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Data Transfer Between Two PC's Using Intrabody Communication System

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Abstract: Intrabody Communication (IBC) is a method that uses the human body as a transmission medium for transmission of electrical signals, providing an efficient channel to connect devices within body sensor networks (BSN) or under personal area network (PAN), and presenting notorious advantages in comparison with usual wireless RF standards such as Bluetooth and Zigbee. For instance, these standards were intended to operate at distances of several tens of meters, causing electromagnetic energy to be radiated into the environment, thus increasing power consumption. In contrast, IBC is based on near-field coupling, in such a way that the popular of the signal is confined through the surface of the body, without much energy being radiated into the air. This feature makes IBC suitable for use with low frequencies and low power signals, thus decreasing consumption, allowing miniaturization, and mitigating external interferences. These advantages have led researchers to progress IBC electronic prototypes as well as to define new applications. Therefore, IBC is a promising approach capable of covering some of the core technical challenges that are yet to be resolved in BSN, such as the necessity of small-size, power-saving, and miniaturized intelligent wearable devices.

Keywords: Body Sensor Network(BSN),Intrabody communication(IBC),Personal Area Network(PAN)

I. INTRODUCTION

The IBC method is defined in the recently ratified IEEE 802.15.6 WBAN protocol. The inhibition of communication to the person's proximity in IBC[1] prevents the energy from being dissipated into the surrounding environment, resulting in potentially inferior power consumption. Research has shown that IBC is capable of low transmission power below 1 mW and data rates of more than 100 kb/s which makes this approach potentially appealing as a short range communications alternative.

A variety of IBC methods have been proposed, which can be grouped into three main approaches: galvanic coupling, capacitive coupling, and waveguide methods[2]. Out of these, first one rely on the coupling of low frequency, low-level currents and second rely on voltages into the human body, respectively, while in the last technique, an electromagnetic wave propagates through the surface of body, which is normally associated with the use of higher frequencies, thus involving a non-negligible radiation of component into the air.

II. PROBLEM STATEMENT

The basic idea is to achieve flawless communication by using human body as the transfer medium .The idea is to develop a hardware on both sending and the receiving side along with a software that will be installed on the devices. Whenever the two devices wish to communicate, just as we turn on Bluetooth, instead of we just touch the touchpad on the device at the sending and the receiving end. When there's human body in contact, the circuit is complete and the body acts as a transfer medium for the data.

III. IMPLEMENTED SYSTEM

The disadvantage of the existing system is eliminated using IBC because in this system data is transmitted using body as a communication medium. By touching the hardware connected with the device we are able to transmit the data[3]. Here, we are eliminating the difficulty of routing cable, radiation of signal because the data is transmitted within the body, this transmission is secure because no unwanted signal interception, and the power consume by the system is also reduced. Considering these advantages, IBC is a promising applicant for the forthcoming ubiquitous computing era.

IV. SYSTEM ARCHITECTURE

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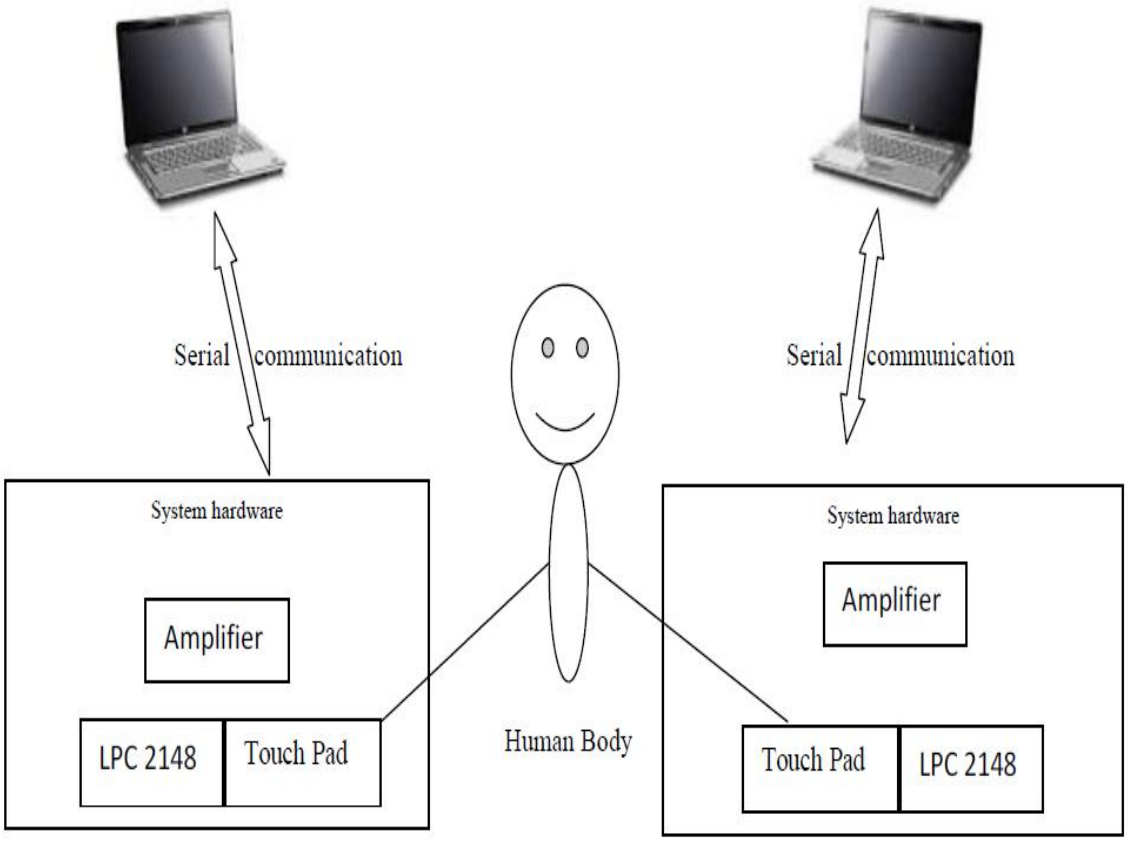

Fig 1 Intrabody communication system model

4.1 Main Components of the System

The following are the brief explanations of the various major blocks or sections used in the system.

- Personal Computer (PC)

We have designed a system to transmit data between two handheld devices. Here we have chosen computer as a handheld device. A Graphical user interface has been created on the computer to send and receive the data. For creating GUI, Microsoft VB.Net platform is used.

- ARM 7

This unit is the core part of the complete system. It is actually responsible for all the process being executed. It monitors& controls all the peripheral devices or components connected in the system. The controller here used isof LPC21XX family, that is LPC 2148.This unit requires +3.3VDC for its proper operation[5].For its functioning, code is written in Embedded C and burned or programmed into the code memory using a programmer.

- Power Supply

This unit supplies the various voltage requirements of each unit. It consists of transformer, rectifier, filter and regulator. Here bridge rectifier is used. It converts 230VAC into desired 5V/12V DC.

- Touch Pad

This unit is used to provide the connection between the system designed and the body. When the person touches the touch pad on both the side it transfers the data from one end to the other end and that transferred data displayed on the computer screen.

- Amplifier

This is the device which is used to amplify the received signal to increase the strength of the signal.

- LCD

LCD is simply used to acknowledge the beginning of transmission process once it started.

- USB

It is used to connect the one of the port of computer to the designed hardware to transmit/ receive data between computer and designed hardware.

- Body

Finally its human body which is used as an innovative media to transfer data between devices.

V. Result

Table 1 Comparison of IBC and RF Specifications in IEEE 802.15.6

	IBC	RF (NB , UWB)
Communication Medium	Human Body	Air
Frequency Band	Centered at 21 MHz (fBW = 5.25 MHz)	Different bands (402MHz-10GHz)
Data Rate	< 2 Mb/s	< 13 Mb/s
Transmission Range	< 2 m	10 m
Signal Attenuation	Low	High (Body Shadowing)
On-Body Antenna	No	Yes
Energy Efficiency	High (High Conductivity of the human body)	Low (Air has low conductivity)

VI. CONCLUSION

IBC is a short range non-RF wireless communication technology specified by the IEEE 802.15.6 using human body as a transmission medium. Many authors have presented the challenges and issues of this field in their papers. Still research is going on to address different issues. One of the category of IBC system i.e. transmission of data between two devices which are portable or say mobile and for that developed an external transceiver hardware for transmission of data between two computers. Further in future it can be designed external hardware inside the system. Data transmission security can be provided audio, video or image file can also be transmitted with increased data rate.

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