

STUDY THE ROLE & APPLICATIONS OF RED TACTON - TECHNOLOGY FOR COMMUNICATION THROUGH HUMAN BODY

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Abstract

NTT's (Nippon Telegraph and Telephone Corporation) labs, Japan has reported new technology called "Red Tacton, it is a Perfect networking technology that transfers data to devices through people's bodies with high speed. Communication is conceivable utilizing anyone surfaces, for example, the hands, fingers, arms, feet, face, legs or toes. It works through shoes and garments too. At the point when the physical contacts get isolated, the communication is isolated. Utilizing RedTacton, the electric fields created by the human body function as a mode for transmitting the data. The chips which will install in different devices contain a transmitter and recipient worked to send and acknowledge data in digital format. The chips can take any sort of document, for example, mp3 music record, or mail and convert in to the digital arrangement that can be gone and read through a human being as electric field. The chip in beneficiary devices peruses these modest changes and converts the document over into its unique arrangement. NTT grew very sensitive Photonic electric field sensor for recognizing minute electric field discharged on the surface of the human body. In this article we have studied the role & applications of red tacton - technology for communication through human body.

1. INTRODUCTION

In practical usage, a RedTacton device must act both as a transmitter and a beneficiary (i.e., like a transceiver). The interface sends a data signal to the two Data sense circuit and transmitter circuit. On the off chance that the data is available, the data sense circuit senses the data and a control signal are created and send a control signal to the transmitter consequently; the transmitter circuit is triggered. Transmitter circuit creates the electrical signals that are to be accepted into the human body and is sent to the transmitting/getting cathode. Since, the terminal capacitively coupled to the human body, transfer of electrical signal happens.

At whatever point a connection is built up by touching, the anode present at the recipient side distinguishes the signal and feeds it to the

electro-optic sensor circuit. Without the control signal from the data sense circuit, the yield is nourished into locator circuit this recognizes transmitting and getting modes to enable two-way communication. At long last, the yield of the finder circuit is sent to the interface.

Multiple REDTACTON transceivers can be utilized on the double since it claims the CSMA/CD (Carrier Sense Multiple Access with Collision Detection) conventions that send simply in the wake of checking the medium, to ensure that there is no data to be gotten to keep away from bundle collisions[49].

2. SECURITY ENHANCEMENTS IN RED TACTON – HUMAN AREA NETWORKING TECHNOLOGY

Amid the most recent decade, wellbeing mindfulness and wellbeing control have expanded among all gatherings of human creatures and the total need to watch biomedical information every day, medicinal services the executives and sensor investigation has expanded. There is an interest to refresh the knowledge, productivity, execution and security of personal and sensitive information of biomedical data sensors and to interface them with the Internet of Things (IOT) framework for the steady working of the network around the body significant. It is additionally important to modify the administration of biomedical information through the insurance and security of protection. This thusly makes the requirement for communication at short proximity which

starts in the human body, rather than long-extend radio communications or different means.

The human body communication technology (HBC), which utilizes the human body as a methods for signal transmission, is one of the promising body network technologies (BAN) utilized for communication all through the human body. This investigation centers around HBC technology and concentrates the transmission attributes and dissemination of the electric field around the human body. Moreover, the transmission of heartbeat data utilizing HBC technology is likewise examined. It is totally not the same as wireless and infrared technologies, since it utilizes the little electric field discharged on the surface of the human body.

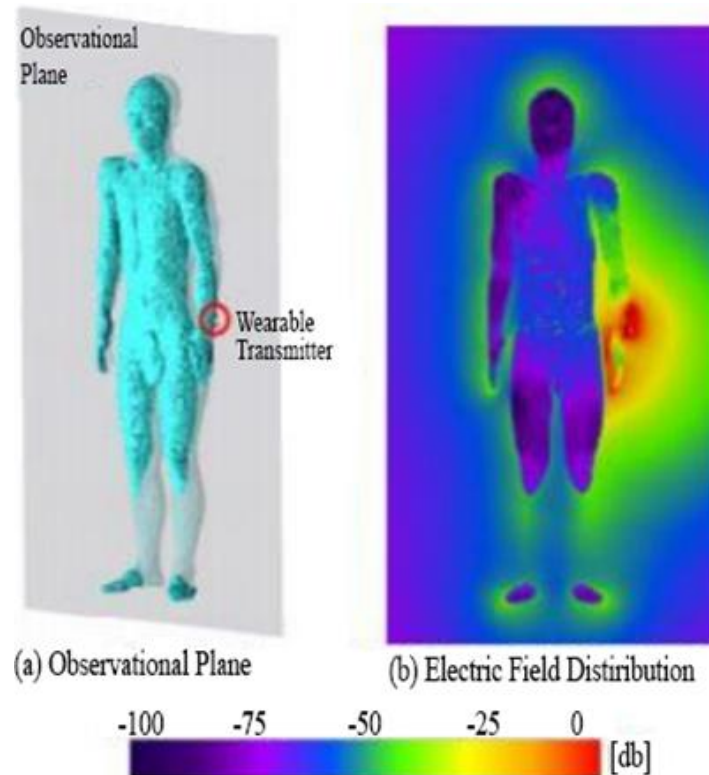


Figure 1: Electric Field Distribution with Transmitter Mounted

The electric field sensor (transistor or photonic electric field sensor) recognizes electric field that achieves the Red Tacton receiver. The recipient senses the adjustments in the feeble electric field on the surface of the body caused by the transmitter. Red Tacton depends upon the rule that the optical properties of an electro-optic crystal can differ as indicated by the progressions of a feeble electric field. The

normally happening electric field actuated on the surface of the human body disseminates into the earth. Consequently, this electric field is uncommonly blackout and unstable. The photonic electric field sensor created by NTT enables feeble electric fields to be measured by recognizing changes in the optical properties of an electro-optic crystal with a laser beam.

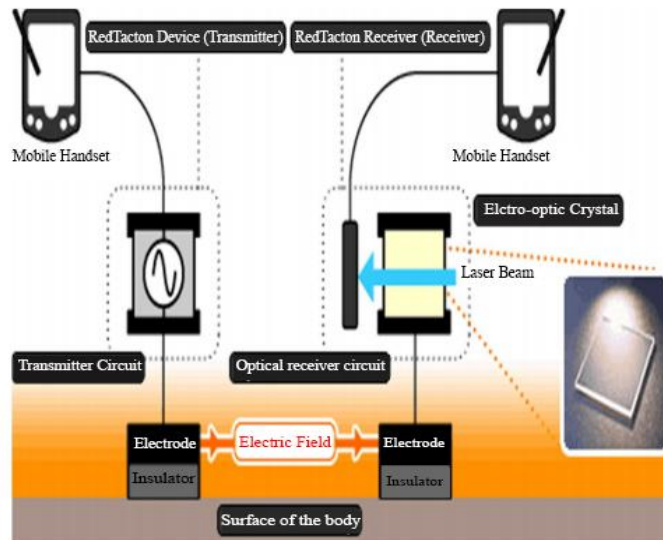


Figure 2: Working principle of Red Tacton

3. NEW TECHNOLOGY TO USE HUMAN BODY AS DIGITAL TRANSMISSION BOTH

Nippon Telegraph and Telephone Corporation (NTT) is seeking after research and advancement of an inventive Human Area Networking technology called RedTacton (*1) that securely transforms the surface of the human body into a data transmission path at speeds up to 10 Mbps between any two points on the body. Utilizing a novel electro-optic sensor (*2), NTT has officially built up a little PCMCIA card-sized model RedTacton transceiver. RedTacton enables the primary practical Human Area Network between body-centered electronic devices and PCs or other network devices inserted in the earth using a

new generation of UI based on normal human activities, for example, touching, holding, sitting, strolling, or venturing on the spot.

RedTacton can be utilized for the instinctive task of PC based frameworks in day by day life, impermanent coordinated private networks based on personal handshaking, device personalization, security, and a large group of different applications based on new standards of conduct enabled by RedTacton. NTT is focused on moving RedTacton out of the research facility and into business generation as fast as conceivable by sorting out joint field preliminaries with accomplices outside the organization, under NTT's far-reaching maker program. Human society is entering a time of pervasive computing when networks are

consistently interconnected, and the information is constantly accessible at our fingertips.

The practical execution of pervasive administrations requires three dimensions of availability: Wide Area Networks (WAN), regularly by means of the Internet, to remotely interface a wide range of separates and terminals; Local Area Networks (LAN), ordinarily through Ethernet or WiFi availability among all the information and communication apparatuses in workplaces and homes; and Human Area Networks (HAN) for network to personal information, media and communication machines inside the lot littler circle of normal every day exercises the last one meter.

NTT's RedTacton is a leap forward technology that, out of the blue, enables dependable high-speed HAN. Before, Bluetooth, infrared communications (IrDA), radio frequency ID frameworks (RFID), and different technologies have been proposed to settle the "last meter" network problem. In any case, they each have different central specialized impediments that oblige their use, for example, the abrupt tumble off in transmission speed in multi-client situations creating network congestion.

Technical Point

RedTacton takes a different technical approach. Instead of relying on electromagnetic waves or light waves to carry data, RedTacton uses weak electric fields on the surface of the body as a transmission medium. A RedTacton transmitter couples with extremely weak electric fields on the surface of the body. The weak electric fields pass through the body to a RedTacton receiver, where the weak electric fields affect the optical properties of an electro-optic crystal. The extent to which the optical properties are changed is detected by laser light which is then converted to an electrical signal by a detector circuit. The

three major functional features of RedTacton are highlighted below.

1. A communications path can be created with a simple touch, automatically initiating the flow of data between a body-centric electronic device and a computer that is embedded in the environment. For example, two people equipped with RedTacton devices could exchange data just by shaking hands. A wide range of natural human actions -- grasping, sitting down, walking, or standing in a particular place -- can be used to trigger RedTacton to start a networked process.
2. Using a RedTacton electro-optic sensor, two-way communication is supported between any two points on the body at a throughput of up to 10 Mbps. Communication is not just confined to the surface of the body but can travel through the user's clothing to a RedTacton device in a pocket or through shoes to communicate with a RedTacton device embedded in the floor.
3. RedTacton can utilize a wide range of materials as a transmission medium, if the material is conductive and dielectric, which includes water and other liquids, various metals, certain plastics, glass, etc. Using ordinary structures such as tables and walls that are familiar and readily available, one could easily construct a seamless communication environment at very low cost using RedTacton.

RedTacton adopts an alternate specialized strategy. Rather than relying upon electromagnetic waves or light waves to convey data, RedTacton utilizing feeble electric fields on the surface of the body as a transmission medium as appeared in figure 3.

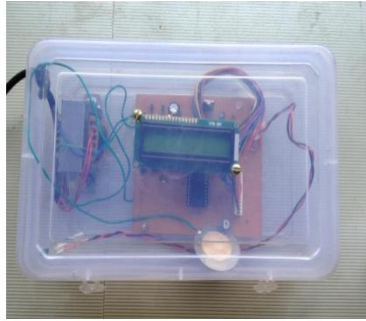


Figure 3: Transmitter

1. The RedTacton transmitter induces a weak electric field on the surface of the body.
 2. The RedTacton receiver senses changes in the weak electric field on the surface of the body caused by the transmitter.
 3. RedTacton relies upon the principle that the optical properties of an electro-optic crystal can vary according to the changes of a weak electric field.
 4. RedTacton detects changes in the optical properties of an electro-optic crystal using a laser and converts the result to an electrical signal in a optical receiver circuit.
- The system can provide authentication and record who touched the device
 - User Verification Management: Carrying a mobile RedTacton-capable device in one's pocket, ID is verified, and the door unlocked when the user holds the doorknob normally
 - Secure lock administration is possible by combining personal verification tools such as fingerprint ID or other biometric in the mobile terminal.

Applications - Minimization of human mistake, advertising applications, customization of vehicles, modern checking.

- Security Applications - Automatic user authentication and log-in with just a touch.
- ID and privileges are recorded in a mobile RedTacton device.
- Corresponding RedTacton receivers are installed at security check points.

4. REDTACTON NEAR-BODY ELECTRIC-FIELD COMMUNICATIONS TECHNOLOGY AND ITS APPLICATIONS

The near-body electric-field communication system described in this Special Feature consists of a transmitter that emits an alternating current (AC) electric-field signal modulated by input data from an electrode and a receiver that uses another electrode to read the weak AC electric field on the body induced by the signal and demodulates it to recover the data from it (Figure 4).

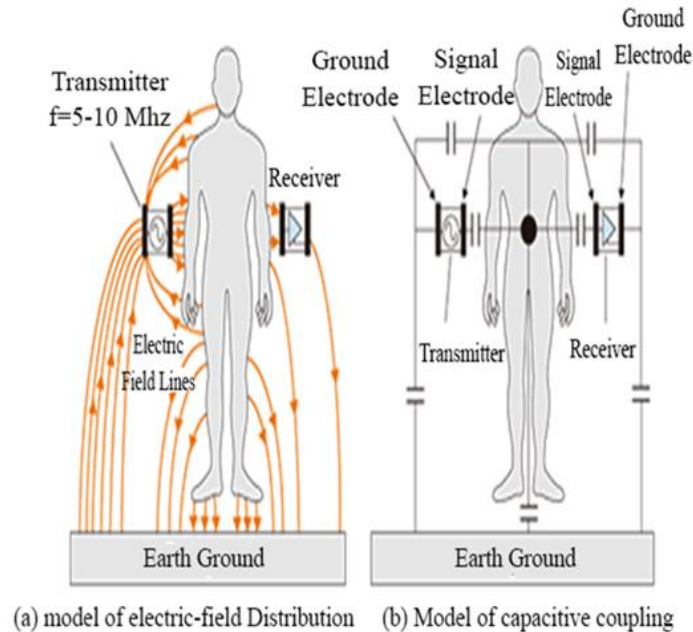


Figure 4: Electric-field and Capacitive-Coupling Models for Near-Body Electric-Field Communications

5. CONCLUSION

We have concluded that the transmitter and recipient are capacitive coupled to the human body through level cathodes that are proportional to the antennas in ordinary wireless frameworks. The close body electric field is adjusted and can be perused and demodulated through these couplings. A component of the technology is that, on the grounds that the signal is passed to and from the body's surface through this capacitive coupling, it tends to be transmitted among transmitter and recipient by means of the body's surface, regardless of whether one of them is in the client's pocket, and the other is under the cover on the floor, for instance. If this technology is connected to a section control framework or ticket door, it is considerably more helpful than customary Contactless cards since you don't have to expel the access card from your pocket.

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