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Prodogious Potential of Redtacton Solitary and in Digital Network

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Abstract: Communication between people and objects in close propinquity is feasible using technologies like Ethernet, IoT, Wifi, etc. Technologies connect objects, networks & people together for data sharing and thus make information ready for access.In new era of technology ,the network security has became the greatest challenge in digital networks. That creates a room and need to have more secure network technology.A breakthrough technology that consider body surface as secure medium is considered to be a promising technology in field of network security.Under Redtacton technology the signals are transmitted through the physical structure that ultimately supports "IEEE 802.3 half-duplex communication" and mobile terminals or seems similar terminals that are implanted within the environment. It uses the weak radio signals and transmit data at greater speeds efficiently.This technology can be applied in multiple application like, in field of banking, security checks, health, etc .During this paper we are going to discuss about Redtacton, and its perks as a secured network for digital system like ATM . we'll also compare enormous potential of Redtacton as an individual's area network with the other available technology .

Keywords: Security, Communication, Redtacton,Technology, HAN

I. INTRODUCTION

In today's digitized world access to the web and therefore the penetration of the web to any or all classes of individuals, allow them to download huge amount of knowledge from diversely located servers to their personal computers or Smartphones connected digitally. But these communications have a security problem and want high speed data transfer security. HAN (Human Area Network) could be a discoverable technology that gives great speed and connectivity among different terminals and devices.Technology like Bluetooth(a short- range frequency approx 10m range.) ,Zigbee, Ir DA, and UWB are unavailable to resolve the 'last meter' connectivity issue, thanks to their vulnerabilities of slow speed within the multi-user environment resulting in overcrowding of signals. Red Tacton is positioned within the right mid of wireless and wired communication. This technology provides great ease to day-to-day tasks like one can transfer pictures just by a contact between our body surface and PC while the camera is around your wrist and similarly electronic business cards can also be exchanged . Redtacton technology is developed by a Japanese communications company NTT (Nippon Telegraph and Telephone Corporation)and is defined by an information transmission path and an AC field of force with a frequency below the resonant frequency of the body, it consists of transmitter and receiver section. Redtacton transceivers don't required any special software instead can use currently available Software. This technique is proposed for secured transaction in ATM MACHINE because it can send data over the surface at speeds of up to 10 Mbps almost a quick broadband that minimize time interval for detection and recognition process.
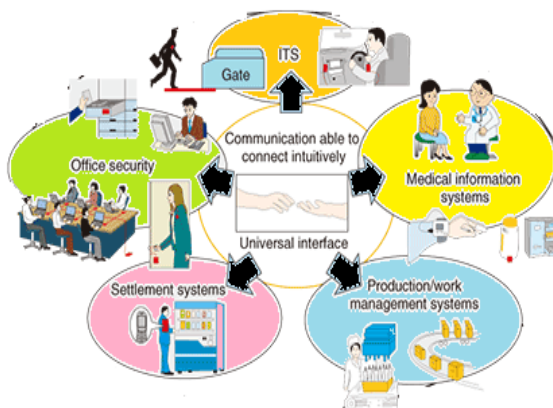

Fig(1) Redtacton Operation

It's completely safe for human utilization because the electrodes of the RedTacton are completely insulated. During transmission of knowledge, the form is subjected to minute electric fields, which ends in displacement current.. Redtacton completely adheres, Radio Frequency-Expo-sure Protection Standard (RCR STD-38).

II. WHAT IS REDTACTON ?

RedTacton can be understood as a warm and cordial communication through an action. It works as omnipresent network services among other connectivity levels for information and communication devices in a sphere and so known as HAN.'RED' a warm color and 'TACTON' is a combination of touch and action. Its an intermediate technology. It uses a super- sensitive photonic electric field sensor. It provides duplex communication of about 10 mbps speed over the human body .

The minute electric field generated by human body is used by Redtacton to transmit signals . The transmitter and receiver chips are embedded to send and receive digital data. Redtacton technology was implemented to overcome the data speed issues and to develop a more secure environment for transmission by reducing the risks of unwanted signal interceptions.
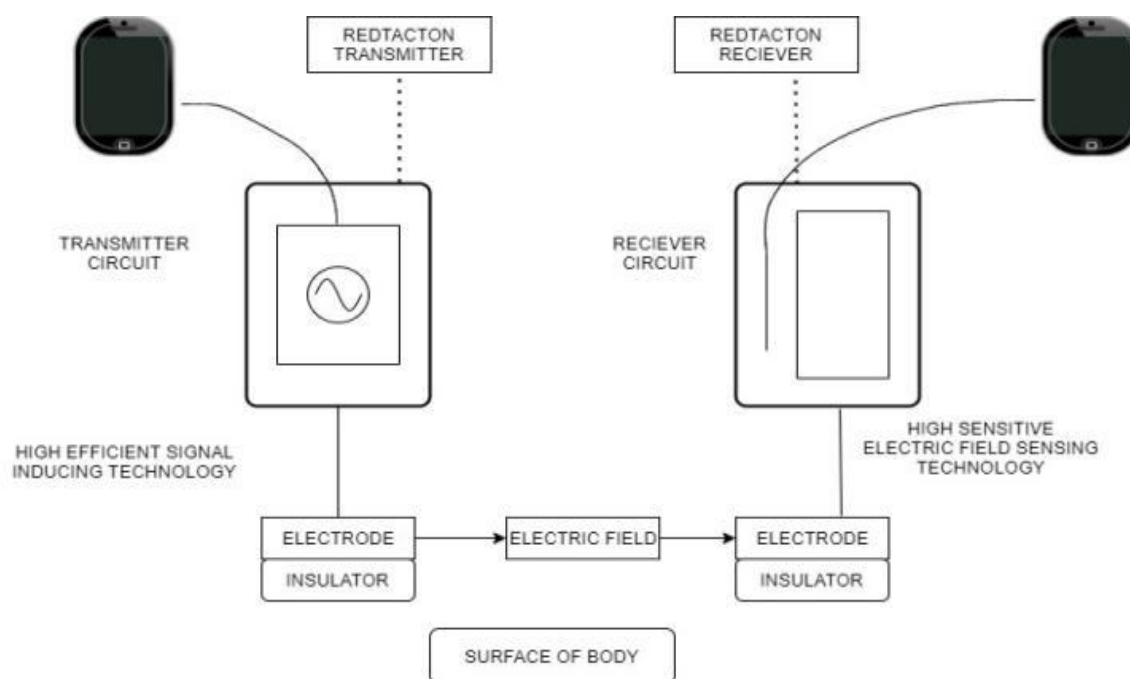
Fig(2) Redtacton

Photonic field :

$Ea – Eb – Ec = Es$

Here,Ea-electric field at Tx.

Eb- electric field at the bottom of the Tx.

Ec- electric field at the Rx

Es- Detected force field at the Rx

Electric field sensors are used to receive data, along with an electro- optic crystal and a laser light it can detect fluctuations in the minute electric field. .They operate through any non-conductive material permits complete invisibility. The sensor functions by detecting small changes in an ultra-low-power electromagnetic field generated between two remotely located antenna electrodes. Without any contact it can measure electric fields from a device under test (DUT),which minimizes measurement disturbance. It supports one-point contact measurement that is independent of the ground and an adjustable range from few centimeters to 4 metre. The basic principle of operation of a photonic E-field sensor relies on electro-optic effect. A change in the electric field under test results in the change of refractive index of the electro-optically active material. There are three primary mechanisms for measuring DC electric field strength, induction probes, field mills and optical sensors.

Features are as follows:-
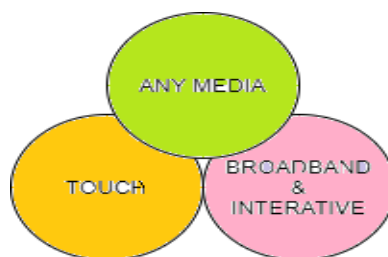
Fig(3).Features of Redtacton

- ❖ Touch-Holding, standing, sitting, shaking and other day to day activities can be the triggers for opening or closing security gate, or initiating or terminating data sharing.
- ❖ Broadband - Duplex transmission path at speeds up to 10 Mbps[2]. Steady transmission speed even in congested areas.
- ❖ Any media -Various conductors and dielectrics(individual or combination) can be used as transmission media along with human body.[3]

The complexity of the human body and the mysteries of how it operates has muddled the medical professionals .Scientists and doctors keep researching for deeper understanding of the biological aspects of human body .Unlike in past ,now medical industry has advanced and contains Armamentarium to diagnose ,monitor and and treat the medical condition. Wearable

wristwatches, blood sugar monitors and implanted devices like pacemaker are now recording and transmitting data.

This technology is promising for applications in areas such as secure systems, intelligent transportation systems (ITS), medical information systems, production and work-management systems, and payment and settlement systems.[5]

III. HOW REDTACTON WORKS?

RedTacton range of communication is limited to devices within human area, the initiation & termination of communication are linked to the user's actions, which provides instinctive sense of connecion to network. Redtacton a universal data transmission interface, with potential for expanding the boundaries of information and communications technology and creating whole new applications areas.[5] Its propagation is similar to contactless cards and targets transmission speeds from 100 kbit/s to 10 Mbit/s.[6].

The workflow of redtacton is as follows:-
1) RedTacton Technology contains a transmitter and a receiver.
2) The natural movements by physical body surfaces like hands, arms, feet, face, legs or torso works as triggers, works well through shoes and other clothing .
3) Transmission initiated when anatomy connects with Redtacton transceiver and connection get terminated with started.
4) A mild force field is induced on the figure .The fluctuation during this force field forms the digital signal for transmission.

Due to mild field sensitive transistor or photonic force field sensor are setup because the receiver part. This sensor detects the electrical field and processed signal carries information for download. There is very small and unstable residual electric fields on the body, which is automatically sent back to earth.
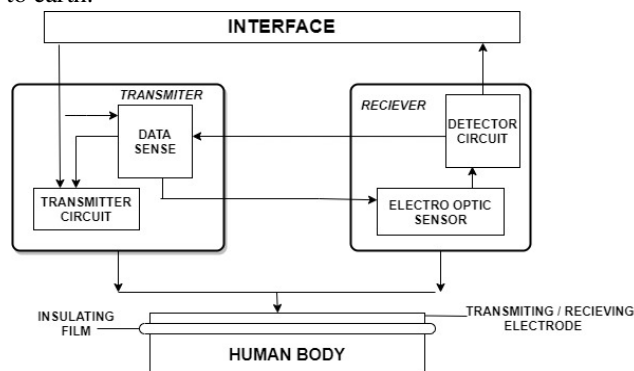

Fig (4):.Block diagram of Redtacton transreciever

It is a small area network hence while transmission, other servers don't receives data. The communication is possible through any part of the body. physique is the most effective conductor of the electrical field, so exchange of knowledge is definitely acquired thanks to naturally present force field. Unlike other technologies like infrared or wireless, in Redtacton transmission path is created when component of the body comes close to a RedTacton transceiver. The terminals are usually carried by the user or embedded in devices makes communication possible using hand, palm, feet, etc(body part).
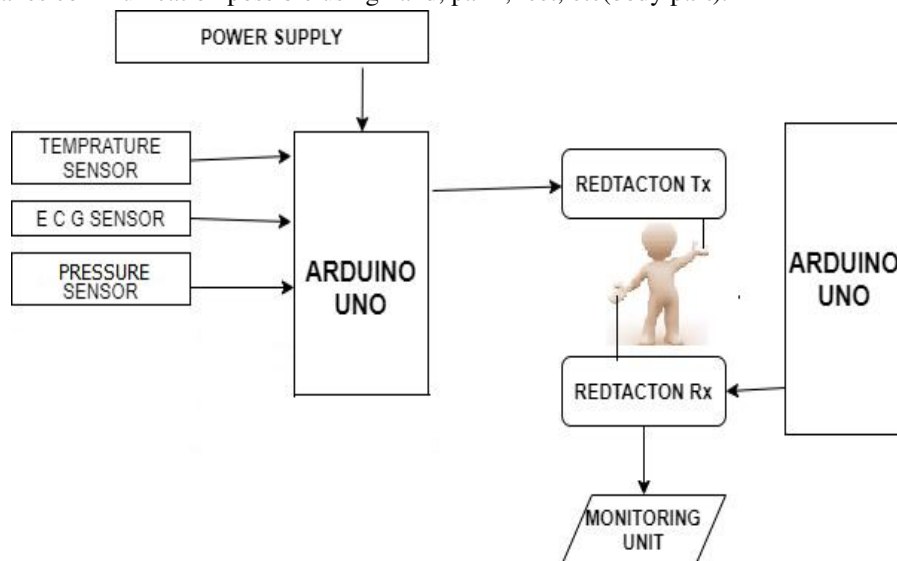

Fig (5) Basic block diagram of Redtacton network

A. *System Components*

1) *Hardware*

- *Arduino Uno:* It comprises of both physical programmable circuit board and a software.
- *Temprature Sensor:* Used for sensing temperature
- *E C G Sensor:* Used to sense heart rate
- PRESSURE SENSOR: Used for sensing pressure, blood pressure in this case.
- *Redtacton Transreciever:* It is a redtacton based transmitter and receiver device, which is connected to Arduino from one end and another end contains a probe used to establish connection by touching ,holding, gripping, etc.
- *Monitoring Unit:* This unit is used to monitor the output (data recovered).
- *Power Supply:* Power supply is utilized to provide electric power to circuit transmitter by convert mains AC to low voltage DC
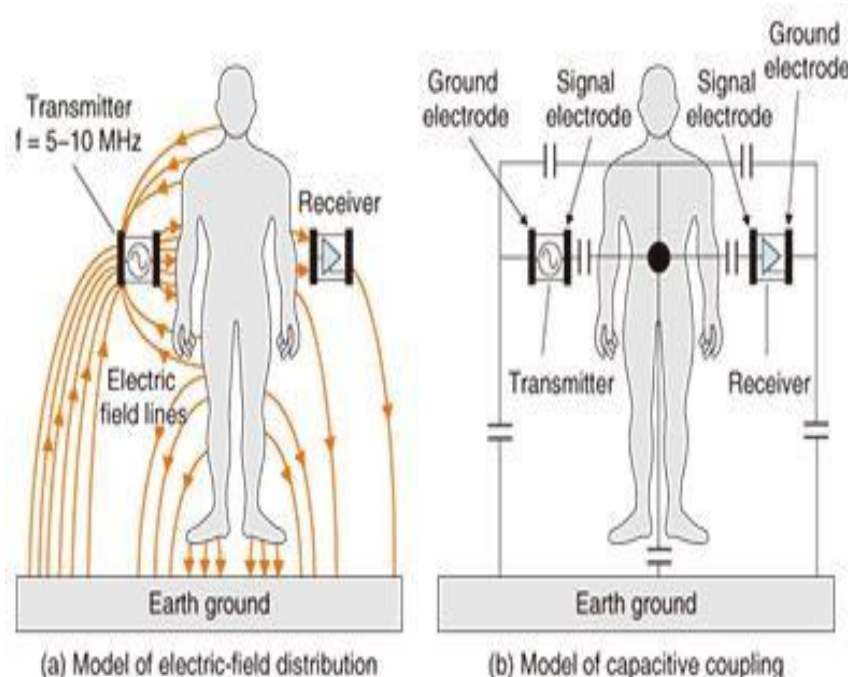
2) *Software*

- *Keil Software:* It is an arm -based microcontroller software supporting the programs upto 8 Kb/s. Capable in solving complex problems of embedded system. It uses C programming language for the benefits like structured programming, large set of operators and code efficiency. It furnishes development tools like, IDE ,ANSI C compiler, debugger, assembler, library managers , simulators, RTX5(real time operating), etc.

Feature of electro-optic sensor :

➢ The electro-optic sensor are used for position or speed measurement. Using (DUT)it can work on high frequencies .
➢ It supports one-point contact measurement and can detect fast moving objects.
➢ For Redtacton (Human Area Networking technology,)NTT utilized this second feature to fabricate an intrabody communication receiver.Redtacton works over near- body electric-field communication system . which comprises of mainly two sections :

Transmitter: Here an alternating current(AC) ,electric field signal is modulated by input data and transmitted .
Reciever: Here an electrode reads and demodulate the weak AC electric field over body induced by recieved signal .

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Fig(6). Network Model

Flat electrodes are used for capacitavely coupling Human body with transmitter and reciever. These couplings are used for modulation and demodulation of near body electric field .this coupling provides a unique feature of contactless communication where transfer of data can take place through body surface . For example :if a person wants to cross any entry control system ,the access card placed inside your pocket is sufficient. An another feature of this technology is reducing emission of electric field in space from human body which results in reducing mutual interference. The best suited frequency band is 5- 10 MHz

IV. COMPARISON BETWEEN DIFFERENT NETWORK TECHNOLOGIES

Here we compare the various features of recently available and used technologies with RedTacton :

Feature Name	LTE-A	Wi-Fi Direct	802.11p	ZigBee	NFC	Bluetooth	UWB	REDTAC TON
Frequency Band	Licensed Band	2.4 -5 GHz	5.86 - 5.98 GHz	868/915 MHz,2.4G Hz	13.56 MHz	2.4GHz	3.1 - 10.6GHz	5 - 10 GHz
Max. Data Rate	1Gb/s	250Mb/s	27Mb/s	250Kb/s	424Kb/s	24Mb/s	480Mb/s	10Mb/s
Max.Trans mission Distance	1000m	200m	200m	10 -100m	0.2m	10 -100m	10m	10m
QoS	QCI(Qos class identifier)	EDCA(E nhance Distribut ed Channel	EDCA(E nhance Distribut ed Channel	EDCA(En hance Distributed Channel Access)	EDCA(Enhanc e Distribu ted	EDCA(Enh ance Distributed Channel Access)	EDCA(En hance Distribute d Channel Access)	------

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		Access)	Access)		Channel Access)			
V2V	Through D2D	Ad-hoc	Ad-hoc	Ad-hoc	Ad-hoc	Ad-hoc	Ad-hoc	Ad-hoc
Mobility Support	Upto 350 km/h	low	Upto 60 km/h	low	low	low	low	high
Performance during congestion	low	low	low	low	low	low	low	high
Duplex Data transfer	Full duplex	Half duplex	Full duplex	Half duplex	Full duplex	Full & half duplex	Full duplex	Full duplex
Infrastructure	User transfer data directly to licensed band	User transfer data directly to un-licensed band	User transfer data directly to un-licensed band	User transfer data directly to un-licensed band	User transfer data directly to un-licensed band	User transfer data directly to un-licensed band	User transfer data directly to un-licensed band	User transfer data through human body
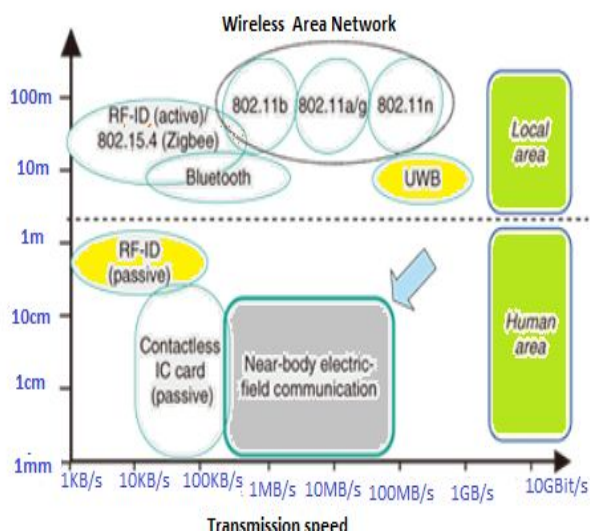
Fig(7). WAN

Network Technology involves the use of data systems to manage and deliver digital resources over a computer network. A variety of industries use computer hardware and system

software that maintains a network.With time and need the development of new technologies has benefited us from generations. The large varieties of technologies present in market increases the edge of perks provided. Each one of them contains some of the other good features which make them fit to fulfill the need of the business.

V. BENEFITS OF USING REDTACTON

A. RedTacton only use body surface not any organ.
B. It transmit data with security at the rate up to10mbps.
C. RedTacton transceivers are programmable, what to share?, whom to share(devices)? is programmed accordingly.
D. Separate channels available for every communication.
E. Provide secure communication and proper transmission speed for multiple users at the identical time.
F. Slighter data loss during transmission.
G. Least amount of power(mv range) is employed .
H. Electronic signals radiating from the body are hard to pickup, hence highly secured.
I. Can work using already available software & any conductor can work as a medium like human body ,animal body ,etc.
J. Large marketing applications.

VI. RESULT

The study about redtacton clearly indicates an upper hand and better future in respect to currently available technologies. The most important feature of redtacton is its reliability, security and speed. Redtacton has proved to be highly desirable technology at time. The result observed during this research, over the transfer of data using redtacton transreciever are:
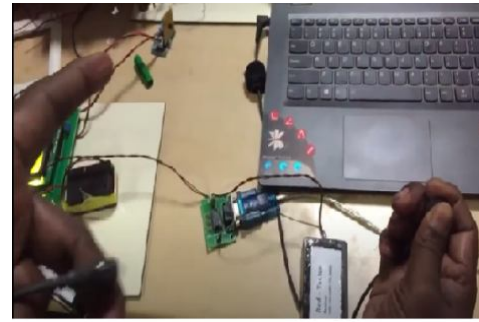

Fig5.1.1a Redtacton Tx circuit

Fig5.1.1b Redtacton Rx circuit

The LCD display and the LED on this circuit reflects the connection and termination states ;
1) *Before the Connection:* The time when the probes are not touched by human body surface,the LED is 'off' and LCD display, 'waiting to connect' ,as programmed.
2) *After the Connection:* At this point the probes are in contact with human body and connecting established ,the LED is 'on' and LCD display, 'connected'.

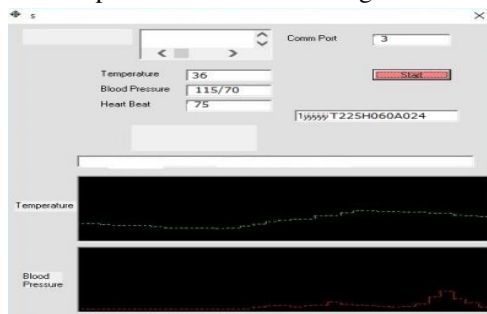The recorded output from the above arrangement is as follows:-
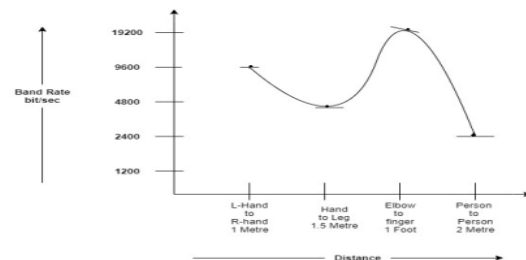

Fig5.1. (2a) Recordeddata

Fig5.1.(2b) bit rate Vs distance graph

✧ *In the fig 5.1.2a* ,The recorded data is the software window representing the data transmitted using human body(dedicated sensors are used to sense the health parameter values)
✧ *In the fig5.1.2b,* graph depicts the variation observed in different position of transreciever placed. The less the distance & complete connection to the transreciever probe, the better is the transmission rate .

VII. SAFETY

An important issue is to know the effects of redtacton technology on human health. The human body which works as an transmission medium is safe as no current can flow from transreciever to person's body, because transmitter and reciever electrodes are completely insulated During communication a minute electric field is generated over the body in result a displacement current is developed by the electrons present in the body. However, such small magnitude displacement currents are normal day to day occurrences and can be easily released in ground through the feet. Redtacton adhere the norms of "Radio Frequency Exposure Protection Standard (RCR STD-38)"issued by the Association of Radio Industries and Businesses(ARIB).for commercial utilization ,its impact is still under research.

VIII. CONCLUSION

Redtacton is restricted to short distances but contain numerous advantages over other Technologies .Its best feature is level of security that it provides to the network thanks to its strenuous encryption process, human body may be a good conductor but its hard to choose weak signal radiating from it. This technology can effectively work with already available electronic gadgets and peripherals. The recent development by NTT labs is development of its prototype transceiver namely PC card, Embedded (Hub type),USB(Box type) contains a capability to perform at high speed up to 10 Mbps even in most congested areas. With increasing demand of secure &high speed internet everywhere the globe would definately recognise it as widely emerging next generation technology

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