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Red Tacton Human Area Networking

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Abstract : *Almost all the services asked by the user in the present day require technologies that enable communication between people and objects in close proximity. Let us make use of a technology which is neither wireless nor a wired communication such as infrared communication proposed by IBM. In this paper we explain a model of human area networking technology that enables communication by touching, such a technology called Red Tacton is developed. It is a new technology that uses the surface of the human body as a safe, high speed network transmission path. It basically makes use minute electric field emitted on the surface of the human body. This technology is an optional for wired and wireless communication where in a wired communication the cables are used for communication between terminals, and in wired communication the data needs to be routed through cables, which is inconvenient. And also we solve which includes the use of the person body as a signal path for communication. Here a transmission path is formed automatically when a person meets a device and communication between mobile terminals begins. and the human body acts as a transmission medium supporting IEEE 802.3 half duplex communication at 10Mbit/s.*

I. INTRODUCTION

Today people want to communicate day in and day out and they always want to be socially active and they can do so anytime, anywhere, and with anyone with the help of a cellular phone network. And more likely now a days the access to the internet and the penetration of the Internet to all classes of people lets them download huge quantities of data from remotely located servers to their home personal computers be it Personal Digital Assistant or Smartphones. Essentially, these two technologies enable communications between terminals located at a distance from each other. However, user-friendly ubiquitous services involve more than just networking between remotely located terminals. But in this paper we propose a Communication between electronic devices on the human body and ones embedded in our everyday environments. Why we make use of human area networking since wired connections between electronic devices in human area networks are difficult and can easily become entangled and Short-range wireless communication systems such as Bluetooth and wireless local area networks (IEEE 802.11b, etc.) have some problems because throughput is reduced by packet collisions and in crowded spaces such as in a conference hall, meeting rooms and auditoriums filled with huge set of people and communication is not secure because signals can be intercepted. The principle drawback of infrared communications (IrDA) is the tight directionality of beams between terminals needed for the system to be effective. The ultimate human area network solution to all these constraints of conventional technologies is “intra body” communication, in which the human body serves as the transmission medium. In ubiquitous services (which imply communication between electronic devices embedded in the environment in close proximity to people), if we could use the human body itself as a transmission medium, then this would be an ideal way of implementing human area networks. It would solve at a stroke all the problems including throughput reduction, low security, and high network setup costs. The concept of intra body communication, which uses the minute electric field propagated by the human body to transmit information, was first proposed by IBM. The communication mechanism has subsequently been evaluated and reported by several research groups around the world.

A. Red Tacton Working Principle

Red-Warmth, T-Touch, and Acton-Action stands for action triggered by touch called RED TACTON. NTT combined “Touch and Action” to coin the term Tacton, and then added the word Red - a warm color to emphasize warm and cordial communications, creating the name Red Tacton. Instead of relying on electromagnetic waves or light waves to carry data, red tacton uses weak electric fields on the surface of the body as a transmission medium.

It is a new technology that uses the surface of the human body as a safe, high-speed network transmission path. Technically, it is completely distinct from wireless and infrared. A transmission path is formed at the moment when a part of the human body comes in contact with a Red Tacton transceiver. Using this, communication starts when terminals carried by the user or embedded in

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devices are linked in various combinations according to the user's natural, physical movements. Communication is possible using any body surfaces, such as the hands, fingers, arms, feet, face, legs. It works through shoes and clothing as well, and the communication comes to an end when the transceiver is not in contact with the human body.

B. How Red Tacton Works?

Red Tacton can achieve duplex communication over the human body at maximum speed of 10 Mbps. The transmitter induces a weak electric field on the surface of the body. The electric field sensor (transistor or photonic electric field sensor) detects electric field that reaches the Red Tacton receiver. The receiver senses the changes in the weak electric field on the surface of the body caused by the transmitter. Red Tacton relies upon the principle that the optical properties of an electro-optic crystal can vary according to the changes of a weak electric field. It detects changes in the optical properties of an electro-optic crystal using a laser and converts the result to an electrical signal in an optical receiver circuit. The transmitter sends data by inducing fluctuations in the minute electric field on the surface of the human body. Data is received using a photonic electric field sensor that combines an electro-optic crystal and a laser light to detect fluctuations in the minute electric field. 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 photonic electric field sensor developed by NTT enables weak electric fields to be measured by detecting changes in the optical properties of an electro-optic crystal with a laser beam.

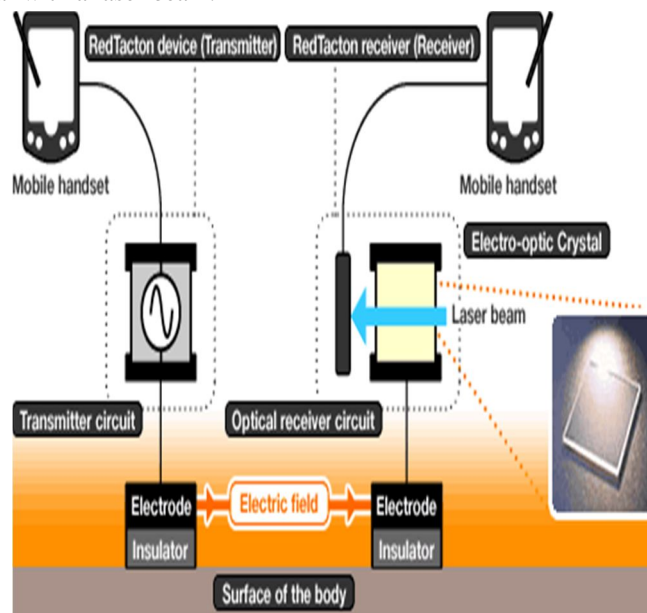


Fig1: Working principle of Red Tacton.

C. Mechanism of Communication with Red Tacton

The transmitter receives the data through an interface and sends data by inducing fluctuations in the minute electric field on to the surface of the human body. Data is received using a photonic electric field sensor that combines an electro-optic crystal and a laser light to detect fluctuations in the minute electric field. 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 technology developed by NTT. Using an electro-optic sensor, Nippon Telegraph and Telephone Corporation (NTT) has already developed a small PCMCIA card-sized prototype RED TACTON transceiver. RED TACTON enables the first practical Human Area Network between body-centered electronic devices and PCs or other network devices embedded in the environment via a new generation of user interface based on totally natural human actions such as touching, holding, sitting, walking, or stepping on a particular spot. RED TACTON can be used for intuitive operation of computer-based systems in daily life, temporary one-to-one private networks based on personal handshaking, device personalization, security, and a host of other a REDTACTON doesn't introduce an electric current into the body instead; it makes use of the minute electric field that occurs naturally on the surface of every human body. A transmitter attached to a device, such as an MP3 player, uses this field to send data by modulating the field minutely in the same

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way that a radio carrier wave is modulated to carry information.

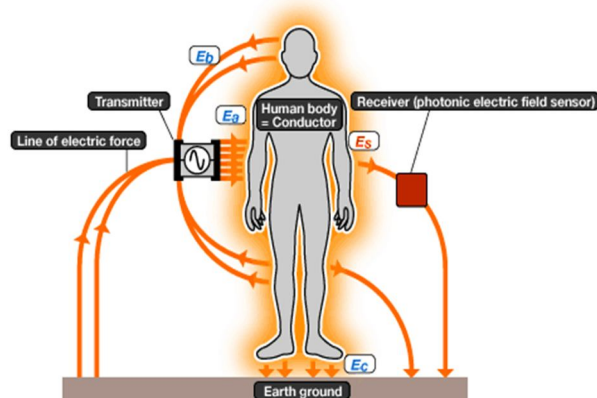


Fig1.1: Working principle of Red Tacton.

D. APPLICATIONS

- 1) One to One Services : With the ability to send attribute data from personal information devices worn on the body to computers embedded in the environment, one-to-one services could be implemented that are tailored to the individual needs of the user.
- 2) An alarm sounds automatically to avoid accidental medicine ingestion: It can be used in medicine bottles thus it can transmit information on the medicines attributes. If the user touches the wrong medicine, an alarm will trigger on the terminal he is carrying. The alarm sounds only if the user actually touches the medicine bottle, reducing false alarms common with passive wireless ID tags, which can trigger simply by proximity.



Fig 2: Eliminating human error

- 3) Intuitive Operation of Personal Information: Communication is triggered by totally natural human actions and behavior, so there is no need to insert smart cards, connect cables, tune frequencies, or any of the other inconveniences usually associated with today's electronic devices. Natural movements and actions are the trigger. There's no "operation" any more. Just intuitive human interaction. In transceivers embedded in two terminals can communicate not only data but also the control or configuration instructions needed to operate devices. Cable connections are eliminated. The body itself is used as transmission medium.
- 4) Instantaneous private network transfer via personal handshake: By shaking hands, personal profile data can be exchanged between mobile terminals on the users. (Electronic exchange of business cards) Communication can be kept private using authentication and encryption technologies.

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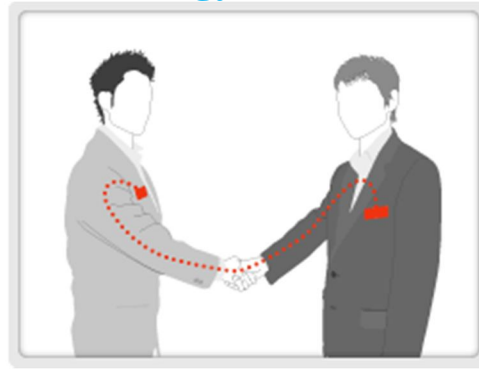


Fig 3: Instant private data exchange

E. Device Personalization

Setup, registration, and configuration information for an individual user can all be uploaded to a device the instant the device is touched, eliminating the need for the device to be registered or configured in advance.

Digital lifestyle can be instantly personalized with just a touch. A pre-recorded configuration script can be embedded in a mobile terminal with built-in RED TACTON transceiver. When another device with REDTACTON capabilities is touched, personalization data and configuration scripts can be downloaded automatically.

F. Connect to a network just by putting laptop on a table

An electrically conductive sheet is embedded in the table. A network connection is initiated simply by placing a lap-top on the table. Using different sheet patterns enables segmentation of the table into subnets.

Red Tacton can carry music or video between headsets, mobile devices, mobile phones, etc. Users can listen to music from a Red Tacton player simply by putting on a headset or holding a viewer.

II. CONCLUSION

There is a need for new artificial body implants to communicate with each other as well as to report back to a portable device could have quite some value. In fact, according to other researchers, the most important application for body-based networking may well be for these type of communications within, rather than on the surface of, or outside, the body.

Red Tacton technology could put an end to the use of cables. The problem faced by this technology is it requires high initial cost for development. This technology brings a new dimension of communication which effectively links the user to anyone he wants to communicate. Since it provides high speed communication, it can provide seamless service wherever, whenever and whoever uses it. We conclude that, when we compare Red Tacton with other technology present today it can give a better performance over others. And we can say that to connect the network with in short distances Red Tacton is best. In this technology, there is no problem of breach of security by a third-party intruders since our body is itself a media.

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