RT and EJPS: Networking through Sapiens and Protecting the Sapiens

Johny Livinston J.E.
Anna University, Chennai.
P.G. Scholar, Vins Christian College of Engineering, Nagercoil, Tamil Nadu, India.

Judith J.E.
Noorul Islam University, Thuckalay
Assistant Professor, Department of CSE.

Lizy A.
Anna University, Chennai.
P.G. Scholar, Vins Christian College of Engineering, Nagercoil, Tamil Nadu, India.

ABSTRACT
Homo sapiens, colloquially known as Humans, have entered into an age of ubiquitous computing & networking, where everything is linked to one another and is user-friendly. These require intuitive technologies that enable communicational transaction between various networking enabled devices. Traditionally, the use of Bluetooth, IrDA, ZigBee, Wireless-Fidelity, LTE, etc were on the run, which has unusual pitfalls such as throughput loss due to multiple nodes, unsecured data transfer, interferences in the midst of carnivals or wherever there is congestion, etc. which are now overcome by a well renowned technology, known as RedTacton. The Humans daily chores are based on sensing which apparently means "touching". This prelude emphasizes a novel approach opined as human area networking technology that enables communication in the form of touching physical objects, through the RT enabled devices. The underlying concept is that, the human body acts as a transmission course, paving support to IEEE 802.3 at a data rate of 10Mbit/s through duplex communication. The prime component of the RT transceiver engine is an electric-field sensor which is coupled with a crystal of electro-optic property and laser. However, since the world is moving swiftly, 10Mbit/s is seldom sufficient. In order to pace with it, this paper initiates a strategy in using Full-Duplex communication increased data rates such as 100Mbit/s for applications in Real Time day to day activities counting Vocal communications among RT equipped devices, which affirmatively cuts call costs. Future perceptions are also envisioned one of which is the EJPS (for Female security) and are inscribed with possible tweaks wherever desperately desired.

General Terms
RedTacton (RT), ubiquitous, NTT, HAN, duplex, data-rate, GPS, IEEE 802.3, authentication, SHE.

Keywords
Sapiens, Eve Jeopardy Positioning System, RCR, electro-optic crystal, laser light, L_PCs, U_PCs, ARWD, DBD.

1. INTRODUCTION
In this modern age, cellular networks provide people with a virtue of communicating anytime, anywhere and with anyone around the globe. Internet helps to download contents from remote locations on site. These two technologies facilitate transactions between terminals located at a distant proximity. Hence, all kinds of electronic gadgets such as PDAs, [1] smart phones, tablets, music player and cameras are becoming smaller, thus enabling people to carry anywhere or even wear various personal information and communicational appliances during their everyday chores. However, user-friendly pervasive devices involve networking between remotely located hosts. Transactions between electronic gadgets on the human body such as the wearable computers [2] which are embedded on humans day-to-day environments are important. And so, this has motivated widespread research and development on HAN, which is the Human Area Network.

The traditional approaches, as in figure 1, followed wired connections between electronic devices which are cumbersome and can easily become entangled since there can be multiple number if hardware wires. Wireless communication systems based on short-range concept, such as Bluetooth, WLAN, etc have some tribulations. Crowded places as in markets, transport stations, meeting rooms and in auditoriums which are filled with people can cause packet collisions and affects throughput. Hence it's obvious that a secure communication is not possible, because signals can be tapped, from which it's possible to understand that there is reduced anonymity. The other wireless approach is the infrared communications (IrDA), which has a principle drawback in communication, for setting up the direction of beams between multiple terminals, else there incur no transactions.

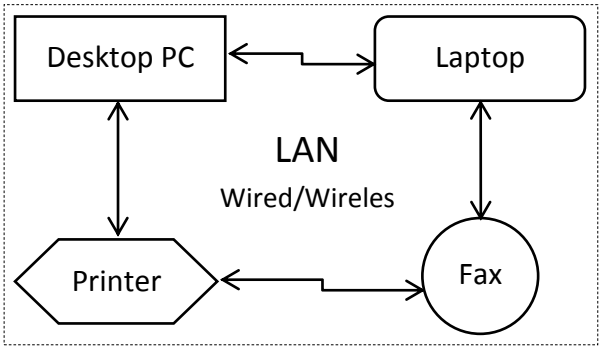

Fig. 1: Traditional Computing

RedTacton is a novel Human Area Networking technology, which is also known as HAN. It works on the surface of the host, which is the human body, as a secure, agile network transmission path. It is completely unique from wireless and infrared technologies. RT is neither wired nor wireless and completely distinct from other networking components [3]. It makes use of the surface of the human body, which possess a weak electric pulse. This serves as the transmission path which gets activated in a moment, only when a part of the host's body arrives in contact with a RT transceiver which is either installed implicitly or explicitly on the body. Communication is possible using hands, fingers, feet, face, or legs [1].

Due to the effect of weak electric pulses, RT can work through shoes and clothing too. The communication is terminated only when the physical contact between the two or

more host's body terminals under communication gets separated [1]. Using RedTacton enabled device, music from a digital audio player or a Smartphone placed in pocket would pass through the fabric and jet over the body to ear phone jack. This is an alternative approach instead of fiddling around with cables. Transferring pictures to computer from digital cameras is possible just by touching the computer while it's still on the host's neck. This helps anyone under the most annoying circumstances of tangled wires which kills time and may even damage the cables hence losing money and the device itself since most damaged wires can lead to short circuitry. Another alternative is that, electronic business cards can be exchanged just by shaking hands with others, share music files by dancing, or even send phone numbers through a kiss. These are all possible through customizing a particular operation for a specific Human movement.

2. ETYMOLOGY

This novel technology renowned as RedTacton came to limelight through developments wielded by the NTT abbreviated as Nippon Telegraph and Telephone Corporation in Japan. The core concept of the label behind "Tacton" is Touch and action also known as touch and act upon, and the word "Red" is coined from Japan, which represents a warm color of the Japanese, [3] which emphasizes their warm and cordial interactions. The vital networking solution for the aforementioned constraints of conventional technologies is "intra-body" communication. This is a concept where the data transmission path is initiated on the host's body surface. In ubiquitous services, communication is achieved between devices being embedded in the host's environment which is close in proximity with one another. If the human body itself is a transmission medium, then it would serve as a Human Area Network (HAN), thus eradicating the practical issues claiming throughput reduction, security losses, and peak network setup costs.

The notion of intra-body communication is to use the nature given minute electric field which is pumped and propagated by the human body from head to toe. So as to transmit information, it was primly projected [1] by IBM. This interacting mechanism has been assessed and reported by numerous research departments around the globe. However, all those reported technologies had two major limitations: I. There was a limitation in using operational frequency through the body to a few tens of centimeters and, II. The peak communication speed was not greater [4] than 40kbit/s. Unusual restrictions are caused by the use of an electrical sensor for reception of signals. It requires few lines such as a signal line and a ground line, which means, external power is required, whereas in intra-body communication it uses only one signal line, which is the body itself. This in turn led to the cause of unbalanced transmission of signals. Hence, by means of electrical medium, the signal which has no proper transmission is overcome by the use of electric medium of the body itself.

3. CONCEPTION

As aforementioned, the communication is triggered by Full duplex rather than Half- duplex. By using RT, a maximum speed of 100 mbps at full duplex can be achieved for communicating between hosts. The transmitter of RT on the surface of human body can induce a weak electric field. This causes some changes in the host's electric traits on the surface and is subsequently sensed by the RT receiver [2]. RedTacton relies upon the principle of the changes that can occur on the weak electric field, which can vary the properties of electro-optic crystal. RedTacton detects these changes in the optical traits by the use of electro-optic crystal coupled with laser beam, which transforms the result to an electrical signal on the circuit. Data is send through the transmitter by inducing electric oscillations on the surface of the human body. The photonic electric field sensor, receives the data by combining laser light and an electro-optic crystal.

4. MECHANISM

NTT has an affirmative solution with the support of an electro-optic sensor coupled with an electro-optic crystal with laser light. It is recently reported [2] that an application of this sensor was deployed to measure the HF of [4] electronic devices. Three key features that explains the electro–optic sensor are; 1) Electric fields can measured from a device under test (DUT) without any contacts to it, which in turn minimizes the measurement disturbances, 2) Ultra wide band (UWB) measurement can be done, and 3) It enables one point contact. NTT utilized the latter element to formulate an intra-body communication receiver for its human area networking (HAN) technology, which is also known as RedTacton.

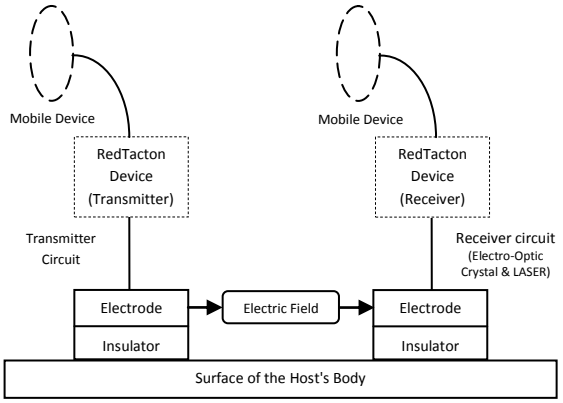

Fig. 2: Transmission

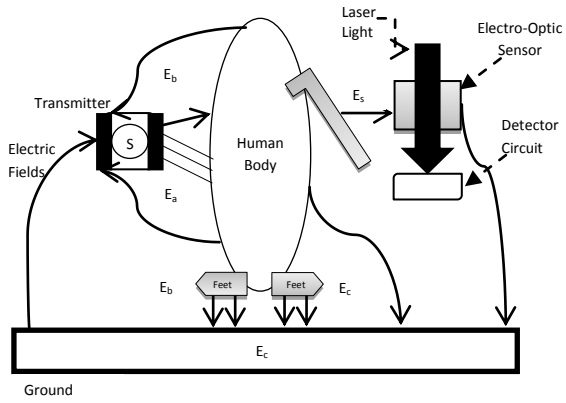

Fig. 3: Principle

The operating principle and transmission in RedTacton is illustrated in the figure 2 & 3: The electric field induced towards the body by the transmitter's signal electrode is indicated by E_a. Ground is required near to the transmitter's signal electrode for the return path of the electric field E_b. Since the host often tends to be on ground, the electric field E_c traverses from the host's body to the ground. The electric signal that reaches the receiver is E_s. This is formulated as follows; $E_s = E_a - (E_b + E_c)$, as represented in figure 4. [4] This passes through the electro-optic crystal, which in turn cause the crystal's optical traits to be altered. This is later converted to data through the detector circuit after the laser light detects the changes on the optical properties.

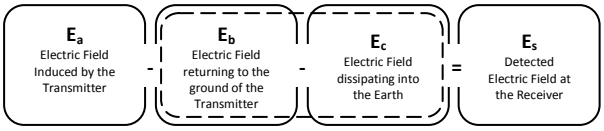

Fig. 4: Mathematical Concept

5. RT ENGINE

For all the operations to be perfectly carried out, it takes a processing unit or an engine to carry out the given task. Here, RT engine, which is also known as the RedTacton Transceiver is being used. [5] The block diagram of a RT engine, apparently known as the Transceiver is shown in the Figure 5. 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.

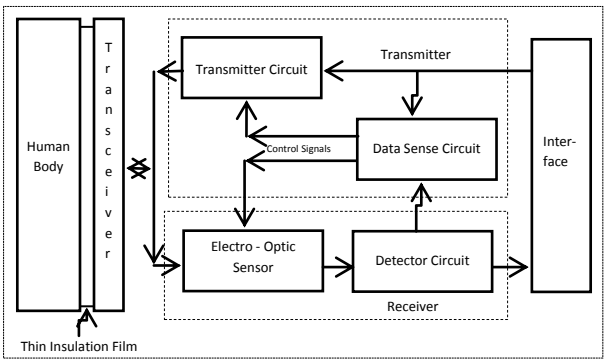

Fig. 5: RT Transceiver

The transmitter circuit varies the electric field on the surface of the sapiens's body. This 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 RT device.

This is demonstrated using multiple Smartphone devices coupled with RT unit within a limited proximity. Interference is possible if the communicating clients are not aware of who is communicating with whom, so it may infer packet collisions. Hence a half-duplex communication which emphasize on receive-first scheme is introduced. Initially, it checks to ensure that there is no data to receive and then sends the data. This concept avoids packet collisions between hosts [6]. The electro-optic sensor and the detector circuit on the receiver circuit, amplifies incoming electric signal, mostly minute, from the electro-optic-sensor and is then converted into electrical signal.

It is obvious for anyone to wonder whether this intuitive technology has any negative impact towards the Sapiens body. It is medically said that any alien object operated from within a Sapiens body is considered to be cancerous. But an investigation which emphasizes on the impact of RT technology on the health of humans was conducted. First, as shown in the aforementioned figure 3, the transceiver electrode of the RT are completely covered with a very thin insulating film. [7] This insulates the body of the host serving as the transmission medium.

Apparently, it makes it possible for the weak electric current to flow into a person's body from a transceiver to the other. When communication takes place, the electrons in the host tend to generate displacement current since it is subjected to minute electrical fields. Such displacement currents are subjected to occur in mankind's common everyday occurrences. For a positive insurance to the RT users, the Association of Radio Industries and Business (ARIB), conforms RT to the [5] "Radio Frequency-Exposure Protection Standard (RCR STD-38)". The level of frequency produced by RT are fine below the safety limit as specified by the RCR standard. Hence one can be very well sure and has the liberty to treasure the benefits of RT.

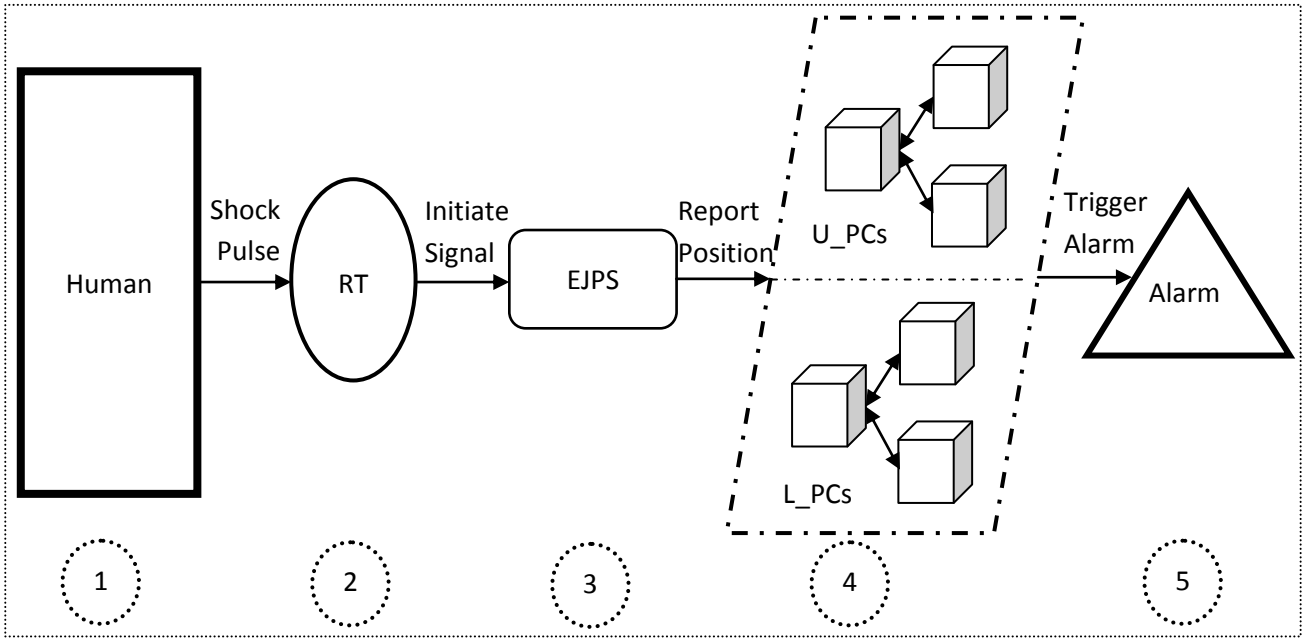

Fig 6: Operation: Eve Jeopardy Detecting System

6. PRELUDE TO FEMALE SECURITY

Mankind reigns in an era where tragic events can be heard out each day, constantly proving how endangered the female lives are. It's like they are constrained to take a deep breath before stepping foot out of house either to go to school or office or anywhere with two probabilities, like tossing a coin and choosing head or tail. Head represents the lady is safe from harm and will reach home and the other is the eerie truth. Hence only two choices are given for any who ventures the world. It's not just the females, but even the males, to be

precise, the kids are abducted each day and the parents are threatened to pay a ransom amount of money to deliver them back safely to home. Hence lots of lives are claimed each day and the increased rates of killing are beyond calculations. So, a novel system proclaimed as EJPS or Eve Jeopardy Positioning System is proposed, which intuitively focuses towards protecting the female kind.

6.1 Operations

The aforementioned figure 6 represents five stages of operations initially from the shock pulse of the sapiens to the triggering of the alarm which is further elaborated as follows.

6.1.1 Human

As aforementioned, the EJPS coupled with RT is implemented on the sapiens body. Here, a female subject is chosen, whose life is threatened by some stalkers. Naturally, it's obvious that there is a continuous flow of minute weak pulse running in the sapiens body. Any slightest variations in the heart rate can be monitored with a change in the electric pulse. This change is what is recorded, as it paves a major role in the functioning of EJPS. For instance, the heartbeat of a normally functioning human is different from that of a human who is in extreme fear as there will be heavy impulses from the heart. This extreme fear is triggered only when a life is being threatened, hence it's very obvious. Furthermore, it is coupled with an activating switch to turn the unit ON/OFF. The subject can use it when in an unsecure environment.

6.1.2 RT

RT or so called RedTacton, is the state of art technology which is used in triggering the EJPS to work. How to deploy RT for sapiens is based on two criterions, such as implicit and explicit. When it comes to implicit, the RT unit can be placed inside the sapiens, preferably near the ribs [9] of the chest through surgery or through injection since its insulated, thin and small [8]. It's proved that it cause no side effects. The latter method is to use it explicitly, similar to the form of wearable devices, likes wrist watches, earring, etc. The purpose of this RT is to detect the shock pulse which is an impact of the changes caused in the sapiens body, as stated in times of extreme fear. RT then initiates a signal to the EJPS which will be further envisioned as follows.

6.1.3 EJPS

EJPS is also a type of unit, wearable device for instance, which is practically described in the form of wrist watch. This is not implemented inside the human body. EJPS is based on the concept of GPS, commonly known as the Global Positioning System. This device is specifically assigned only for each individual user and is registered on the U_PCs and the L_PCs. The record contains all the information about the user including the personal details and the precise location of the user. Location reporting is automatically performed by the EJPS similar to that of the normal functioning of the GPS and is denoted by a Dynamic Blue Dot (DBD). It's dynamic because the dot moves in accordance to the movement of the subject. A different operation is performed by the EJPS when the RT initiates a unique signal which is an impact of the extreme fear of the subject due to an interception of an alien subject. This triggers and reports the position with an Animated Red Wave Dot (ARWD) to the U_PCs and L_PCs notifying that the subject is in danger.

6.1.4 U_PCs & L_PCs

For visualizing the locations reported by the EJPS, it is obvious to have a Graphical User Interface (GUI), (i.e. a computer system). U_PCs & L_PCs represent computers for visually monitoring the location of the subjects. U_PCs are the upper computers used by the Department of Police or any other security officials such as job site or school site. And the L_PCs represents the lower computers which are sited at the home of the subject which can be accessed by the subject's family or relatives or by any trusted neighbors who have the access codes to the subject. EJPS, by the concept of ARWD notifies the users of L_PCs and U_PCs.

6.1.5 Alarm

Not all of mankind takes a keen look through the system every 24/7 since sapiens are scheduled to do some tasks every moment, from home chores to jobs in any offsite. So ARWD is helpless if it couldn't knock someone in times of danger. Hence, for the better functioning, an Alarm is implemented, which beeps when the subject is in extreme danger. This is deployed both on Home site and Police site from which one has to understand that a subject is in danger and to call for backup. Based on Shortest Path Algorithm, one can intercept the victim by approaching from nearby stations.

7. COMPARITIVE STUDY

7.1 Social Harnessing Equipment (SHE)

The Social Harnessing Equipment is an electronic device fabricated with the female's clothing, which is based on the concept of electrocution, which delivers electric shock of 3800kv. This is triggered when the female subject is being brutally assaulted by an assailant, thus electrocuting the assailant, but doesn't harm the female subject. Furthermore, it supports Global System for Mobile GSM technology, which sends a Short Message Service (SMS) of the geological location of the assault through GPS coordinates. Message is received by the concerned authorities monitoring the jeopardy events. It is also coupled with a self-actuating switch to use the device when required.

7.2 RFID, GPS, and GSM

The coupling of Radio Frequency Identification (RFID), GPS, and GSM forms a security system meant for female safety. It is implemented on cabs, and other travel mediums. It gets triggered by the female subject through a switch in times of crisis. When triggered, the RFID sends the unique identity details of the cab, along with the location coordinates from the GPS of the assailant cab, and is sent as SMS through GSM to the authorities, thus initiating further remedies.

7.3 CCTV, GPS, and PB

Transit helps people to travel from workplace to home, or anywhere around the globe. But disasters are crawling into local transits, thus harassing the females. The concept of integration of Closed Circuit Television (CCTV), GPS and Panic Buttons (PB), [10] helps the female subject to trigger an alert using Panic Buttons, which further activates the CCTV and GPS, thus delivering the location of the attack and monitors the impact from a remote location. Apparently, emergency methodologies are carried out in saving the female subject.

Table 1. Result Analysis

	Accuracy	QoS	Security
EJPS	9	9	8
SHE	7	8	8
RFID, GPS, GSM	7	7	5
CCTV, GPS, PB	5	5	6

8. RESULT ANALYSIS

In the case of existing techniques, it requires tremendous hardware resources, and less compact devices, which in turn degrades the performance of the security principle. EJPS focuses on precision of operation with more compact units and are higher in performance, from triggering of data transactions till delivery of data.

The measures of Accuracy, Quality of Service (QoS) and Security is plotted in the range of 0 to 10 scale for the existing and proposed systems, which are illustrated in table 1. The ranges are, 0 - indicates Low, 5 - indicates Medium, and 10 - indicates High. Accuracy represents the precision in triggering and delivering of the assault location, QoS promotes in reliable transaction services, and Security insures the full potential of the device.

9. OTHER APPLICATIONS

9.1 Beep automatically to avoid accidental medicine intake

RT units can be embedded on the cap of medicine bottles to transmit information based on the medicines' attributes. [1] If the patient touches the wrong [9] medicine at the specified occasion, the RT unit will trigger an alert.

9.2 Touch ads and receive info

In major electronically improvised cities, consumer shops hosts the info about their products in an electronic advertising panel. [4] A consumer who stands in front of an advertising panel, the information matching [11] one's interests is displayed automatically. Hence, by touching the desired items on display, it gets automatically delivered in cart at the counter and the pay has to be done.

9.3 Touch to print

Print documents or pictures wherever and whenever with the leniency of a touch on the desired RT coupled printer [4] with one hand and the other on a RT coupled PC or any RT wearable devices thus saving time and energy in a fast world.

9.4 Data transaction through Handshake

It's an usual formality to greet someone with a handshake. Just by means of shaking hands one can transact personal profile data between multiple [3] RT enabled mobile terminals holding on by the users. These transactions can be made private with the use of encryption technologies.

9.5 Review meeting

Review meetings are usually carried out by the product's stakeholders. These stake holders are sure to carry a laptop or any other devices and are placed on table. An electronic conductive sheet is embedded in the table. [3] Here, the network transmission path is initiated by simply placing the laptop on the RT coupled table. By the use of different sheet patterns, it enables segmentation of the table into subnets. The manager or the client will have complete access with the stakeholders and business is done.

9.6 RT headset

As aforementioned, RT units can stream music or video frames between [2] Smartphone, laptops, MP3 players, etc. and plays them on headsets thus by saving the user from entangled wires.

9.7 Authenticate user

By carrying a RT enabled gadget in one's pocket, the user ID is verified and the door that user holds on to is unlocked. [12] For increased security, the concept of biometrics is used. Based on that, the user's fingerprints, retina pattern, vocal perception, etc. are stored onto the RT enabled gadget.

9.8 Sitting ignites the car and loads all its presets

The RT enabled car is customized with the unique functions of the user. Hence, when the user pops into the car, the position of seat and steering wheel adjusts to match the favor of user. [2] If the driver's home is set in the car navigation system, the car drops him/her at the user's destination. Also, the audio system [10] plays the user's favorite song on the run and stops while off board.

10. CONCLUSIONS

Humanity has crossed various ages, for instance, from Stone epoch to Technological era where everything around us is simple as it can be. Anything is possible with just a touch which adds a whole new meaning to life. It was once when the computers were as size of a room. But the era at extant is an era of change and the intellectuals are the agents of change. And this change has paved way to ubiquitous computing were computers are in the size of jewels. Hence there are various challenges in networking among these wearable devices. Existing network chips such as Bluetooth, Wi-Fi, etc. are facing certain loses such as reduced throughput, low data rates, poor security, etc. So as to terminate the limitations, NTT paved way to a networking which is distinct from both wired and wireless networks. It is obvious that RedTacton will bring a global change in the field of Science and Technology. My work which is inscribed above deals with improving the multi-path transaction of information with full duplex communication. Also the aforementioned RT sports a 100mbps fast Ethernet connectivity paving support for transferring bulky information or software in manufacturing industries or for sharing High Definition (HD) motion gallery with social circles or for reporting the location or health statistics of sapiens. This paper couples RT with Eve Jeopardy Detecting System (EJPS) for protecting the humans particularly the female kind from being abducted and also from the attacks of alien subjects, the strangers. It's inevitable that, by using this technology, the rates of killing or harming the female kind can be drastically reduced and can bring peace to the nations which are under chaos and prone to female killing. Few other possible tweaks have also been envisioned on other application domains for the better use of RedTacton.

11. ACKNOWLEDGMENTS

Thus acknowledging that, all the aforementioned information is an art of our work towards researching and adding importance to science and technology to the ambience at extant. The prime goal was to make sure every living beings on earth have the liberty to venture the benefits of the universe and not wane what is gifted for each of mankind. It's of certain that, if what is inscribed in this paper is put into practice over the globe, then all of mankind is blessed with inestimable security and can shine out of any unfortunate events. Gratefully, I thank my co-authors for their novel notions and constant support in delivering this concept.

12. REFERENCES

[1] Reena Antil, Pinki, Sonal Beniwal, "RED TACTON: A REVIEW", International Journal of Scientific & Engineering Research (IJSER), Volume 4, Issue 1, January - 2013.

[2] Anupama Kumar and Nikhil Kumar, "Redtacton", International Journal of Computing, Communication and Information System (IJCCIS), Vol. 3, No. 1. Jan - Jun 2012.

[3] T. G. Zimmerman, "Personal Area Networks: Near-field intra-body communication", IBM Systems Journal, Vol. 35, Nos. 3&4, pp. 609-617, 2010.

[4] Vidhu Rawal, Ashutosh Dhamija, Sonam Gupta, "Advanced Communication through Flesh RedTacton - Human Area Networking Technology", International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), Volume 2, Issue 6, June 2012.

[5] Gurpreet Singh and Jaswinder Singh, "Redtacton", International Journal of Computer Science and Technology (IJCST), Vol. 2, Issue 3, September 2011.

[6] Tadao Nagatsuma and M. Shinagawa, "Photonic measurement technologies for high-frequency electronics", NTT REVIEW, Vol. 14, No. 6, pp. 12-24, 2009.

[7] M. Shinagawa, M. Fukumoto, K. Ochiai, and H. Kyuragi, "A near field-sensing transceiver for intra-body communication based on the electro-optic effect", IEEE Trans. IM, Vol. 53, No. 6, pp. 1533-1538,2009.

[8] M. Shinagawa, "Development of Electro-optic Sensors for Intra-body Communication", NTT Technical Review, Vol. 2, No. 2, pp. 6-11, 2007.

[9] Kiyoshi Hamaguchi, "Body Area Network: Introduction of Research on a New Generation Tele-health at NICT", Medical ICT Group New Generation Wireless Research Center, 2010.

[10] S. S. Pethakar, N. Srivastava, S. D. Suryawanshi, "RFID, GPS & GSM Based Vehicle Tracing & Employee Security System", International Journal of Advanced Research in Computer Science and Electronics Engineering (IJARCSEE), Volume 1, Issue 10, December 2012.

[11] M. Mizoguchi, T. Okimura, and A. Matsuda, "Comprehensive Commercialization Functions", NTT Technical Review, Vol. 3, No. 5, pp.12-16, 2008.

[12] N. Matsushita, S. Tajima, Y. Ayatsuka, and J. Rekimoto, "Wearable key: Device for personalizing nearby environment", in *Proc. Fourth Int. Symp. Wearable Comput.*, 2000, pp. 119–126.

About the Authors

Johny Livinston J.E. received his Bachelor of Engineering (B.E.) degree in Computer Science and Engineering in 2012 from Anna University, Chennai. At extant, he is pursuing Master of Engineering (M.E.) degree in Software Engineering under Anna University, Chennai. He has presented more than 14 papers, both in Engineering and Business Management, on National and International Symposiums and Conferences. He has attended various Workshops and has Research interests on Data Mining, Big Data Analytics, Pervasive Computing, and Mobile Computing. Currently, he is carrying out a project on Data Mining and Big Data Analytics.

Judith J.E. received her Bachelor in Engineering (B.E.) degree in Computer Science and Engineering in 2003 from Manonmaniam Sundaranar University and also received her Master in Engineering (M.E.) degree in Computer Science and Engineering in 2006 from Karunya University. She has attended various workshops and presented papers on national and international seminars. At extant she is working as an Assistant Professor from the Department of Computer Science and Engineering at Noorul Islam University, Kumaracoil, and pursuing her Doctorate in Data Mining and Big Data Analytics at Noorul Islam University, Kumaracoil, India.

Lizy A. received her Bachelor of Science (B.Sc.) degree in Computer Science from Manonmaniam Sundaranar University, Tirunelveli, in 2010, and Master of Computer Application (M.C.A.) degree from Anna University, Chennai, in 2012. At extant, she is pursuing Master of Engineering (M.E.) degree in Computer Science & Engineering under Anna University, Chennai. She has presented papers on National and International Symposiums and Conferences. She has attended various Workshops and has Research interests on Image Processing, Android, and Computer Networks. Currently, she is carrying out a project on Image Processing.