CH 6			-68 -68
HUAWEI-B618-6112 MAC: 54:ba:d6:b5:61:12 Freq: 2447MHz (40MHz) @[WPA2-PSK-CCMP] [HU	2 2m CH 8(6) WEI			48 (48)
UTHM MAC: 9c:8c:d8:e8:f9:c1 Freq: 2412MHz (20MHz) a[ESS] [Hewlett Pa]	79m CH 1			
eduroam MAC: 9c:8c:d8:e8:f9:c0 Freq: 2412MHz (20MHz) ft[WPA2-EAP/SHA1-CCMP	SOm CH 1 [Hewlett Pa]			50000
(HiddenSSID) MAC: 0a:5e:cb:0d:f4:8c Freq: 2437MHz (20MHz) (WPA2:PSK-CCMP)	16m CH 6			64
Danheng MAC:0e:21:da:fa:57:71 Freq: 2412MHz (20MHz) @[WFA2:PSK-CCMP]	176m CH 1			
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Fig. 3List of Available Networks in Nearby Area.

IV. CONCLUSION

In conclusion, this project has allowed us to analyze the telecommunication signals of the 5G network in the Pagoh area. Additionally, we have examined the requirements necessary for the 5G network to function on both Android and iOS devices. We also successfully achieved our goal of exploring the advantages of 5G over the current 4G network. Furthermore, we were able to investigate the progress of 5G network development in Malaysia. Based on our findings, it is clear that the 5G network is not yet widely available in the country. This is primarily due to industry concerns regarding pricing and transparency, as well as fears that a government-managed network could lead to a nationalized monopoly [7]. However, it is highly anticipated that the 5G network will become more widely adopted in Malaysia, as it serves as a natural progression from the existing 4G network that is already in use by most Malaysians.

V. ACKNOWLEDGMENT

This work was supported by Department of Electrical Engineering Technology, Faculty of Engineering Technology, Universiti Tun Hussein Onn Malaysia (UTHM). The project group consist of Theevaarasan A/L Ghandi, Nivaashkumar A/L Chandrasekaran, Yuvegan Rao A/L Sampasiva Rao, Vinod Shiva Tharshan A/L Perumal, Magdelene A/P Moses, Sambavi A/P Thiruvengkatarajoo, Muhammad Amir Hamzah Bin Badrulhisam, Muhammad Izat Firdaus Bin Roslan, Mohamad Haiqal Bin Ahmad Zainaddin, Muhammad Syakir Bin Mohd Halim, Muhammad Dinie Imran Bin Kamaludin, Mohamad Nadzirul Ariff Bin Mohammad Zaid,

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DOI: 10.48175/IJARSCT-22637



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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

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