

# DATA TRANSMISSION VIA HUMAN BODY

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**Abstract:** Communication between devices is very important nowadays for making our lives more easy and secure. This can be done either by wired or wireless communication. Wired communication is unsuitable because the wires can get tangled, damaged and are difficult to manage. Wireless communications like Wi-Fi, Bluetooth, infrared possess problems like hacking, lack of data security and unwanted signal interception. This paper manifests Human Area Network (HAN), that enables communication through human contact. When a person comes in contact with the conducting plates, a transmission path is formed and the data is transferred from one device to other. This concept will be a breakthrough in the history of data transfer.

**Indexterms:** Human Area Network(HAN), wired communication, wireless communication.

## I. INTRODUCTION

The wireless technologies have encountered a very striking growth in the present era. There are many ways through which data can be transferred using wireless communication nowadays such as Bluetooth, Wi-Fi, and infrared, etc. All the technologies stated above can be used to transfer the data at a very high speed like within seconds. Yet all the technologies have their own disadvantages such as more power consumption, data cannot be transferred in long range, interference in the signal may occur, low throughput, etc. In order to conquer the disadvantages for the transmission of data the concept of Intra-body communication can be used.

Data transfer through human body uses the idea of transmitting the data through human body from one device to the other. The fact that the human body is a good conductor of heat and electricity has been used in the paper. The data is transmitted through the piezoelectric plates to the human body, through conduction the data is transferred to the other piezoelectric copper plate and the data has transferred to the device. Intra body communication can be used to communicate between devices in our daily lives, such as door locks, cars, mechanical instruments, etc.

This concept of data transfer was first proposed in 1996. Here, cables are eliminated and are more secured as compared to wireless communication. By increasing the Baud rate, we can increase the rate at which the data is transferred, so the data cannot be intercepted. The start and stop of the transfer can be controlled by the human body, when both the plates are in contact with the human body; data transmission takes place and when both the plates are not in contact with the human body the transmission of data stops.

### 1.1 RELATED WORKS

In one of the paper wearable devices such as Dual Band Metallic Button Antennas are used for data transfer. The optimal combination of locations has been assessed according to the received signal envelope. This way the data is transferred between two devices. Since, this paper proposes the use of wearable devices it is ill-suited as the device should be attached to the human while the data is being transferred. It is also menacing to the human body since a lot of electric waves and current is passed through the device.

Another paper demonstrates the use of sensors with the wearable clothing's as well as implanted under the skin. A Fully homomorphic encryption algorithm to implement the secure channel communication between the data sink and third-party access. The algorithm is used to securely retrieve the sensitive data from data sink and to instruct the sensors in a wireless body area network. The main stumbling block of this paper is the use of sensors which are implanted under the skin and attached with the wearable clothing's. It is very detrimental to the vital organs of the human body. It is unreasonable to use such technology for data transfer.

Other authors have proposed a system which uses radio signals with high frequencies for data transfer. A major shortcoming of this paper is that it uses radio signals of high frequencies that the human body cannot tolerate and which can harm the body to a great extent.

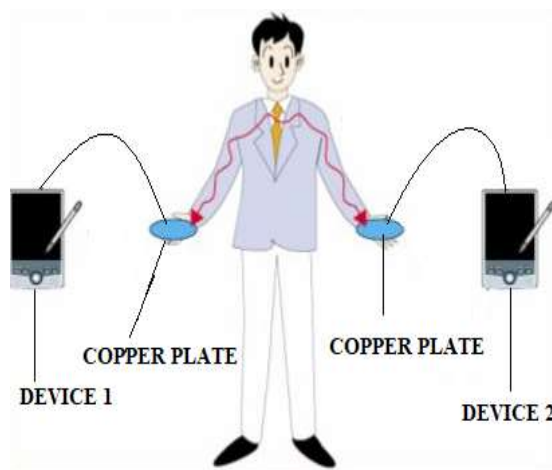


Fig. 1 Data Transmission Path

### 1.2 CONTRIBUTIONS

The existing techniques to transfer data have many disadvantages such as excessive power consumption, limited range, low data security and unwanted signal interception. This paper proposes a system that overpowers these limitations. Here, human body is used as a medium to transfer data. The fact that the human body is a good conductor of electricity is utilised by this system. The transfer commences as soon as the human comes in contact with the two conducting copper plates. The electric field is transmitted through the human body. It then circulates inside the body, travelling from one hand to another. In this way, the data is transferred to the other hand and thus to the other device or computer. The data can then be displayed on the second computer. The proposed system can also be termed as Intra Body Communication. The paper possesses a number of advantages over the existing modes of communication. It does not require any cables or wires, has total security of data and does not have range problems or unwanted signals. Another striking feature of this mode is that it does not harm the human body in any way because the amount of electric field passed is under the limit the human body can handle.

### 1.3 ORGANISATION

This paper is organised as follows: Section II demonstrates the proposed architecture. Section III describes advantages of the proposed system. The result of the project is discussed in the section IV. The section V includes the conclusion and future work suggestions along with the acknowledgement in section VI. Section VII has the references.

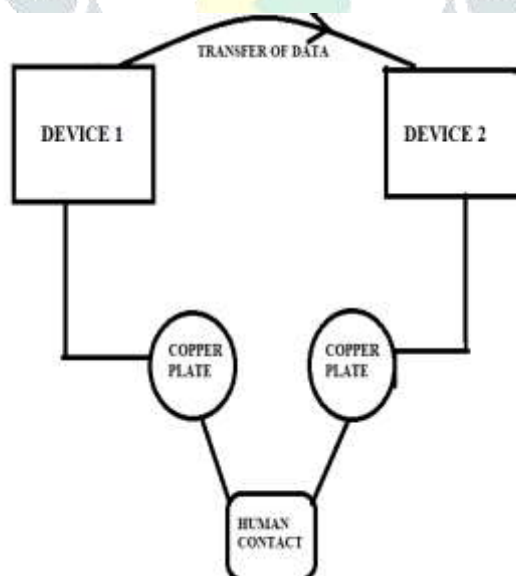


Fig.2 Network topology

## II. SYSTEM OVERVIEW

In this project we employ the fact that the human body is a good conductor of heat and electricity. To make sure that the human body is not harmed in any way the current passed is limited to 5mA-9mA.

To put into practice this proposed system, two devices with the serial ports are obligatory. The db connector pin out is coupled with the serial port. The db connector pin out has a total of 9 pins. In the first device, transmission wire is connected to the

third pin of the db connector. In case of the second device, the reception wire is affixed to the second pin of the db connector. The other end of the wire in both the devices is connected to the copper plates. Both the transmission and reception wires are red in colour whereas the black coloured wire is used for the grounding purpose.

As shown in the fig.5 Conducting piezoelectric copper plates are used in the proposed system. The data transfer takes place as soon as the human body comes in contact with both the conducting plates and the process is ceased instantly when the contact is withdrawn.

The application 'Parallax-Serial-Terminal' acts as a user-interface. It is developed in C language. Before the transmission procedure commences, the Com Port setting must be changed from NONE to COM1. The baud rate must be maintained at the standard value which is 9600 i.e. data is transferring at a speed of 9600 bits per second. Baud rate ranges from 300 -3000000, the value can be increased to attain utmost data security. Every time when the application is started it must be ensured that the application is enabled. The text field must be cleared before the data transfer is started.

The proposed system is designed to only transfer texts from one device to another. The text is typed on the first device and when the human body comes in contact with the conducting plates the text is displayed on the other device.

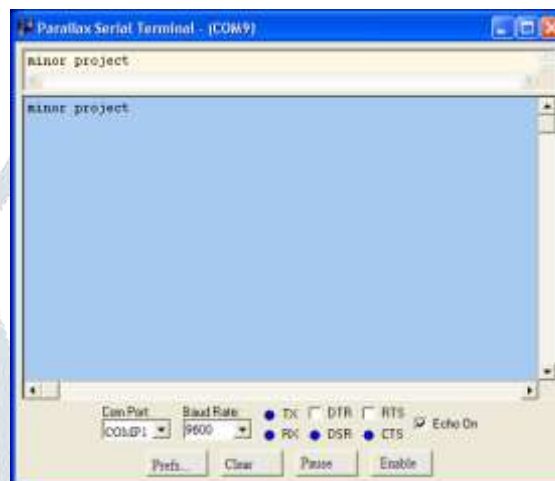


Fig 3. Transmission of data from Device 1

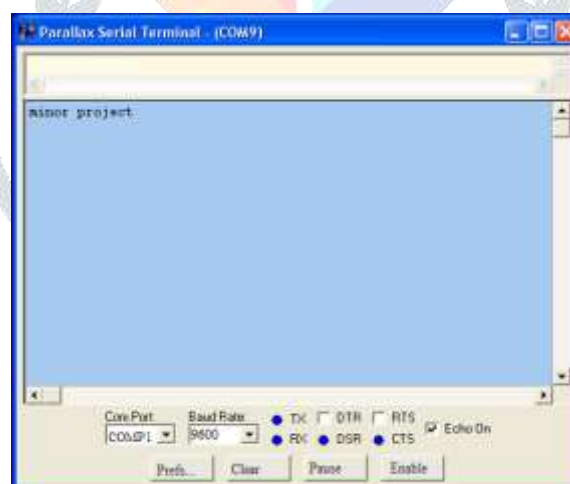


Fig 4. Reception of data by Device 2

### III. ADVANTAGES

This mode of data transfer is very inexpensive and reliable. When compared to the existing systems it has many benefits like, there are no range issues, data security is maximum, it is portable and flexible. It does not anguish the human body in any means. It is most efficient technique to transfer data from one device to other.

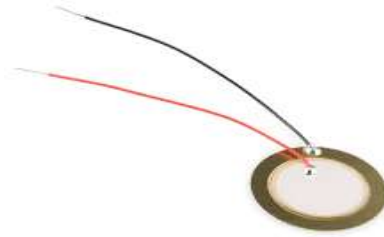


Fig.5 Conducting Piezoelectric Copper Plates

#### IV. RESULT

The proposed system was tested on two different pair of devices and the data transfer was successful in both the circumstances. When both the plates were in contact with the human body, the text that was typed on the first device was displayed on the second device. The system does not have any additional hardware requirements other than the two devices with serial port and the conducting copper plates. So, it can be established that the proposed system is effective in transferring data from one device to another.

#### V. CONCLUSION

This paper is superior than other papers as it introduces another mode of communication (Human Area Network) which can lessen the load on the other communication modes. This mode of communication is preferable than wired or wireless communication since both wired and wireless communication have their own downsides. In case of wired communication there is dearth of portability, the wires can be damaged and it is not easy to manage. Considering the wireless communication, it overcomes the portability subjects but there is lack of data security. Due to all these issues there was a crucial need to bring about a new technology in this era. Many advantages of proposed system were discovered over the existing system and new ideas were explored to perceive the unique applications of data transfer through human body.

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