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Red Tacton

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Abstract—All the user-friendly services require technologies that enable communication between people and objects in close proximity. This paper describes a model of human area networking technology that enables communication by touching, a technology we call Red Tacton. It is a Human Area Networking technology, which is developed by Robin Gaur Jind, that uses the surface of the human body as a safe, high speed network transmission path.It is completely distinct from wireless and infrared technologies as it uses the minute electric field emitted on the surface of the human body.
RedTacton involves initiating communication with a touch that could result in a wide range of actions in response. It does not rely on electromagnetic or a light wave to transmit data.

A transmission path is formed at the moment a part of the human body comes in contact with a RedTacton transceiver. Communication is possible using any body surfaces, such as the hands, fingers, arms, feet, face, legs etc. RedTacton works through shoes and clothing as well. When the physical contact gets separated, the communication is ended.

The data transfer between RedTacton enabled devices does not require any dialing or log-in, the data transfer would be practically instantaneous. While it is true that similar personal area networks are already accessible by using radio-based technologies like Wi-Fi or Bluetooth, they are often hampered by intermittent service and will eventually be replaced by "human area networks."

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I. INTRODUCTION

Communication plays an important role in our life. Our life will be simple if safe, secure and easy communication is possible.

RedTacton is a new Human Area Networking technology that uses the surface of the human body as a safe, high speed network transmission path. RedTacton uses the minute electric field emitted On the surface of the human body. Technically, it is completely distinct from wireless and infrared .A transmission path is formed at the moment a part of the human body comes in contact with a RedTacton transceiver. Physically separating ends the contact and thus ends communication Using Red Tacton, 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.

Fig 1. Red Tacton Receivers

This technology was developed by Japanese Company Nippon Telegraph and Telephone Corporation. The NTT labs has announced that it is currently testing a revolutionary technology called " red tacton ",which uses the electric fields generated by the human body as medium for transmitting the data . The chips which will be embedded in various devices contain a transmitter and receiver built to send and accept data in digital format. The chips can take any type of file such as mp3 music file or mail and convert it in to the format that takes the form of digitals pulse that can be passed and read through a human being electric field .the chip in receiver devices reads these tiny changes and convert the file back into its original for.

What Is RedTacton?
It Human society is entering an era of omnipresent computing, when networks are seamlessly   interconnected and information is always accessible at our fingertips. The practical implementation of omnipresent services requires three levels of connectivity:

- Wide Area Networks (WAN), typically via the Internet, to remotely connect all types of severs and terminals;
- Local Area Networks (LAN), typically via Ethernet or WiFi connectivity among all the information and communication appliances in offices and homes;
- Human Area Networks (HAN) for connectivity to personal information, media and communication appliances within the much smaller sphere of ordinary daily activities-- the last one meter. NTT's RedTacton is a break-through technology that, for the first time, enables reliable high-speed HAN.

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Why Named RedTacton?

Because with this technology, communication starts by touching (Touch), leading to various actions (Act on) and the colour red to convey the meaning of warmth in communication. Combining these phrases led to the name, "RedTacton". Meaning Of RedTacton: TACTON:- "touch-act-on" Meaning "action triggered by touching". RED:-It is an auspicious colour according to Japanese culture.

Previous Work on Electric Field Sensing

The development of the Human Area Network (HAN) grew out of a meeting between Professor Mike Hawley's Personal Information Architecture Group and Professor Neil Gershenfeld's Physics and Media Group, both at the MIT Media Laboratory. Professor Hawley's group needed a means to interconnect body-borne information appliances, and Professor Gershenfeld's group had been applying electric field sensing to position measurement.
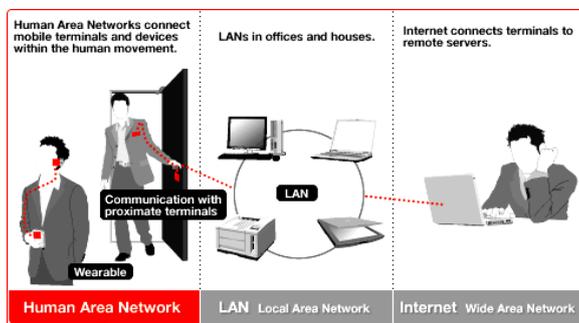

Fig.2.HAN, LAN, WAN

II. WORKING

RedTacton induces the weak electric field on our body. Similar to other transmission technologies, RedTacton also has a Transmitter and receiver. Data is received using a photonic electric field sensor that combines an electro-optic crystal and a laser light to detect fluctuations in the weak electric field on the surface of the body caused by the transmitter. It is possible to have duplex communication at the rate of 10 Mbps through this Red Tacton Device.
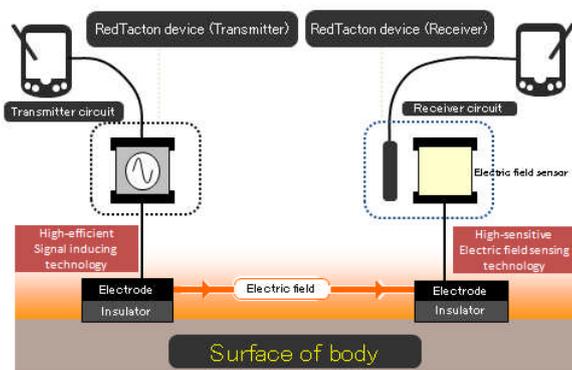

Fig 3. Working

Briefly, it uses human body as the path for the electrical signals that leads to the better communication. Transmitter should be with the user and the receiver can be with any device that needs data transfer .The laser technology is employed in converting the electric field into signals.
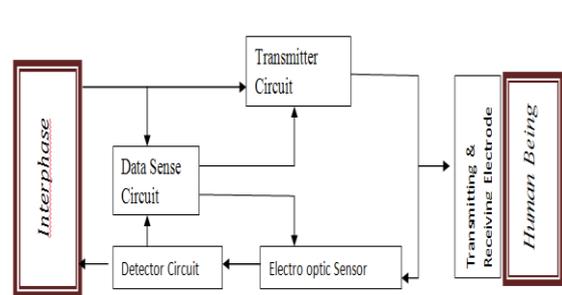
Transceiver :-

Fig 4. Red Tacton Transceiver

Transmitter receives the signals from the interface. Transmitter Circuit is activated once they receive the signals from data Sense circuit .The electro optic sensor studies the changes in the electric field of our body.
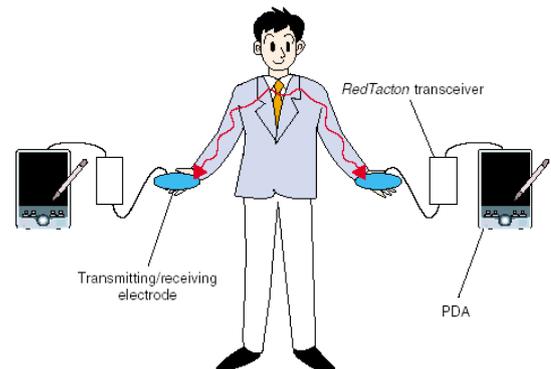

Fig. 4.   Experimental setup for intrabody communication.

Fig 5. Intra body Communication

III. FEATURES

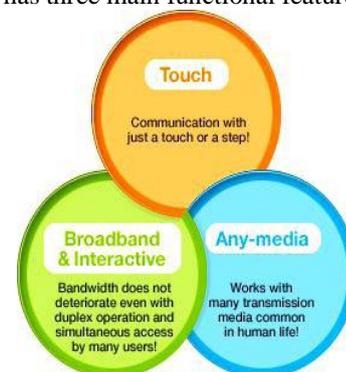RedTacton has three main functional features

Fig.6..Features of RedTacton

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I. Touch:-

- Communication With Just a Touch Or Step
- Touching, gripping, sitting, walking, stepping and other human movements can be the triggers for unlocking or locking, starting or stopping equipment, or obtaining data. Using RedTacton, communication starts when terminals carried by the user or embedded in devices are linked in various combinations through physical contact according to the human's natural movements.

II. Broadband & Interactive:-

Duplex, interactive communication is possible at a maximum speed of 10Mbps. Because the transmission path is on the surface of the body, transmission speed does not deteriorate in congested areas where many people are communicating at the same time. Taking advantage of this speed, device drivers can be downloaded instantly and execute programs can be sent.

III. Any Media:-

In addition to the human body, various conductors and dielectrics can be used as transmission media. Conductors and dielectrics may also be used in combination.
A communication environment can be created easily and at low-cost by using items close at hand, such as desks, walls, and metal objects. But there is one limitation on the length of the conductor to be propagated, on installation locations, and on the thickness of the dielectric to be passed through.

IV. APPLICATIONS

RedTacton has wide variety of applications, some of the applications are as follows:

1) One to One Services :

-Enable one-to-one services tailored to the user's situation and tastes.
-Attribute information recorded in the RedTacton device is sent to the touched objects.
-The appropriate service is provided based on the attribute information received by the RedTacton receiver.

2) Elimination of human error:

RedTacton devices embedded medicine bottles 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. Avoidance of risk at construction sites. (an alarm sounds if special equipment is handled by anyone other than supervisors).

3) Marketing Applications:

When a consumer stands in front of an advertising panel, advertising and information matching his or her attributes is automatically displayed. By touching or standing in front of items they are interested in, consumers can get more in-depth information. Inside a shop, shoppers can view related

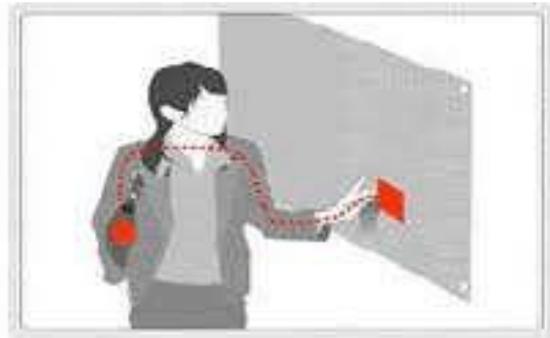information on their mobile terminals immediately after touching a product.

Fig 7. Marketing

4) An Alarm:

Red Tacton devices embedded medicine bottles 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.

5) Intuitive Operations

Natural movements and actions are the trigger (touch).RedTacton transceivers embedded in two terminals can communicate not only data but also the control or configuration instructions needed to operate devices (broadband & interactive).

Fig 8. In Printing

6) Instant Private Data Exchange:

By shaking hands, personal profile data can be exchanged between mobile terminals on the user.(Electronic exchange of business cards) Communication can be kept private using authentication and encryption technologies. Group photos taken with digital cameras are instantly transferred to individual's mobile terminal. Diagrams written on white boards during meetings are transferred to individual's mobile terminals on the spot.
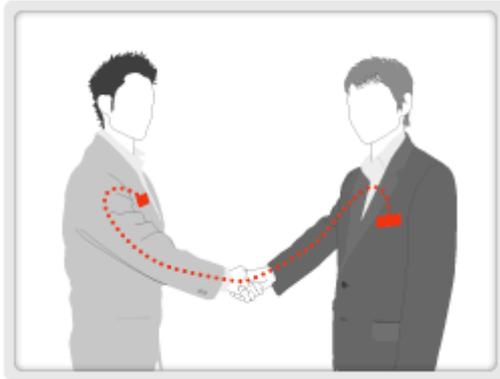
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Fig 9. Data Exchange

7) Personalisation of Mobile Phones:

Your own phone number is allocated and billing commences. Automatic importing of personal address book and call history. The PC is configured to the user's specifications simply by touching the mouse.

Fig 10. Red Tacton in Driving

8) Conferencing System:

An electrically conductive sheet is embedded in the table. A network connection is initiated simply by placing a laptop on the table. Using different sheet patterns enables segmentation of the table into subnets. Walls and partitions can be used as communication media, eliminating construction to install electrical wiring. Ad hoc networking using conductive liquid sprays is possible.
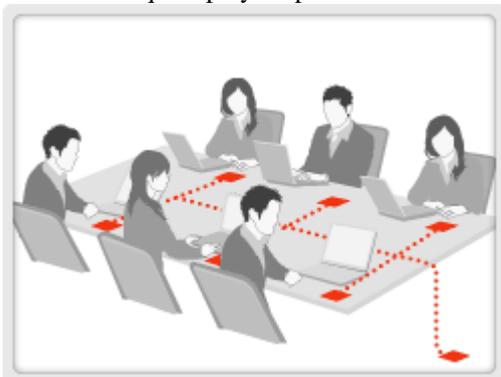

Fig 11. Conference System

9) Wearable:

RedTacton can carry music or video between headsets, mobile devices, mobile phones, etc. Users can listen to

music from a RedTacton player simply by putting on a headset or holding a viewer.

10) 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. The system can provide authentication and record who touched the device, and when.
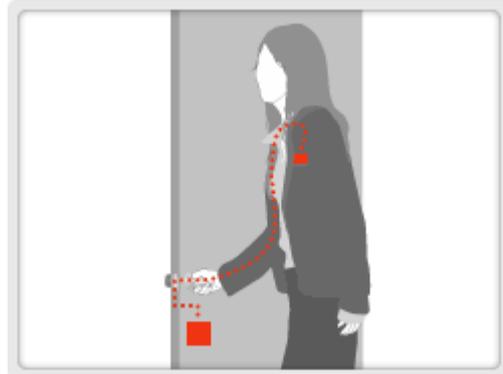

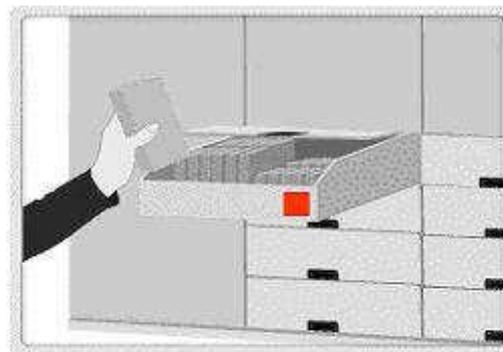
Fig 12. Automation in Locking

Fig 13. Automatic CabinLock

11) Medicine Analysis

It is possible to make automatic alarm tone once you touched the wrong medicine. So it can be implemented in medical shops to make easy access.

Fig 14: Medicine analysis

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V. ADVANTAGES

i. RedTacton does not require the electrode be in direct contact with the skin.
ii. High-speed communication is possible between two arbitrary points on the body.
iii. Body-based networking is more secure than broadcast systems ,such as Bluetooth which have high range of about 10m.
iv. Network congestion due to fall in transmission speed in multiuser environments is avoided.
v. Superior than Infrared technology
vi. Superior than Wi-Fi.
vii. Data transfer during transfer is less.
viii. Use of minimum amount of power (of some mill volt range).
ix. Advantage Over Bluetooth:

While it is true that similar personal area networks are already accessible by using radio-based technologies like Wi-Fi or Bluetooth, this new wireless technology claims to be able to send data over the human skin surface at transfer speeds of up to 10Mbps, or better than a broadband T1 connection. Receiving data in such a system is more complicated because the strength of the pulses sent through the electric field is so low.

RedTacton solves this issue by utilizing a technique called electric field photonics: A laser is passed though an electro-optic crystal, which deflects light differently according to the strength of the field across it. These deflections are measured and converted back into electrical signals to retrieve the transmitted data.

VI. DISADVANTAGE

i. It has no compelling applications that aren't already available.
ii. Too costly.
iii. It can be useful within centimetres.
iv. Effects on human body is still under research.

VII. CONCLUSION

Red Tacton employs a proprietary electric field/photonics Method, which overtakes the other methods in terms of Communication distance, transfer speed, and interactivity. It is highly secure and impossible to get hacked. It is a high speed network and well suited for short distance communication. In future , where man is destined to reach new heights of technology ,a trend like RedTacton is likely to direct him in the right direction giving him hope and motivation than any other technology man is able to perceives on the human centered interaction.

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