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SPARSH - A Human Area Network

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Abstract: Today everyone uses PCs or Laptops many times at some extent if anyone needs some data to transfer from PC to PC there may be many ways to transfer data such as using USB Cable, transfer cable, Drive etc. This system requires routing of the cable for wired network and these networks are not procure because of the data signal are emitted outward. Other disadvantages include the security risk from unwanted signal prevention, the power is exhausted by the system is more. The aim of this project SPARSH is to develop a Communication System to transfer data from one computer to another computer through human body. It is based on a technology called RedTacton[1] which human body as a medium for communication supporting half duplex communication at 10Mbit/s.

Keywords: Routing, procure, security, RedTacton, half duplex communication.

I. INTRODUCTION

Today people can communicate anytime, anywhere and with anyone over a mobile phone. Also, Internet has provided the way by which people can download large quantities of quality data even from remote locations. Most electronic devices that include personal digital assistants (PDA's), pocket video games and digital cameras have helped in reduction in size, so that they can be carried around and used at the instance of requirement. Communication between electronic devices on the human body is also critical, which has led to extensive research and development on human area networks.

Wired connections between electronic devices are tedious and can easily become entangled. Short range wireless communication systems such as Bluetooth, Infrared and wireless local area networks have some limitations. Due to packet collisions occurring in crowded places such as meeting rooms filled with people the overall throughput gets reduced and secure communication is not possible because signals can get intercepted. The principle drawback of infrared communication is the tight directionality of beams between terminals is needed for the system to work effective.

Therefore a new technology called RedTacton[1] was introduced by Nippon telegraph and Telephone Corporation (NTT's) that uses the human body surface as a high speed and safe network transmission path. It is a Break-through technology that enables reliable network for the first time.

In the past, infrared Communications (IrDA), Radio Frequency ID systems (RFID), Bluetooth and other technologies are proposed to solve the connectivity problem. However, those technologies have their various technical limitations that reduce their usage, such as the fall-off in transmission speed in Multi-user environments that produces network congestion.

The advantages of using this technology are:

RedTacton makes use of the minute electric field present on the surface of the human body and it is completely differs from infrared and wireless.

Using RedTacton, communication starts when the user terminals are linked in different combinations according to the his/her natural and physical movements.

Communication is possible using anybody surfaces, such as the fingers, feet, face, hands, legs, skin or torso. It works through clothing and shoes as well.

II. EXISTING SYSTEM

We know about various wireless technologies that are very useful for instant data transfer through wireless medium. Some of them are Infrared, Bluetooth and newly developed technology called RedTacton.

A. InfraRed:

InfraRed uses wireless technology in devices or systems which help to convey data through infrared (IR) radiation. This signal can be blocked by any foreign material that is in front of the transmission which could be things such as objects, walls and people. Also, the transmitters and receivers must be closely aligned to communicate by being directly in sight of each other. The weather can also cause interference from sunlight, rain, dust.

B. Bluetooth

Bluetooth is another short range wireless communication technology used to transfer data with disadvantage that it can be hacked into. All wireless technologies have limits on how fast they can transmit data; generally, faster connections leads to higher energy consumption. Though Bluetooth is intended to be very energy-efficient, it sends data relatively slowly.

C. RedTacton

RedTacton is a new technology that uses the surface of the human body as a transmission path for communicating. It makes use of the minute electric field which is generated by human body as medium for transmitting the data. When this technology was introduced many researchers had in-depth study and this technology was implemented using electro-optic sensor and concept of galvanic coupling.

III. PROPOSED METHODOLOGY

RedTacton is a Break-through technology that enables reliable high-speed network for the first time. In the past, infrared Communications (IrDA), Bluetooth, radio frequency ID systems (RFID), and other technologies have been Proposed to solve the "last meter" connectivity problem. However, those technologies each have various fundamental technical limitations that constrain their usage, such as the precipitous fall-off in transmission speed in Multi-user environments producing network congestion. Red Tacton technology uses the human body as a transmission medium. They have only developed applications using wired electro optic sensors. SPARSH is an application where we transmit data between two laptops using a transmitter on one side, receiver on the other and human body as a medium.

Human body can bare upto 50v of DC. In this system we are transmitting only 5v which has no effect on our body. This technology only uses weak electric fields on the surface of our body. So the data actually does not flow through the body but the skin.

SPARSH will require the following components:

A pair of laptops

A pair of USB-TTL

Two amplifiers, two transformers, two copper pads, resistors, voltage regulator, wires for connections[4].

VB.net software to send and receive data along with proper user interface.

IV. IMPLEMENTATION

The Fig. 1 shows the complete working of the technology.

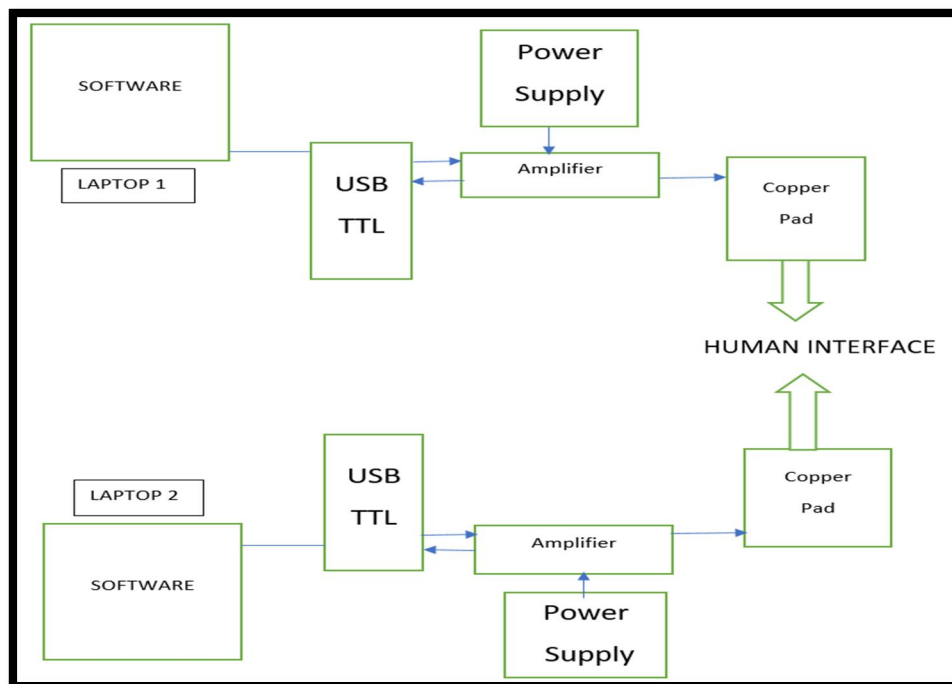


Fig. 1 Block Diagram of SPARSH

For the proper execution of this system, we will be requiring two devices (laptops) with the same GUI at sending and receiving side and follow the steps:

- A. Connection can be established between PC device and system hardware by searching in device manager where we can see com port in which USB TTL is inserted on side (Transmitter side and Receiver side).
- B. After verifying the com port when we open the GUI we first have to select the com port at transmitter and receiver side. Refer Fig. 3.
- C. As we open the GUI form on the left corner side there is Name and My Address means we assign name for our laptop or PC or we assign address of the specific laptop or PC by numbering them. It also consists of a chat box in which Transmitter can send data from transmitter to Receiver for chat or message communication from transmitter side PC to receiver side PC.
- D. When we want to send some text message, we write the message in the text field and after touching the copper pads at transmitter and receiver side we click on send button. The message will pass through our body and will be successfully transmitted at the receiving side.
- E. If the user wishes to select any text or image file he can do so by clicking on Attach File button.
- F. On the transmitting side, the user will be selecting the data or file he wishes to transfer to the other laptop.
- G. During the whole communication process, the status bar at the transmitting and receiving side will be in progress. When the both progress bar is completed the file will be send to the receiver side and it will automatically be saved in BIN folder at receiver side. The progress bar at the time of transmitting and receiving is shown in Fig. 5 and Fig. 6.
- H. In the same way we can send files such as word/doc file, PDF file, image, audio, etc.
- I. The GUI also has an additional feature of Encryption password wherein if the user wants to send the file in an encrypted form then he has to type the encrypted password. At the receiver side, if the receiver types the correct password then only he will be able to get the decrypted file.

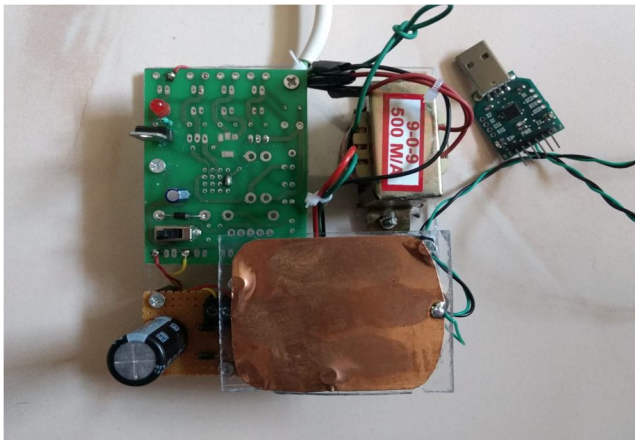


Fig. 2 Transmitter

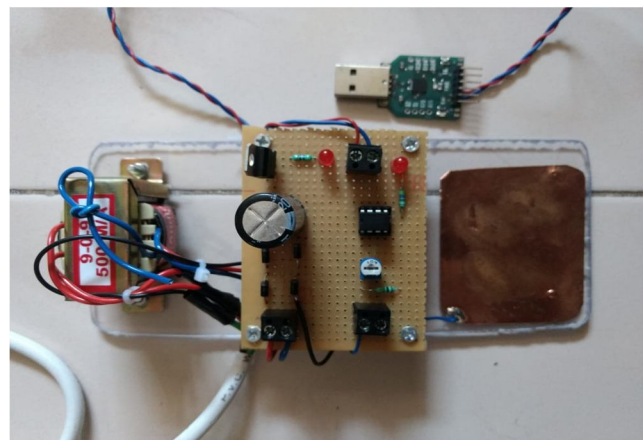


Fig. 3 Receiver

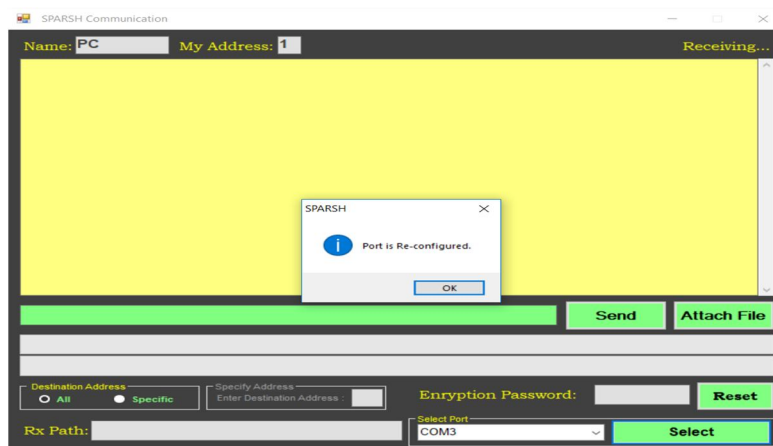


Fig. 4 Port selection

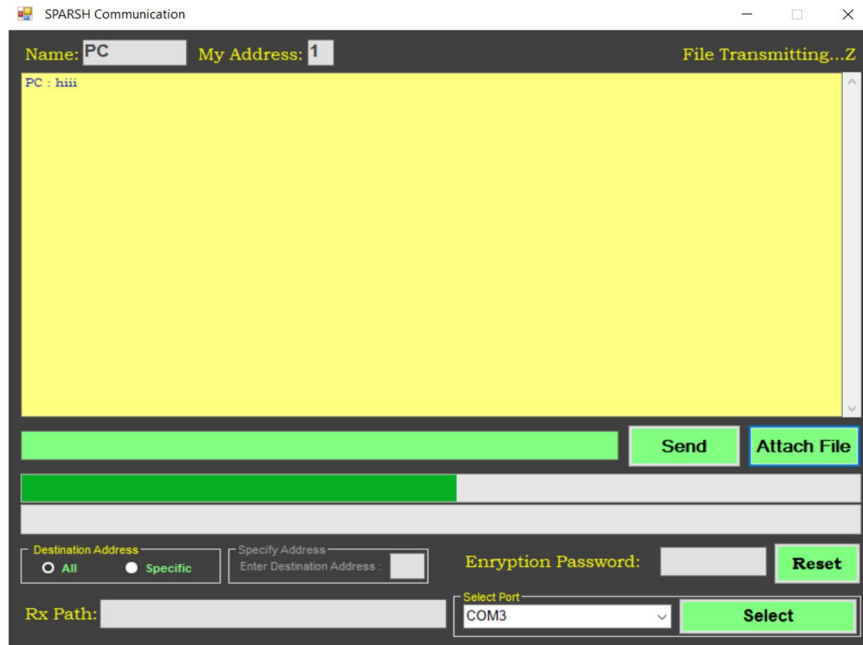


Fig 5 File Transmission in process

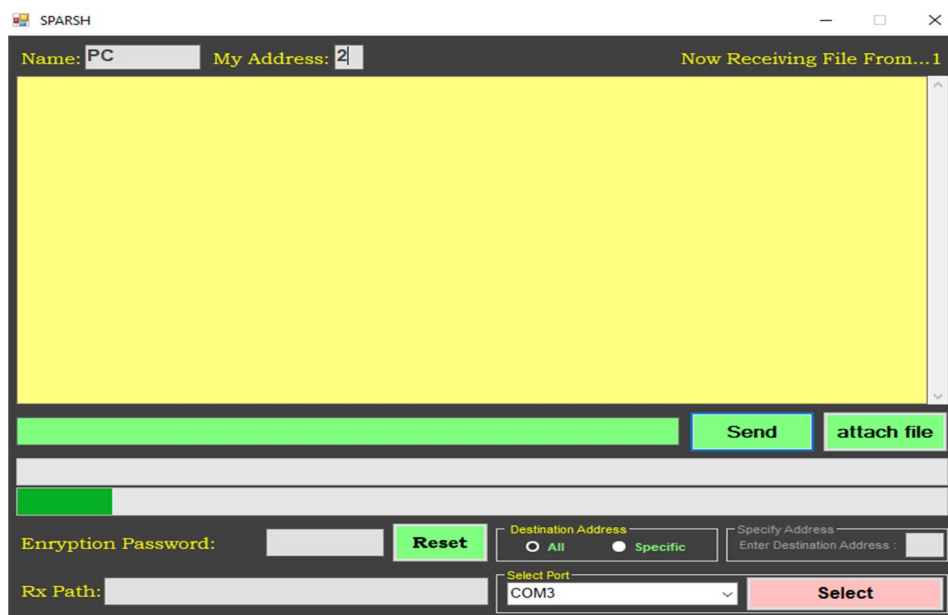


Fig 6 Receiving File in progress

V. CONCLUSION

Our project SPARSH- A Human Area Network is an user-friendly technology that establishes a communication between computing devices in closer proximity because it is very simple to operate, the user may not be necessarily an expert. Our project proclaims model of an human area networking technologies that enables communication by means of “Touching”. This technology will overcome the weak radio signals, data speeds and security risks on unwanted signal interceptions. Here, human body is the transmitting medium supporting 802.3 half-duplex communication at 10 Mbits/s. It will use the minute electric field generated by human body as an medium to transmit the data. The transmitting and receiving hardware consists of an insulating film, so there are no side effects on the human body. We successfully implemented application called SPARSH by transmitting data through human body.



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