Comparison of Wireless Fidelity (Wi-Fi), Bluetooth, and Redtacton

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Abstract

Human space network (HAN) technology is within the initial stage of development, and numerous analysis challenges ought to be overcome for it to be accepted wide. The transmission media in HAN is the flesh that has the potential to support Redtacton communication at 10 Mbit/s within the age of web of things (IoT); wearable devices have become commonplace. HAN is thought of to produce present services in the internet of things (IoT) atmosphere that shall alter communication between wearable devices in shut proximity. Because of the aptitude of HAN to avoid expensive network setups, it can be another to well-liked wireless transmission protocols like wireless local area network (WLAN) and Bluetooth. During this investigation, a discussion is conferred of the core set of application, functional, and technical needs of the Redtacton HAN to boot, fundamental analysis challenges area unit listed. Redtacton associate in nursing alternative candidate technologies poised to deal with the rising wireless communication market area unit evaluated with an empirical study and their deserves and demerits area unit highlighted.

1. INTRODUCTION

The IoT created an associate in nursing scheme wherever communication between the sensing element and actuators happens through wireless media. With the recognition of IoT, wearable devices additionally proliferated. Exchange of information between terminal devices on the flesh (can be worn devices) is important and has driven in-depth analysis and development. [1] Wireless fidelity (Wi-Fi) and Bluetooth are most ordinarily utilized protocols for communication and knowledge transmission between devices. Each of these protocols has problems associated with security and information measure. Because of this, there is a necessity for investigation of protocol that addresses issues of secure and quick knowledge transmission. HAN alter this transmission, so data is systematically pronto obtainable at our fingertips, each virtually and metaphorically. [2] Implementing human space networks would solve issues associated with low security, outturn deficiency, and exalted network setup prices. [2] In Bluetooth and wireless native space networks (Wi-Fi, etc.), overall output is reduced by inflicting collisions of packets in over-crowded areas, and communication is not safe and secured as a result of signals is altered or disturbed. [3] The most downside of infrared communications (IrDA) is that the tight directivity of beams between electronic devices required for the system to be economical. [1] Wireless communication technologies even have drawbacks like the abrupt decrease in speed of transmission, particularly in multi-user atmosphere resulting in network congestion were peculiar to them. [4] Several matched services area unit doable with flesh surface as a communication medium. Samples of these area unit sensors that may be worn, intuitive operations, personalization, security and safety, health and military operations, and alternative application areas of the technology that mostly enhance ubiquitousness of computing. [4] Redtacton transceivers use the body's electrical field to transmit digital messages. Field of force communication is dissimilar from orthodox wireless, or infrared communication that merely does not think about magnetic attraction or lightweight wave to transmit knowledge as a result of it uses the electrical field created on the surface of the flesh. [2] Optical crystal and optical maser technology convert the changes in the electrical field into a symbol at the receiver. This methodology of information transfer is harmless on flesh. It is a freelance in the atmosphere during which it is used. The most important disadvantage display by this methodology is noise interference. This causes loss of information in alternative words security lapse. [5] As HAN may be an aborning field, this comparative study is drawn with the following objectives: providing the background of Redtacton and understanding its deserves and demerits vis-a-vis wireless local area network and BLUETOOTH. Additionally, basic analysis challenges of HAN are listed. The remaining of the paper is organized as follows: section I-A describes the purposeful and technical principle of Redtacton; section II provides associate in nursing examination of comparative studies of wireless protocols.

1.1. Background of Redtacton

Redtacton needs a transmitter with a symbol conductor that induces an electrical field towards the flesh (Ea), as given in Fig.1. At the same time, Eb is that the field of force elicited from the body to the transmitter and European Community is that the field of force that escapes from the flesh to the bottom. The receiver has an associate in nursing electro-optic crystal and a detector circuit. Field of force metallic element = Es=Ea-Eb-Ec is coupled by the electro-optic crystal and alters the properties of the crystal. Detector circuit detects these changes with an optical maser lightweight and converts it to digital knowledge.

The Redtacton transmitter given in Fig.2 encompasses a transmitter circuit that produces electrical fields toward the flesh and a knowledge sense circuit that differentiates transmittal and receiving phases by police work each transmission and reception data and outputs management signals appreciate the two modes to alter both-way communication.

The receiver has an associate in nursing electro-optic sensing element and a detector circuit that will increase the amplification of the minute signal coming back from the electro-optic sensing element and converts it to an electrical signal.

2. REVIEW OF LITERATURE

Here it includes numerous analyses and analyses created within the field of intrabody communication and, therefore, the results that area unit already printed, considering numerous parameters of the project and therefore, the extent of the project. It provides clarity and a higher understanding of the project. The construct was 1st planned by IBM. [6] However, intrabody communication had two of the subsequent limitations: 1) the operative vary through the human network was restricted to a number of centimeters (10 cm), and 2) the best communication speed was solely 40 Kbit/s. [7],[8] These drawbacks area unit coming back, whereas creating use of associate in nursing electrical sensing element for the receiver. There area unit two lines needed by an associate in nursing electrical sensing element, viz., ground line and the signal line, though in communication through bodies there is just one signal line, i.e., the flesh itself, that results in associate in nursing unbalanced line, that results in the signal not transmitted during a correct approach. [1] The NTT (Nippon Telegraph and phone Corporation) labs launched "Redtacton" a proprietary technology for intrabody communication in 2005. Redtacton has achieved 10 Base communication in consideration with IEEE 802.3 through somebody's body interface from one hand to the opposite hand; however, it could not bring home the bacon interbody communication. [1] S Adewuyi et al. reviewed the performance of wireless local area network (LAN), shut vary wireless, IC card's mistreatment no contact, passive ID tags with no wires, and Redtacton. The authors over through experimentation that Redtacton outperformed alternative wireless communication systems on parameters like the speed of transfer, result of congestion on performance, knowledge transfer mistreatment duplex methodology, knowledge configuration at the initial section of communication, tasks needed at on every occasion of communication and synchronization with user behavior. [4] Y Perwej [2] performed an in-depth survey of HAN communication supported Redtacton. The author delineates the technical specifications of Redtacton additionally as compared to Redtacton with wireless native space networks (Wi-Fib, Wi-Fia/g, Wi-Fin), Radio Frequency

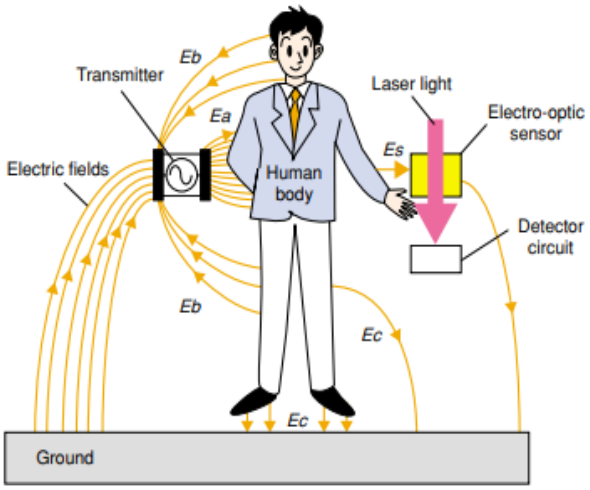

Fig.1: Principle of Redtacton. Image extracted from [1]

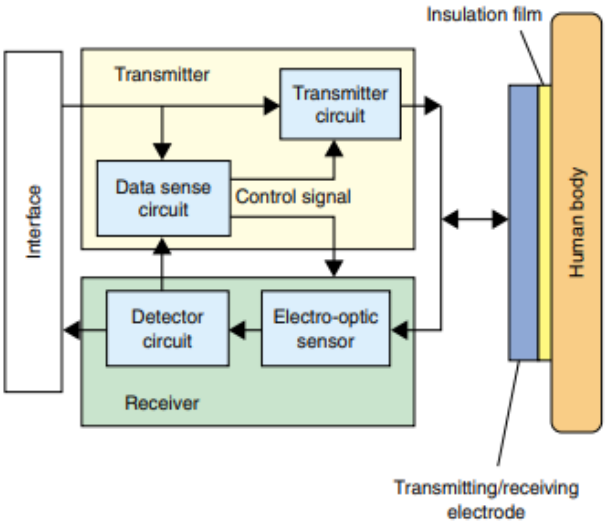

Fig.2: Redtacton transceiver. Image extracted from [1]

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Identification (RFID), and Bluetooth. However, solely one parameter was used for comparison, viz., propagation distance through the house. Ž Lucev et al. analyzed numerous HAN technologies, but the authors restricted themselves solely to understanding the consequences of those technologies on flesh. W Chen et al. summarized the present analysis results of HAN and classified HAN supported coupling modes of intra-body communication. [9] Whereas the authors targeted on providing an in-depth taxonomy of existing technologies, associate in nursing empirical study of existing HAN was out of the scope of their analysis. They discuss basic analysis challenges of HAN, like quantifiability (in terms of information rate, power consumption, and duty cycle), antenna style, interference mitigation, being, QoS, responsibility, security, privacy, and energy potency. The discussion focuses chiefly on Bluetooth, RFID, wireless local area network, and does not cowl Redtacton in its scope. [10] It illustrates numerous HAN design, communication technologies, challenges, and totally different aspects of HAN. The authors concentrate on ZigBee, Wi-Fi, Bluetooth, and Redtacton is on the far side the range of their inquiry [11]. F Douma et al. highlight the strengths and problems with two HAN standards: IEEE802.15.6 and IEEE 802.15.4. The authors compare the communication modes and access mechanisms these standards in knowledge transmission. [12] M Shaik et al. compares Bluetooth, IEEE 802.15.4 (ZigBee), IEEE 802.15.6, or Bluetooth1 (low power Wi-Fi). The authors study mitigation techniques to cut back inter-network interference in these HAN and additionally discuss general open problems in HAN.[13]

3. PROBLEM STATEMENT

The basic idea is to achieve seamless communication by using the human body as the transfer medium. The idea is to develop hardware on both sending and the receiving end along with a software that will be installed on the devices. When there is a human body in contact, the circuit is complete, and the body acts as a transfer medium for the data. Some of the features of our project include highly secure data transmission, the integrity of data is maintained, and the speed of the data transfer is not affected even by the addition of more devices.

4. COMPARATIVE ANALYSIS

5. APPLICATIONS OF REDTACTON

While listening to music on your headphones, you need to adjust the headphones first and then play the music on your mobile kept somewhere in your pocket, however using this technology, without using any wires and passing the digital signals through your body or clothes. This also provides you the facility of changing the song just by a gesture of touch, as explained above.

While sharing pictures between mobile and laptop, all we need to do is touch both the devices to each other.

There exist other unique applications such as sending

Table

Parameter	*Bluetooth*	*Wi-Fi*	*Redtacton*
Speed	version 1.0 (1 Mbps)	Data transfer rates (11 to 1,300 Mbps)	Data transfer speed is upto 10 Mbps
	version 2.0 (3 Mbps)		
	version 4.0 (3–25 Mbps)		
Distance/range	Typically less than 10 m (33 ft), up to 100 m (330 ft)	WiFi a (802.11a) = 10 m	Depends upon the size of the human chain, as much usually 1–2 meters per human
		WiFi B (802.11b) = 100 m	
		WiFi G (802.11b) = 100m	
Date of invention	1994	1997	1996 by IBM
Synchronization with user behavior	Does not exist	Poor	Excellent
Number of parallel systems	15–20 depending upon the application	3	Greater than 50
Example	It takes 8 Mb photo from one smartphone to another, the photo transfers in about three seconds.	Home network router gives a speed of 405 Kb/s, where it takes 27 minutes to transfer 65 files for a total of 641 Mb.	A test case shows that it takes about 2 seconds for a file of 524 Kb to get transferred from one device to another.

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business cards to each other just by touching hands, interchange phone numbers while dancing, sending e-mails with a touch, and many more.

6. CONCLUSION

The project Redtacton–a Abbreviation of Human space network (HAN) is a user-friendly technology that establishes a communication between computing devices in a closer range. This project puts the fourth model of a HAN technology that allows communication just by "Touch." This technology will improve the shortcomings, such as the data speeds weak radio signals and security risks on unwanted signal disturbance. The receiving and transmitting electrodes of the system's transceiver are completely coated with an insulating film, so the body of the person acting as the interface is completely insulated and safe. This application is concentrating on improving the human-computer interaction. The main advantage of the project is that it does not make use of any radio waves at all for data transmission. Over usage of radiofrequency is a major concern these days. We feel that the project will make us learn technologies and broaden our horizons to a better level. Meanwhile, the system under execution has limitations that can be overcome, and the system can be implemented in daily activities.

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