

REVIEW ON: WI-FI ENABLED APPLIANCES AND IT'S FUTURE CHALLENGES

Sanjay P. Pande¹

¹Department of Computer Technology
Yeshwantrao Chavan College of Engineering,
Nagpur, India.

¹sanjaypande2001@gmail.com

Abstract

In current scenario, the term Wi-Fi is very much popular and familiar to everyone, it is seen that the world is moving towards wireless technology. Wireless networking is an upcoming concept of information technology. The networking that enables us to share information in the network to execute processes automatically, a human being can manage any application easily. The objective of this paper is to study Wi-Fi-enabled appliances used at home and offices, what is an impact on the people, how they react while working with wireless technology, and presents the future challenges. The technology for Wi-Fi enabled device is developed, but many issues need to be solved. When many users are trying to access a single Wi-Fi router at the same time. Then, due to shared bandwidth the signal strength decreases, causes delay in downloading, playing videos and finally data accessing and video streaming speed decreases. Also, power consumption increases due to the requirement of an uninterrupted power for 24x7 continuously. Thus, there is a certain scope for improvement in current technology. In this paper we proposed the concept of OTP based security key to restrict unauthorized access and the use of rechargeable battery-operated Wi-Fi unit for power saving purpose to resolve the future challenges.

Keywords: Wi-fi; router, applications, challenges, innovations, security, sensors.

1. Introduction

Wi-Fi (Wireless Fidelity) is a standard recommended by IEEE in the month of February 1980 named 802.11 wireless standard that uses radio waves to connect with the internet. The first wireless Wi-Fi device was including the feature of a wireless LAN called a router. It was developed using initial bandwidth ranges from 2Mbps, the hardware device with a sensor that transmits data from one point to another over the web network is stated as the Wi-Fi device. Wireless sensors, software, and routers are the components of the Wi-Fi system. This device can be implemented into smart devices, practical kits, farming system, auto industries, fitness system, and many more applications. WI-Fi allows us to accomplish our target, helps to balance our work from home in any situation. The current version of the Wi-Fi router permits a single device at a time for exchanging data between two connected devices. As more user increases the accessing speed reduces.

Wi-Fi devices are special computing devices that connects remotely to a network and transmits data. For example, various Wi-Fi devices, such as PCs, notebook computers, smartphones, and palmtops, or physical devices without any physical connection, these devices can communicate in the network and also used for online monitoring and controlling activities remotely.[3]

Since the concept of a network is changing continuously, while Wi-Fi functions as a network of various connected devices. Presently, smart devices such as mobile phones, automobiles, engineering systems, Video recording, playing instruments, automated appliances, and many more can share information over the wireless network. Since the year 1999 the standards that have started evolving over the periods taking care of user demand to increase the overall range of frequency.[2]

2. Methodology

The present study is on theoretical research based on the study it is based on the secondary data.

3. Literature review

Adel Ismail Al-Alawi expressed that network using wired network still involves network control devices. By using Wi-Fi wireless devices computers can communicate with each other by replacing cable technology. Hence this advanced technology highlighted the advance in technology that made it possible for Wi-Fi devices that allow communicating and sharing information using a wide radio spectrum. Hence it was possible to replace the traditional network with the wireless network with minimum cost. Thus, Wi-Fi implemented considering future opportunities.[1]

Abdel Rahman H. Hussein has explained that the gradual evolution of IoT, it becomes complex to identify the various possible area of IoT applications and the challenges in research related to those applications. Starting from hi-tech cities, to medical care, automatic agriculture system, logistics and supply chain, to even smart living culture and environmental system. The wireless technology is projected to get into almost all features of everyday living. However, in recent years, the existing technologies of IoT have been improved significantly. In reality the IoT is too costly and focuses various impact in our daily routine life. This makes important for the researcher to study on various topics like communication and networking technology and computer field. Hence IoT is concrete path for innovative scopes to carry out research work.[2]

4. The Merits of Wi-Fi

4.1. Easy Accessibility

As compared to a wired network, Wireless networks are easy to configure and allows many users to get connected using the same network. Using a hotspot feature of a smartphone or direct Wi-Fi connection makes it possible to establish a connection with another device with less configuration and in very less time.

4.2. Flexibility

Since the network is wireless it is not necessary to be always near to the device to access the internet. We can carry our mobile phone anywhere and we can also do our regular works from smartphones such as bank money transfer, forwarding and checking emails online purchasing, etc. [12]

4.3. Deploying a Router

The Wi-Fi router device is just a plug and play device. There are very easy steps to follow to configure the router device. No cable is running from each connected device. Configuring network connections for desktop machines is difficult and time-consuming. A router can be easily configured and installed as well as it can be easily shifted to new location.

4.4. Versatility

After configuring the Wi-Fi router any user can join the Wi-Fi device, user can get access to the router only by entering an authenticate password. No other device is required to install or to access new users, the device that is already being used allows any user to get connect instantly, the user starts utilizing it in a very less time and with minimum efforts as well.

5. Demerits of Wi-Fi

5.1. Security

In Wi-Fi, there is very weak security. As the Wi-Fi system can easily access by any user it is open to all, hence hackers can interfere with the duplicate password. There are many security techniques used for Wi-Fi networks but hackers are very smart and they can easily break the password and hacked the system.[1][3]

5.2. Speed

The speed of the Wi-Fi network is slow as compared to the wired network, speed ranges from 10 to 50 Mbps. When two devices are connected using point to point link then the data transmission speed remains as it is, but in the case of the wireless network as the number of users increases the speed of accessing reduces. Hence, adding new user have certain limitations.[5]

5.3. Bandwidth

The Wi-Fi network has limited bandwidth, as the number of users increases the speed drops, and signal strength decreases. It is better for not more than five users. As the router allows us to connect 10 to 20 users, but practically it is not possible. As we experienced adding more devices speed reduces.

5.4. Fitness issues

Physical fitness issues may arise due to electromagnetic radiation coming out of Wi-Fi routers. Excessive and continuous radiation from wi-fi devices may cause health problems, such as uneasiness, skin problem, sleep problems, also increases cancer-related issues in the future.

6. Wi-Fi device applications

Every connected device communicates to other interconnected device to automated home and industry tasks. The devices can be divided into three classes: client, commercial, and business. User connected devices includes internet televisions, digital embedded audio system, electronics playing gadgets for kids, electronic home appliances, computerized security systems. Other technologies, including digital air cooler, programmable LED series, and intelligent home protection, and business usages. At home, we can assemble a Wi-Fi system to open and close the door intelligently as the car came in front of door, etc.

7. Future Challenges

7.1. Need of Security and Data Protection

As users always demanding that the security issues are the most important reason for future development. But in reality, no one can stop hacking, there is an uncertainty for the development of security issue. Many branded are available with better security features, such as network security key up to eight or maximum nine numeric numbers. An inexperienced user can also use Wi-Fi enabled appliances easily. The research is needed for protecting network from unauthorized access of Wi-Fi devices. An experienced user can easily install and configure Wi-Fi network with minimum interfaces. Apart from security and data protection of the Wi-Fi, other parts like privacy in data handling reliability, authentication between clients, protection necessities are to be combined. Generally, in the professional transaction, intelligent devices never allow an external participant to access personal data, if it supports strong security.

8. Proposed Work

The network security issue is discussed using the activity as shown in figure 2 and 3. This problem can be overcome in the concept used in proposed work. The mismatch problem because of the following reasons, when someone tries to enter using an unknown WPA/WEP key or network security key and if it doesn't match then the person re-type by using capital, small letter, and other numeric keys. Sometimes the device will respond sometimes not, if it stops working then it has to restart again.

Due to the incompatibility of the device, the password will also not match. Thus, the Wi-Fi network version should be properly matched. If problem remains continue then the complete system has to restart. Hence by resetting the old password a new password will have to create to resolve the issue. Thus, by following the above steps if password gets matched then anyone can use Wi-Fi and resolve the problem of the network key.

To stop such activity or unauthorized access of the Wi-Fi device. The proposed work can be carried out, after entering the correct password key, if the Wi-Fi device generates and sends an OTP to the registered mobile number then the use of Wi-Fi device can be restricted. As well as in future nobody will try to crack the security key to use a Wi-Fi device.

Another issue is related to huge power consumption because of an uninterrupted power requirement for 24x7 (hours and days), when Wi-Fi is not in working mode then also unnecessarily the power gets consumed. To avoid excess power, we proposed the use of rechargeable battery-operated Wi-Fi device. This concept helps to solve the problem of unexpected power shut down and use of costly inverter. Hence rechargeable battery will save power and saves environment too. Further, the saved energy can be used for future purpose.

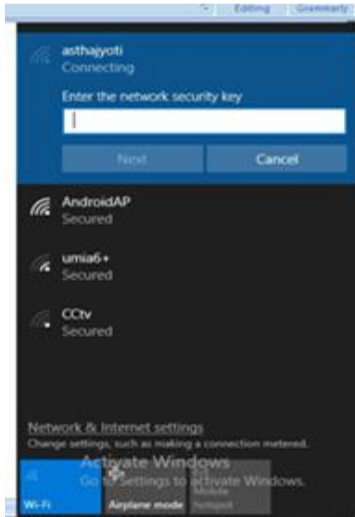


Fig.2.Security Key



Fig.3.Security Key Mismatch

Conclusion

Wi-Fi enabled devices technologies suddenly came in recent years, with minimum cost and fulfill the user's need, the several susceptibilities in wireless system causes to less physical security. this paper has emphasized a variety of possible interconnected Wi-Fi network-enabled appliances and their future challenges. As per the literature study, it has been observed that there are many challenges that the researchers are facing in this domain, such as the network security key, while connecting to internet, huge power consumption, hacking, data transfer speed, reliability, and secured exchanging of information at a satisfactory level as well as strong technological infrastructure support. Network security key issue can be resolved if the system generates OTP on the registered mobile of user, then no one can use Wi-Fi connection unauthentically. Thus, Wi-Fi is providing the way for new scopes of research to be carried out. Another issue related to the requirement of uninterrupted power. It can be resolved by using rechargeable battery-operated Wi-Fi device, hence at least 20% to 30% power can be saved. Therefore, in future deep research work is needed on this topic.

Acknowledgment

I thank to all faculties and colleagues those who gave me direct or indirect support and who inspired

and encouraged me to complete my study work, without whom I could not complete my study.

References

- [1] Adel Ismail Al-Alawi, WiFi Technology: "Future Market Challenges and Opportunities" Journal of Computer Science 2 (1): 13-18ISSN 1549-3636, (2006).
- [2] Surabhi Surendra Tambe, "Wireless Technology in Networks" International Journal of Scientific and Research Publications, Volume 5, Issue 7, July (2015).
- [3] AN Wenbo, WANG Quanyu, GAO Zhenwei, "Smart Home Implementation Based on Internet and WiFi Technology" Proceedings of the 34th Chinese Control Conference July 28-30, (2015).
- [4] Abdel Rahman H. Hussein, "Internet of Things (IOT): Research Challenges and Future Applications" (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 10, No. 6, (2019).
- [5] Falguni Jindal, RishabhJamar, Prathamesh Churi," Future and Challenges of Internet of Things" International Journal of Computer Science & Information Technology (IJCSIT) Vol 10, No 2, April (2018).

- [6] M. H. Miraz, M. Ali, P. S. Excell, and R. Picking, "A Review on Internet of Things (IoT), Internet of Everything (IoE) and Internet of Nano Things (IoNT)", in 2015 Internet Technologies and Applications (ITA), pp. 219–224, Sep. **(2015)**.
- [7] P. J. Ryan and R. B. Watson, "Research Challenges for the Internet of Things: What Role Can OR Play," *Systems*, vol. 5, no. 1, pp. 1–34, **(2017)**.
- [8] M. Miraz, M. Ali, P. Excell, and R. Picking, "Internet of Nano-Things, Things and Everything: Future Growth Trends", *Future Internet*, vol. 10, no. 8, p. 68, **(2018)**.
- [9] E. Borgia, D. G. Gomes, B. Lagesse, R. Lea, and D. Puccinelli, "Special issue on" Internet of Things: Research challenges and Solutions".," *Computer Communications*, vol. 89, no. 90, pp. 1–4, **(2016)**.
- [10] K. K. Patel, S. M. Patel, et al., "Internet of things IOT: definition, characteristics, architecture, enabling technologies, application future challenges," *International journal of engineering science and computing*, vol. 6, no. 5, pp. 6122–6131, **(2016)**.
- [11] V. Sundareswaran and M. S. null, "Survey on Smart Agriculture Using IoT," *International Journal of Innovative Research in Engineering & Management (IJIREM)*, vol. 5, no. 2, pp. 62–66, 2018.
- [12] P. Tadejko, "Application of Internet of Things in logistics-current challenges," *Ekonomia i Zarz{a} dzanie*, vol. 7, no. 4, pp. 54–64, **(2015)**.
- [13] Z. Alansari, N. B. Anuar, A. Kamsin, M. R. Belgaum, J. Alshaer, S. Soomro, and M. H. Miraz, "Internet of Things: Infrastructure, Architecture, Security and Privacy", in 2018 International Conference on Com-puting, Electronics Communications Engineering (iCCECE), pp. 150–155, Aug **(2018)**.