INTRA-BODY COMMUNICATION FOR SECURABLE DATA TRANSFER AND DEVICE AUTHENTICATION

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ABSTRACT: The paper presents a new concept of communication method called as Intra-body communication for the purpose of security enhancement in various fields especially in the military. In this concept, our human body will be used as a medium of transmission of data. The use of this technology eliminates the complexity of existing technologies that involves cables, wire connection for transmitting data. The proposed model provides a secure and efficient communication system that consists of wearable devices for authentication and also useful for transmitting the data to the master device in real time. The proposed model is easy to be wearable on the wrist or any other part of the body which has an integrated processor and an insulating material (copper) to allow the intra-body communication using the method of galvanic coupling. Thus the proposed methodology of using human body enhances the security of transmitted signals as compared to the other wireless technologies.

Keywords: Galvanic coupling, Intra-bodycommunication, secured data transmission

I. INTRODUCTION

At current situation, the security for safeguarding our devices has become a must. Hence by using this Red Tacton concept, we can provide security for our vehicle through authentication and also for important devices. Also nowadays the piracy has been increasing.So in order to transfer an data in a secured manner, we can use this intrabody communication process in which data in one's controller can be transferred to other person controller connected with a Red Tacton device by making an physical contact between them. This method overcomes the complexity of wired and wireless communication[1]. The intra-body communication uses the human body as a conducting medium, providing the security and is a non-complex method. Though the communication distance is limited within a body-area, it is used on the construction of personal area network. In this paper, they mentioned a prototype called intra-body communication using the FPGA module. These modulation methods are chosen after body-channel analysis. The experimental results are demonstrating the feasibility of intra-body communication module for establishing the PAN (Personal Area Network).

Here it is showed why IBC is best than the existing ultrasonic propagation. Ultrasonic has been used in a number of biomedical and civil application ranging from medical ultrasound devices to beam deformation non-destructive testing. Ultrasonic pressure waves have been used naturally for thousands of years by animals for navigation and communication, with the prime examples being bats with ultrasonic navigation through air and dolphins with ultrasonic communication and navigation in water. This paper investigates on signal propagation within the Human Being by means of Intra-Body Communications without radiofrequency waves but, instead, with lower (if not deeply lower) frequency waves [2].

Here to know why intra body communication is good, let different technologies are compared based on their frequency, data rate, transmission power, and size. According to characteristics shown in Table I, an excess amount of transmission power is emitted by Bluetooth and WLAN modules. It also dissipates a very high power for any sensors connected which are powered by a battery. Active RFID and Zig-bee modules provide a very low rate of data transmission.

Technology	Frequency	Data Rate	Trans Power	Size
WLAN	2.4/5.1GHz	54Mbit/s	100Mw	PC card
Bluetooth	2.4GHz	723.1Kbit/s	10mw	PCB module
Zig-bee	868MHz	20Kbit/s	1mw	PCB module
Active RFID	134KHz	128bit/s	<1mw	Pill
Intra-body COM	<1MHz	>64Kbit/s	<1mw	Band-Aid Pill

Table1.Comparison between Intra-Body communication and wireless technologies

Therefore based on above comparison, a technique Intra-body communication is chosen that provides transmission power below l mW, greater than 64 Kbit/s data rates, and also miniaturizes the transceiver modules into implantable pills and Band-Aids.

II. PROPOSED MODEL AND WORKING

Intra-Body Communication is a method of transmitting electrical signals through the human body.Fig 1 shows the block diagram of transmitter side in which a PIC 16F877A microcontroller will be aided with components like crystal oscillator
(upto 12 MHZ), 7805 IC and some resistors and capacitors. The pic controller will hold a data which needs to be transmitted but in this proposed system a password key will be stored in the pic controller. Then the information from the pic controller will be sent to the Red Tacton kit. The Red Tactonkit will inside consists of the sections like a pic 16F877Acontroller in it used for high-frequencyswitching and a sawtooth oscillator to round-off the decimal values of

sinusoidal signal andnext it will consist of a voltage converter which will convert the high voltage into the low voltage of few millivolts which is suitable to transmit through the human body.

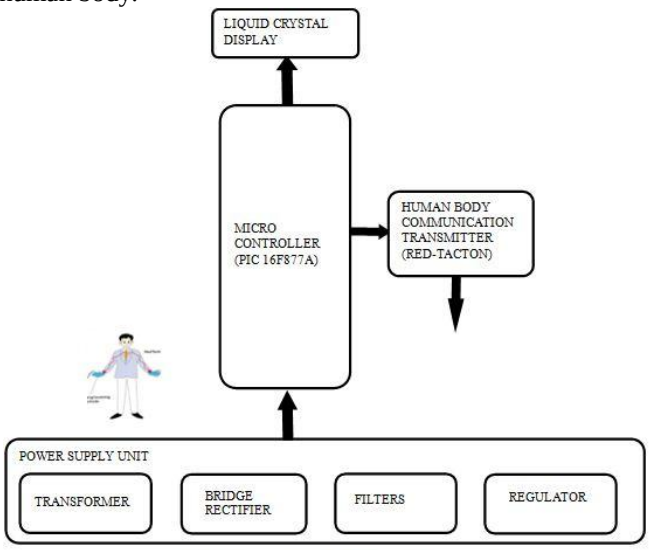


Fig.1.Transmitter side of Human body communication

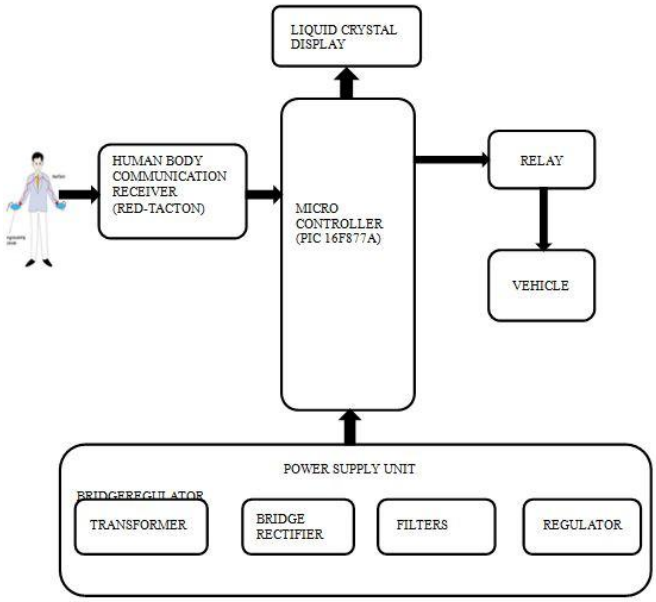


Fig.2. Receiver Side of Human Body Communication

Then Fig 2 is the representation of receiver block diagram which also consists of a PIC 16F877A controller where the received data will be stored which aided again by devices like crystal oscillator, IC 7805 and a power supply transformer. A relay board will be there at the receiver connected to the PIC controller.Then at the receiver, there will be a diode 2W10 and a 1mF capacitor is connected to the relay board in order to filter the noise coming along with the dc signal. Then when the exact data that is when password key is get transferred to the PIC controller through the electrode attached then through the connection between pic and relay we can give a signal to run motor shaft connected to vehicle wheels. Also when the PIC receives the data it will be displayed in a 16*2 LCD board.At both, the transmitter and receiver an electrode will be attached to the Red Tacton module.Those electrodes are to be held or wear by us so that the data can pass through our body.

First, the electrode at the transmitter should be held by a person so that data from the PIC controller will be modulated and undergone some conversion inside Red Tacton and will bepassed through our human body. And when we hold the electrode at the receiver side the data will be given to Red Tacton where demodulation process and high sensitivity conversion will take place and then get transferred to the pic controller where the data will be displayed. We can also do this process by one person holding electrode at the transmitter side and another person holding electrode of the receiver and when a physical touch happens between those then the data transmission will happen.

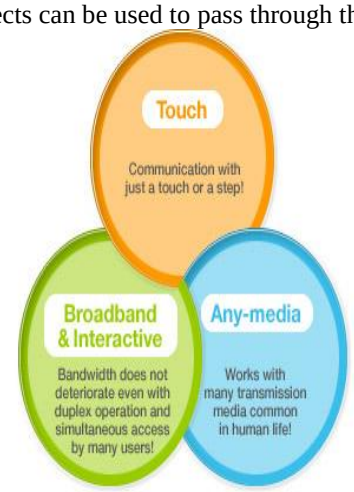
So this proposed concept is useful for authentication of a device in military applications and also can be used for transmission of data between the individuals when high security and reliable transmission is needed.

III. FEATURES OF RED TACTON

Touch:Touching, Gripping, sitting, stepping, walking and other gestures of the human body helps in revoking the working of equipment or in obtaining the data. When the physical contact is done between two people who have respective transmitter and receiver the transfer of data is accomplished. When the physical contact gets separated, communication ends.

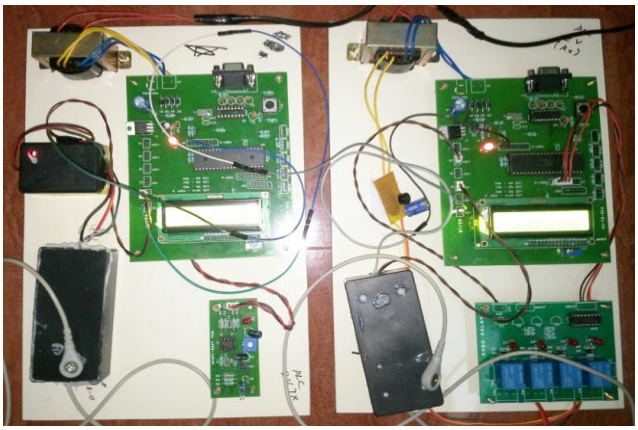
Broadband and Interactive: Sending and receiving of data from both the sides at same time along with interactive communication is possible at the speed of 10 Mbps because here the human body is transmitting medium where deteriorate does not happen as like in congested areas when many people communicate. Even when multiple communications are used through this technology, the speed will not be affected as the signal is transmitted through the human body. Thus the execution of the programs can be faster. This is for full duplex Communication.

Any Media: Different type of conductors, semiconductor and dielectric material has a possibility to transmit the data via the human body. Also, Conductor and the dielectric material can be used in as a combination. Desk, walls, water, and metallic objects can be used to pass through the data.



IV. IV.RESULT

Here the correct password key is transmitted from the Red Tacton transmitter to the receiver through the human body and then the data transmits to the pic controller from where the data that is password can be displayed on the LCD connected to the pic. When a relay is connected to the pic controller the signal will be transmitted to the relay which in turn rotates the dc motor attached to the vehicle. It is just a prototype where we have used the Intrabody communication for giving authentication for a vehicle.But in real time it can be adopted for authentication of valuable military devices like in gun and missile launchers where the user who has the Red Tacton transmitter kit can alone access those devices with Red Tacton receiver kit of matched frequencies. Also used for transmitting data with high security between the military personnel when they just make a physical touch between them.



V. CONCLUSION

Since Red Tacton uses a property of photonic electro-optic crystal, it has many advantages over other technologies in terms of communication distance, data transfer rate, and the interaction. A major advantage is that the data transferred through this technology cannot be hacked. A big achievement is obtained in the field of medical application and security applications with the help of invention of Red Tacton technology. If Red Tacton is introduced in the world of the cyber market, then it will bring tremendous revolution as it can eliminate the cybercrime. There no danger to the human body from electric signals and other radiations created by this technology because the human electric field is the medium to transfer the data. As discussed above, Red Tacton has a clear edge over the other technologies,so we can say that the Red Tacton will be the step for future developments.

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