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Human Body Communication for IoT Enabled Ambulatory Health Monitoring Systems

Asha. V*
School of ECE
Mar Ephraem College of Engineering and Technology
Marthandam

Anisha. R. R
School of ECE
Mar Ephraem College of Engineering and Technology
Marthandam

Josphin Sharmi. A. S
School of ECE
Mar Ephraem College of Engineering and Technology
Marthandam

Benschwartz. R
School of ECE
Mar Ephraem College of Engineering and Technology
Marthandam

***Abstract*—A short-range wireless communication wit in a human body is known as Human Body Communication(HBC). In this the human body is used as the propagation medium. Human Body Communication is divided into two solutions: galvanic coupling and capacitive coupling. Here one user requires a pair of electrodes in both the transmitter (TX) and the receiver (RX) side, whereas the other user requires only a single electrode at the TX and the RX. The capacitive coupling in this communication makes it possible to miniaturize the size of device, and it is more suitable for applications that requires a small size devices. HBC can transfer in high data while maintaining low power consumption, and provide high security and easy integration within body-worn devices, HBC shows great potential for wearable devices. Moreover, as the proportion of biological tissues such as muscle, fat, and skeleton differs between individuals, the overall dielectric constants of human body are diverse, as well as the signal propagated through human body. The diverse HBC propagation of signal can be utilized as a biometric trait to authenticate within individuals. HBC is used for both authentication and communication approaches, as the size of wearable devices will be more miniatured. HBC authentication is suitable for wearable device regardless of the location due to the use of propagation signal between devices.**

Human body communication (HBC) is like a physical layer for wireless body area network in healthcare and medical applications because of its low propagation loss and high security characteristics. In this study, we developed a wearable electrocardiogram (ECG) which employs impulse radio (IR) type HBC technology for transmitting vital signals on the human body in a wearable BAN scenario. In this paper, we give an voiced output for the blind. No external devices like Bluetooth, LAN, RF, Zigbee, Wires are used for transmitting the data. Thus reducing the capital or investment cost.

I. INTRODUCTION

With increase in growing population, the number of blind people across the world is set to triple from about 36 million to 115 million by 2050. Here an embedded device is dedicated for blind or visually impaired people. Blindness makes life difficult, but the use of technology can help them in day-to-day tasks. Technology poses a challenge for blind people as well. Our present work focuses on the development of a text-to-speech application for the blind. Raspberry pi is the main unit which, has an inbuilt camera that is used to scan any written document and uses Optical character recognition (OCR) to convert the image into a digital text. We then use a text to audio system that will enable us to convert the digital text into a synthesized voice. In our present project, we develop a system in which the text written are been analyzed and Optical Character Recognition (OCR) is been performed. To classify the input with the trained dataset, Hidden Markov Model (HMM) is used.

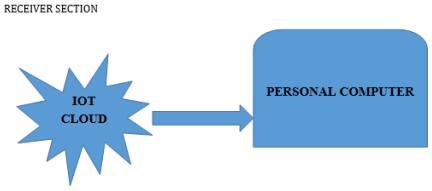
II. EXISTING SYSTEM

The process of the authentication by using SVM in the data analysis, the data obtained in previous 7 times including groups of data which amount were used as templates to train SVM classifier, and then, SVM models was established.

III. PROPOSED SYSTEM

It is confirmed that C-SVM is more suitable than the nu-SVM in both the identification and verification modes. The linear function outperforms the polynomial and RBF function in the identification mode. The linear function outperforms the polynomial and RBF function in the identification mode. Whereas in the verification mode, the polynomial is better, and the linear function is slightly inferior to the polynomial.

A. BLOCK DIAGRAM



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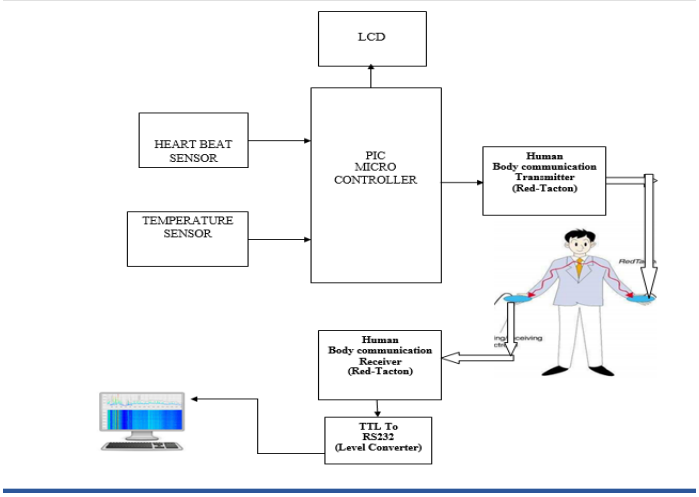

B. HARDWARE DISCRIPTION

Micro Controller
Lcd
Heart Beat Sensor
Temperature Sensor
Ttl To Rs232 Converter
Stepdown Transformer

SOFTWARE REQUIREMENTS

Mplab Ide
Embedded C

C. WORKING METHODOLOGY

The two methods used for transmission of signal through body are:

a. Capacitive coupling
b. Galvanic coupling

These two body transmission principles allow the signal to pass through the human body. The way in which the coupling of the electric signal occurs differentiates these two methods. The flow of current or an electric voltage controls the induced electric signal. Two pair of electrodes is required in the transceiver for both the methods of coupling.

A. Capacitive coupling :

In this method, two electrodes namely signal and ground electrodes are used for coupling. Out of these two electrodes, ground electrode is in the air not attached and the signal electrode is attached to the human body. Ground generates a current in the form of loop which hence generates signal between the transceiver comprising body as channel. Induction of electric field into the human body is done through the signal electrode attached to the transmitter side. The electrical voltage controls the electric signal induced in the body where body behaves as good conductor and ground acts as path of reversal.

B.Galvanic coupling :

The method in which both the electrodes namely signal and ground electrodes are attached to the body is termed as galvanic coupling method. Alternating current is coupled into the human body which forms the basic principle of galvanic coupling. Flow of ac current controls the amount of coupling. In this method, body acts as medium of transmission or channel. An electrical signal is transmitted differentially between the signal and ground electrodes of the transmitter. Major amount of signal is propagated between the two transmitter electrodes and a highly attenuated signal is obtained by the two receiver electrodes. Path for a flow of current between transmitter and receiver electrodes. Differential signal is also generated by the small current between the electrodes of the receiver. Generally, in this method, the data is carried by the ions flowing through human body. Reference ground as return path has always remained as one of the drawbacks in capacitive coupling. Galvanic coupling overcomes the drawbacks of capacitive coupling. Since the current propagation occurs only within human tissue, the transmission does not depend on the path returned from the external ground. Hence galvanic coupling is majorly preferred to be used in intra body communication. In our system, copper is being used instead of electrodes for coupling of the signal.

IV.RESULT

V.CONCLUTION

In this paper, we have described a prototype system which reads the printed text on hand- held objects for assisting blind persons. In order to solve the common problem for blind users, we proposed a motion-based technique to detect the object of interest, while the blind user simply shakes the object for few seconds. This method can effectively distinguish the object of interest from background or other objects in the camera vision. Furthermore, we will address the significant human interface issues associated with reading text by blind users.

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