

Overview on RedTacton Technology

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Abstract-Here is a new concept called RED TACTON which makes the human body as a communication network by name HAN (Human Area Network). Focusing on the naturalness, inevitability and sense of security conveyed by touching which is called as RedTacton which could let people transfer data to each other handhelds by means of handshake or a physical contact. RedTacton is the major requirement and advantage for people. RedTacton uses the minute electric field generated by human body as medium for transmitting the data.

Index Terms: Human Area Network; Infrared Communication; Pulse Code Modulation; Liquid Crystal Display.

1. INTRODUCTION

Today people can communicate anytime, anywhere, and with anyone over a cellular phone network. Moreover, the Internet lets people download immense quantities of data from remotely located servers to their home computers. Essentially, two technologies enable communications between terminals located at a distance from each other. Meanwhile, all kinds of electronic devices including personal digital assistants (PDAs), pocket video games, and digital cameras are becoming smaller, so people can carry around or even wear various personal information and communication appliances during their everyday activities. However, user-friendly ubiquitous services involve more than just networking between remotely located terminals.

2. BACKGROUND

In the past, Bluetooth, infrared communications (IrDA), radio frequency ID systems (RFID), and other technologies have been proposed to solve the connectivity problem. Physically separating ends the contact and thus ends communication. Using RedTacton, communication starts when terminals carried by the user or embedded in devices are linked in various combinations according to the user's Communication is possible using any body surfaces, such as the hands, fingers, arms, feet, face, legs or torso. RedTacton works natural, physical movements. However, they each have various fundamental technical limitations that constrain their usage, such as the precipitous fall-off in transmission speed in multi-user environments producing network congestion. The implementation of such a network services requires

three levels of connectivity: Wide Area Networks (WAN), typically via the Internet, Local Area

Networks (LAN), typically via Ethernet and Human Area Networks (HAN), for connectivity to personal information. NTT's RedTacton is a break-through technology that, for the first time, enables reliable high-speed HAN which provides services based on human-centered interactions and therefore more intimate and easier for people.

3. CONCEPT OF REDTACTON

Principle of RedTacton is point to point network; transceivers exchange information none other server receives data using photonic electric field sensors combined with optic crystal & laser light. Communication is possible through any part of the human body. In the project concept, we are transmitting the Data stream (Analog or Digital) as an input to the circuitry; two probes are attached or connected in the contact of human body. In this technology, the human body acts like optical wire or transmitting media in system. Communication or data transfer is done because of the electric field which is naturally present in the human body. Human body is the good conductor of the electric field hence exchange of data is easily obtained. Human Area Networking (HAN) technology is the new concept, which plays the important role in the technology.

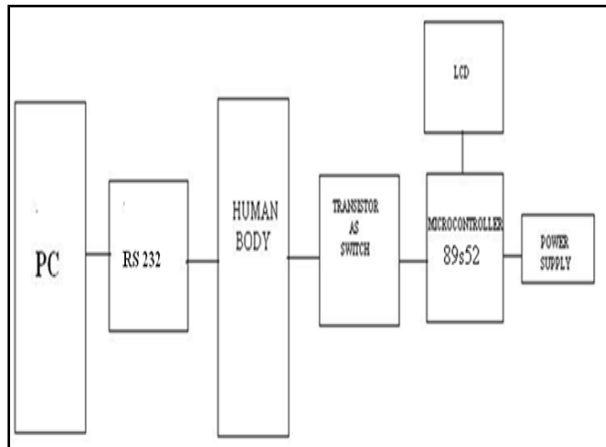


Figure 1: Block diagram of transceiver

4. Working of REDTACTON

The transmitter sends data based on fluctuations in the weak electric field induced in the body. The electric field is received using super-sensitive electric field sensing technology. The naturally occurring electric field induced on the surface of the human body dissipates into the earth. Therefore, this electric field is exceptionally faint and unstable. - The super-sensitive electric field sensing technology measures the weak electric fields induced by the super-efficient alternating electric field induction - Dielectric : Signals pass through materials Conductor + Dielectric : Combinations of travelling along and passing through materials.

5. HUMAN BODY FIELD BEHAVIOR

NTT utilized this third feature to fabricate an intra-body communication receiver for its human area networking technology, which is called RedTacton.. The operating principle of RedTacton is illustrated in Fig.1. The electric field induced toward the body by the transmitter's signal electrode is represented by E_a . The system requires a ground close to the transmitter signal electrode, so electric field E_b induced from the body can follow a return path to the transmitter ground. Moreover, since people are usually standing on a floor or the ground, electric field E_c escapes from the body to ground, mainly from the feet. The electric field E_s that reaches the receiver is $E_s = E_a - (E_b + E_c)$. It couples to the electro-optic crystal and changes the crystal's optical properties. This change is detected by laser light and transformed into digital data by a detector circuit.

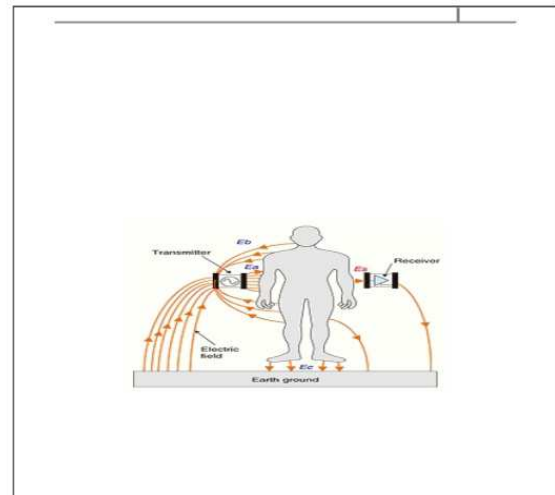


Figure 2: Electric field communication model.

6. DATA TRANSMISSION TECHNOLOGY

Data transmission, digital transmission, or digital communications is the physical transfer of data (a digital bit) over a point-to-point or point-to-multipoint communication channel. Examples of such channels are copper wires, optical fibers, wireless communication channels, and storage media. The data are represented as an electromagnetic signal, such as an electrical voltage, radio wave, microwave, or infrared signal.

While analog transmission is the transfer of a continuously varying analog signal, digital communications is the transfer of discrete messages. The messages are either represented by a sequence of pulses by means of a line code (*baseband transmission*), or by a limited set of continuously varying wave forms, using a digital modulation method. The pass band modulation and corresponding demodulation (also known as detection) is carried out by modem equipment. According to the most common definition of digital signal, both baseband and pass band signals representing bit-streams are considered as digital transmission, while an alternative definition only considers the baseband signal as digital, and pass band transmission of digital data as a form of digital-to-analog conversion.

Circuit diagram includes transmitter & receiver circuits and human body. Transmitter will send some message to words receiver through human body. As shown in fig. the touch pads are connected at both the ends of the transmitter & receiver. Human body is connected to both circuits through these pads. Here human body acts as a transmission media for this transmission. LCD displays at both transmitter &

receiver displaying whatever message to be sent.

Data transmitted may be digital messages originating from a data source, for example a computer or a keyboard. It may also be an analog signal such as a phone call or a video signal, digitized into a bit-stream for example using pulse-code modulation (PCM) or more advanced source coding (analog-to-digital conversion and data compression) schemes. This source coding and decoding is carried out by codec equipment. There are two Figure 2: circuit diagram of transmitter & receiver.

Connections In telecommunications, serial the sequential transmission of signal elements of a group representing a character or other entity of data. Digital serial transmissions are bits sent over a single wire, frequency or optical path sequentially. Because it requires less signal processing and fewer chances for error than parallel transmission, the transfer rate of each individual path may be faster. This can be used over longer distances as a check digit or parity bit can be sent along it easily. Parallel transmission is the simultaneous transmission of the signal elements of a character or other entity of data. In digital communications, parallel transmission is the simultaneous transmission of related signal elements over two or more separate paths. Multiple electrical wires are used which can transmit multiple bits simultaneously, which allows for higher data transfer rates than can be achieved with serial transmission. This method is used internally within the computer, for example the internal buses, and sometimes externally for such things as printers.

7. FUTURE SCOPE

RedTacton can be used as an alternative to present day networking technologies which are limited by traffic congestion and data loss. Thus the future of networking finds a competent technology that can take networking to greater heights which is unimaginable. The Future proposal in this field of networking is that we can embed Artificial Intelligence and Neural Networking concepts which take RedTacton a step further. Thus Human Area Networking sets a wide horizon for upcoming data transfer technologies.

A more compact communication module would allow a greater variety of card terminal types, including smart keys, wristwatches, and cell phones. Diversification into medical care giving and treatment, payment settlement, and other such services in addition to security applications will probably require greater functional flexibility through the use

of rewritable firmware. Among future goals, one we are working toward is power consumption low enough to enable terminals to be powered by the tiny amount of electrical power generated by the human body (battery less terminals). NTT also trying to expand the range of uses of this technology throughout society, in the home and office, in public facilities, and for transportation, as an innovative communications.

8. CONCLUSION

RedTacton is an exciting new technology for human area networking. We have developed a transceiver that uses the human body as a data transmission medium. Using this transceiver, we succeeded in achieving 10BASE communication in accordance with IEEE 802.3 through a human body from one hand to other hand. While our immediate objective is to implement a RedTacton system supporting two way intra-body communication at a rate of 10 Mbps between any two points on the body, our long term plan includes reduction in size and power consumption of the transceiver to enhance its portability. Human society is entering an era of ubiquitous computing, when networks are seamlessly interconnected and information is always accessible at our fingertips. RedTacton is a breakthrough technology that, for the first time, enables reliable high-speed HAN. The advent of RedTacton technology by NTT is in itself revolutionary, which will likely be targeted for use in applications such as wireless headphones, wearable medical devices, security applications, point-of-sale interactions etc. This could get as simple as two people equipped with RedTacton devices being able to exchange data just by shaking hands.

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