

Red Tacton Human Area Networking

Minu C Jose
 MSc ComputerScience
 Computer Science Dept
 St. Marys College
 Thrissur

Abstract — All the user-friendly services require technologies that enable communication between people and objects are in close proximity. This paper describes a new technology for communication by touching called, a technology we call Red Tacton. It is a communication between mobile terminals and terminals that are embedded in the environment. The routing of cable is clearly inconvenient. When weak radio signals are used the data packets get collided which leads to loss of packets. In this technology the human area become the path of transmission. A transmission is formed automatically when a person comes into contact with a device and communication between mobile terminals begins. Here, the human body acts as a transmission medium IEEE 802.3 half duplex communication at 10Mbits/s.

Keywords — Red Tacton, Human Area Networking, Communication through Touch Technology.

I. INTRODUCTION

In our modern world people can communicate anytime anywhere and with anyone with more convenient and in a simple way as we do in our real time. This technology that facilitates faraway communication with the people. Although many electronic devices have reduced. Wired connection between electronic devices in human area networks is easily tangled. Also the short range communication systems called Bluetooth also have some problems. Throughput is reduced due to packet collision and communication is not secure because signals are interpreted. The ultimate solution is the human area network to provide “intra body” communication, in which the human body serves as a medium of communication. This technology reduces the problem of throughput reduction, low security. 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. Red Tacton can be used for intuitive operation of computer-based systems in daily life, temporary one-to-one private networks based on personal hand shaking, device personalization, security and a host of other applications. With the “Red Tacton” system, we can envisage a future in which the human body acts as a non-stop conduit for information. The technologies have reported two limitations: 1) The operating range through the body was limited to a few tens of centimeters 2) the communication speed was only 40kbits/s.

II. HUMAN AREA NETWORK

The electro-optic sensor combining an electro-optic crystal with laser light and recently reported an application of this sensor for measuring high frequency electronic devices. The electro-optic has three key features: 1) It can measure electric

fields from a device under test without contacting it, which minimizes measurement disturbances, 2) Ultra wide band measurement is possible, and 3) It supports one point contact measurement that is independent of the ground. NTT utilized this feature to fabric an intra-body communication receiver for its human area networking technology, which is called Red Tacton. The operating principle is illustrated below:

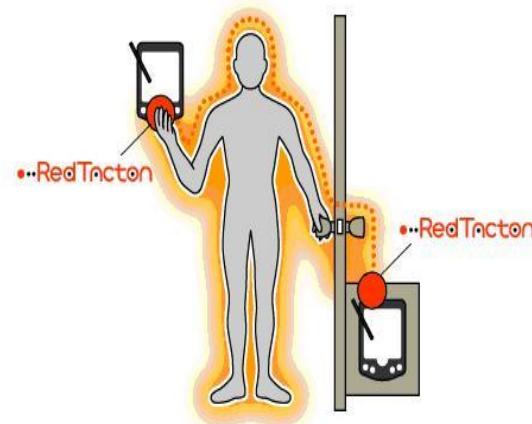


Fig 1: Operating principle of Red Tacton

We can represent the electric field induced towards the body by the transmitters signal electrode is represented by E_a . The system requires a ground close to the transmitter signal electrode, so the electric field E_b induced from body can follow a return path to the transmitter ground. Moreover, since people are usually people are standing on a floor or a ground, the electric field E_c escapes from the body to ground, mainly from the feet. The electric field E_s that reaches the receiver is $E_s = E_a - (E_b + E_c)$. This change is detected by a laser light and transformed into digital data by a detector circuit.

III. TRANSMISSION STEPS

- 1) The Red Tacton transmitter induces a weak electric field on the surface of the body.
- 2) The Red Tacton receiver senses changes in the weak electric field on the surface of the body caused by the transmitter.
- 3) It relies on the principle that the optical properties of the electro-optic crystal varies according to the changes in the weak electric field.

4) It detects the changes in the optical properties of an electro-optic crystal using an laser beam and converts the result into an electrical signal in a detector circuit.

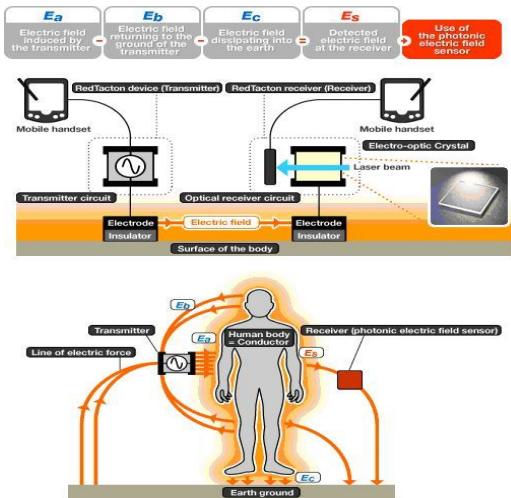


Fig 2. Working

IV. RED TACTON TRANSCEIVER

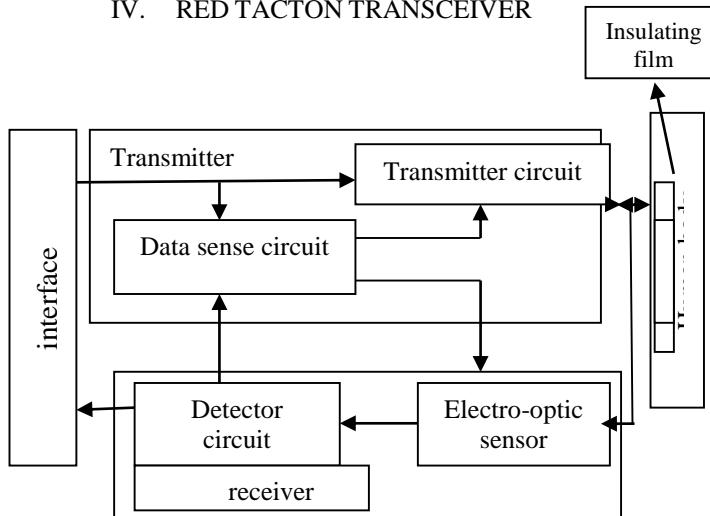


Fig 3: Block diagram of a Red Tacton Transceiver

The signal from the interface is sent to the data sense circuit and the transmitter circuit. The data sense circuit senses the signal and if the data is present it sends control signal to the transmitter which activates the transmitter circuit. The transmitter circuit varies the electric field on the surface of our body. The change in the electric field is detected by the electro-optic sensor. The output of the electro-optic sensor is given to the detector circuit, which in turn given to the interface of the receiving Red Tacton device.

V. HUMAN SAFETY

Although the transmission is taken place through human body it will not affect our health. Because the transmitting and the receiving electrodes of the Red Tacton receiver are covered with insulating film, so the body is perfectly protected. This makes it possible for the current to flow into our body from a

transceiver. When communication occur, displacement current is generated by the electrons in the body because the body is subjected to minute electric fields.

Red Tacton subjects to the “Radio Frequency Exposure Protection Standard (RCR STD-38)” issued by the association of radio industries and business.

VI. FEATURES OF RED TACTON

1) Touch

It establishes the communication with just a touch which is the major feature of Red Tacton Device.

2) Broadband and Interactive

The transmission media is on our body surface, the speed does not get varies in congested areas where many people can communicate at the same time.

3) Any Media

It is possible for the Red Tacton to work with any type of device.

VII. APPLICATIONS

Red Tacton has wide range of applications. It include:

i. APPLICATION FIELDS

- A. One to One Service
- B. Intuitive operations
- C. Personalization
- D. New Behavior Pattern

A. One to One Service

1) Medicinal Analysis

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



Fig. 4. Medicinal Analysis

2) Automation

Automatic locking and touching.

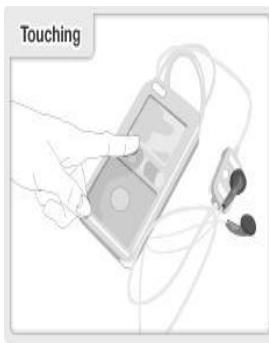


Fig. 5. Touching and gripping

A communication path can be created with a simple touch, it automatically initiates the flow of data between a body and a computer that is embedded in the environment. High security locking system can be enabled with this device.

3) Marketing

If the system is implemented, then people can just touch the device to know more about it.

B. Intuitive Operations

1) Touch a printer to print

Print out where you want just by touching the desired printer with one hand and a PC or digital camera with the other hand to make the link complicated configurations are reduced by downloading device drivers “at first touch”.

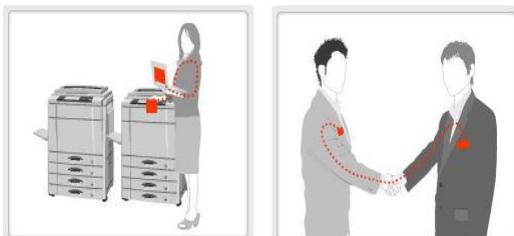


Fig. 6. Intuitive operation

2) Instant private data exchange

By shaking hands, personal profile data can be exchanged between mobile terminals on the users. Communication can be kept private using authentication and encryption technologies

C. Personalization

1) Just touching a phone makes it your own.

Your own phone number is allocated and billing commences. Automatic importing of personal address book and call history.

2) Personalization of Automobiles

The seat position and steering height can be adjusted according to the driver's convenience just by sitting in the car.



Fig. 7. Personalization

3) Wireless Headset

Red Tacton can carry music or video between headsets, mobile devices. Users can simply listen to it by putting a headset or holding a viewer.

4) Conference System

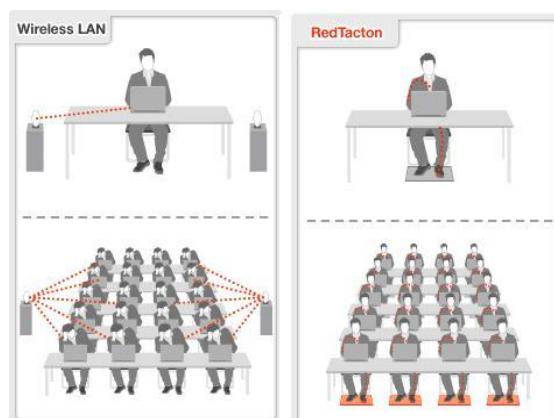


Fig. 8. Conference system

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.

D. Security Application

Red Tacton is very secure in all respects such as authenticity, authentication and verification as well as unlocking as we see in fig 9.



User verification& unlocking



Automatic Access log

Fig. 9. Security application

1) User verification and unlocking with just a touch carrying a mobile.

If the Red Tacton capable device in one's pocket, ID is verified and the door is unlocked when the user holds the doorknob normally. Fingerprint ID and biometric in the mobile terminal can also be used.

3) Automatic access log

There is also a facility to access automatic log for confidential document storage. These access logs contain database information in the form of log files.

Other Application

1) Medicine

It helps in easy identification of abnormal growth of tissues and tumors. It is highly secure. It can also be adopted for an insulin pump for diabetics, it will surely gain acceptance from patients and other professionals.

2) Military Application

Gun security can be provided efficiently. Then it is not possible for our enemies to use our weapon and reprogram it.

Future Development

Data will transfer through one's clothing, handbag or shoes, anyone carrying a special card can unlock the door simply by touching the knob or standing on a particular spot without taking the card out. It will have many future applications such as walkthrough ticket gate, a cabinet that opens only to authorized people and a television control that automatically chooses favorites channels. The system also improves security. It ensures that only drivers can open their cars by touching the doors if the keys are in their pockets, not people around them.

Communication in New Domain



Potential for use as communication
method in outer space and under water



Potential for use as communication method
with devices inside the body.

Fig. 10. Communication Domain

VIII. PROTOTYPES

NTT has made three prototypes. They are

- A. PC Card Transceiver
- B. Embedded Receiver(Hub Type)
- C. USB Transceiver(Box Type)

IX. LIMITATION

The technology is very expensive to implement. It takes more time to get popular among the people in the market as it is a new kind of network.

X. CONCLUSION

Red Tacton is a exciting new technology for human area networking. We have developed a transceiver that uses human body as a data transmission medium based on electric field sensor that uses an electro-optic crystal and laser beam. It employs an proprietary electric field which overtakes other methods in term of communication distance, transfer speed and interactivity. It is highly secure and impossible to be hacked. It as a high speed network and well suited for short range communication. In future, where man is destined to reach new heights of technology a trend likely to direct him in the right direction giving him hope and motivation than any other technology man is able to perceive on the centered interaction.

ACKNOWLEDGEMENT

I heartily express my thanks to all those who helped this Journey a successful one. And the valuable comments and suggestions that I got from my reviewers.

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