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Design of Energy Efficient Topology for Wireless Scheme

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ABSTRACT: We study the Wireless sensor networks typically require low cost devices and low power operations. We propose a new energy efficient communication scheme for wireless sensor networks that is based on the ternary number system encoding of data.0 and 1 bit values are known as energy based transmission schemes. In other words, if the energy required per bit transmitted is 4000 joules, the total energy consumed to transmit n-bit data would be n number. We have presented in this system a new low energy communication scheme that can generate energy savings simultaneously at the transmitter and the receiver. We collect information through sensor networks include various climate data such as temperature, relative humidity, solar radiation and soil composition etc. These data are typically transmitted as ASCII text messages. Given the difficulty in replacing the batteries of sensor devices deployed in such network deployment scenarios, using an energy efficient communication scheme such as that provides savings in both transmission and reception of data would greatly benefit the farmer.

KEYWORDS: Energy-efficient communication, wireless networks, ternary encoding, silent communication, sensor networks.

I. INTRODUCTION

Wireless sensor networks (WSNs) typically utilize highly energy constrained low cost sensor devices that are deployed in areas that are difficult to access and with little or no network infrastructure. In most scenarios such battery powered sensor devices are expected to operate over prolonged periods of time. Communication being a major source of power drain in such networks, energy efficient communication protocols that can be implemented with low hardware and software cost/complexity are thus of paramount importance in WSNs to reduce the device recharging cycle periods and hence provide connectivity for longer durations at a stretch. Data transmission is the physical transfer of data (a digital bit stream or a digitized analog signal) over a point-to-point or point-to-multipoint communication channel. Examples of such channels are copper wires, optical fibers, wireless communication channels, storage media and computer buses. The data are represented as an electromagnetic signal, such as an electrical voltage, radiowave, microwave, or infrared signal.

Energy saving as one bit data = 4000 joules then if we could save those number of one's then we could save the energy automatically. Try to reduce energy consumption from all above sources. There are the major source of energy wasting like Long idle time when no sensing event happens Collisions Control overhead and Overhearing. For this regions we use this technique for saving the energy when data transmission.

As high energy is required for networks in wireless communication which leads to emit high power radio waves with very high battery consumption Causes various human health problems. For every transmission of data in digital communication we requires almost 4000 joules of energy for one bit of binary ,so if we transmit 8 bit of data then 4000 * 8 will require almost 32000 j of energy every time, so our motivation is to find solution using which we can reduce these no of ones. Also making transmitters buzzy could increase the chances of overloading and collision at networks.

For this long period of time we requires that much of energy, so it is very important to increase the life of batteries Last end device which actually contributes transmission are heavily utilized, i.e transistors so life span and regular maintenance is required increasing maintenance cost. In currently working system temperature sensor senses the temperature in analog form. In analog form it is converted to binary coded decimal form. In this system no use of algorithm therefore it directly gives the output in binary form. This system requires more transmission energy at both

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side i.e is transmitter and receiver. In currently working system temperature sensor senses the temperature in analog form.

In analog form it is converted to binary coded decimal form. In this system no use of algorithm therefore it directly gives the output in binary form. This system requires more transmission energy at both side i.e is transmitter and receiver. for Energy saving as 1 bit data=4000 J then if we could save those no of one's then we could save the energy automatically. Reduced Energy Consumption is increasing the life of transreceivers, Increase the battery lifetime or save the transmission energy is very important in WSN. To reduce the device recharging cycle periods is very important in WSN to provide the connectivity for longer duration of time. Reducing the radiation in environment.

II. LITERATURE SURVEY

M Cagalj have developed Energy-efficient broadcasting in all-wireless networks,. In this system the main focus on the problem of optimal broadcast, for which broadcast nature of radio transmission can be exploited to optimize energy consumption. [1]

J polastre developed Telos: enabling ultralow power wireless research. In this system Telos is new mote design built from scratch based on experiences with previous mote generation. Minimal power consumption, easy to use and increase the software and hardware robustness are major goals of system. [2]

Y. P. Chen developed Energy-efficient data aggregation hierarchy for wireless sensor networks, In this system single level aggregation and proposed an energy efficient protocol for aggregation (EPAS). This system derive the optimal number of aggregators with generalized compression and power consumption model. [3]

CHONG LIU developed Energy efficient data collection framework for wireless sensor networks. This system requires more energy for transmission of data. to capture such ripple effects of symbol errors in RBN encoded data streams, we introduce the concept of frame error rate(FER) instead of the conventional bit error rate for an accurate performance analysis. [4]

K. Sinha developed An energy efficient communication scheme for applications based on low power wireless networks, to appear in Proc.6th IEEE Consumer Communications and Networking. In this system no use of algorithm therefore it directly gives the output in binary form .This system requires more transmission energy at both side i.e is transmitter and receiver. [5]

K Sinha developed An new energy efficient MAC protocol based on redundant radix for wireless networks. In this system radix based number representation for encoding and transmitting data for application which typically utilized low cost devices. This system coupled with silent period for communicating the digit zero. [6]

B. P. Sinha developed The system based on, On the distribution of runs of ones in binary strings, In this system data compression, bus encoding techniques to reduce crosstalk in VLSI chip design, computer arithmetic using redundant binary number system and transformation of runs of one's into compressed information pattern. [7]

Koushik Sinha developed Energy Efficient Communication Scheme for Wireless Networks. A Redundant Radix Based Approach. The system proposed the new communication scheme based on recoding data from binary to ternary Radix and the silent symbol strategy, with the aim of generating energy saving simultaneously at the transmitter and receiver. This system requires high power drawn in the transmit or receive state is considerably more than the idle or active state - i.e., when the radio is in low power operation mode. [8]

Vinay Kumar developed The system based on Energy efficient clustering algorithm. In this system WSN have a limited processing power and storage space. Cluster based data aggregation protocols reduces the latency in the tree-based data aggregation by grouping the nodes in WSNs into cluster. WSN have a limited processing power and storage space. [9]

Fei Yuan developed the system Data Density Correlation Degree Clustering Method. This system cause energy wastage at aggregator nodes due to the decryption and encryption operations at aggregator nodes for the data aggregation and further secure transmission for Data Aggregation in WSN. This system requires high density power for energy transmission. [10]

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III. PROPOSED SYSTEM

Description of proposed System:

This project aims at developing a high energy is required for networks in wireless communication which leads to emit high power radiowaves with very high battery consumption causes various human health problems. For every transmission of data in digital communication we requires almost 4000 joules of energy for one bit of binary, so if we transmit 8 bit of data then 4000*8 will require almost 32000 joules of energy everytime, so solutions is in which we can reduce the number of one's and save the transmission energy.

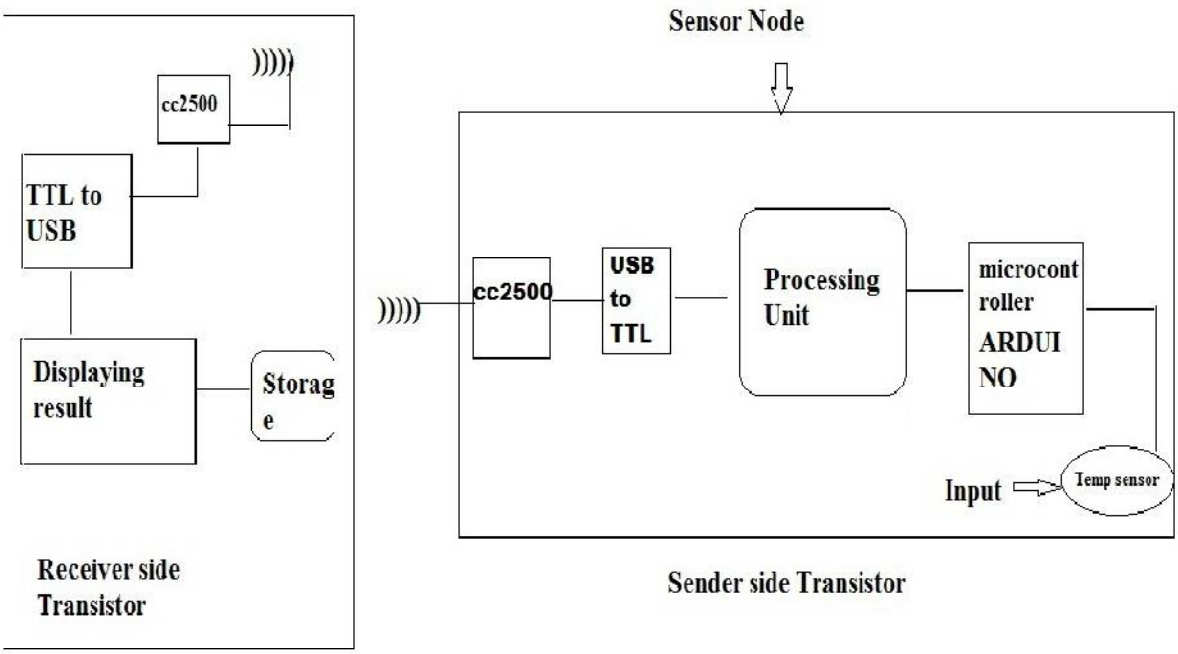

Fig: 1.1System Architecture

Description of components:

Arduino Uno Board: Arduino Uno is a single board microcontroller, for building digital devices and interactive objects that can sense and gather information from the physical world. The Arduino IDE Software can be used for programming.

Fig: 1.2 Arduino Uno Microcontroller

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Temperature sensor: It senses the temperature in the form of analog single and send the output to the microcontroller as input.

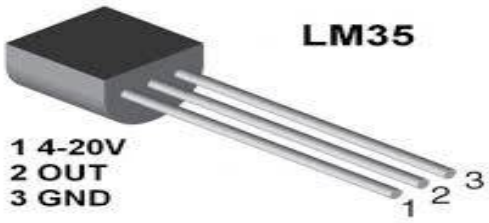

Fig: 1.3 Temperature sensor Module

USB to TTL convertor: It is used to connect microcontroller to our processing system.

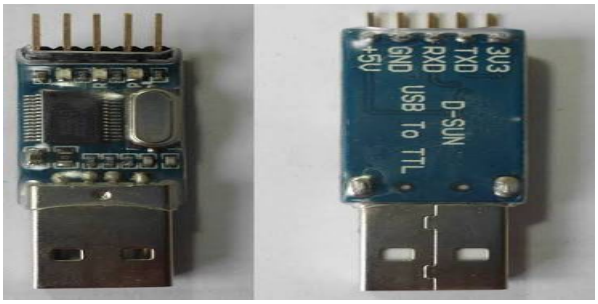

Fig: 1.4 USB to TTL

CC2500: This is radio frequency transmitter receiver XB cc2500 this is used for the sending the data from sender to receiver.

Fig:1.5 CC2500

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IV. PSEUDO CODE

Step 1: It senses the temperature in the form of analog single and send the output to the microcontroller as input.
Step 2: ARDUINO microcontroller this microcontroller converts the analog single into digital signal.
Step3: Processing unit in this side we use the binary to ternary algorithm for reducing the number of one and save the actual energy and it shows in the form of graph.
Step4: USB to TTL convertor It is used to connect microcontroller to our processing system.
Step 5: CC2500 This is radio frequency transmitter receiver XB cc2500 this is used for the sending the data from sender to receiver.

Algorithm:

1. First check decimal value is empty or not , and if not empty then proceed further .
2. Extract analog input signal into digital (decimal) output using ADC .
3. Convert this decimal values into binary values .
4. Define an array with 8bit length and then check if value is greater than or equal to 8, if yes then exit the function else proceed further .
5. Declare the local variable =0 and extract the first location of array string and store it to the local variable for ex. X and assume it as default MSB bit. Simultaneously assign a global variable value to 1.
6. Increment the value of local variable by 1 and then store that variable to x1 as another local variable .
7. Increment the local variable and store that variable to y1 as another local variable .
8. Compare the x1 and y1 variables , if the are equal then append "0" to the previously store MSB bit (X) define (extracted) in step no. 6.
9. If they are not equal then append "1" to the MSB bit (X).
10. Repeat the above steps till your array is not greater than 8. When array is above 8 then stop the process.

V. SIMULATION RESULTS

We have developed an application using Energy Efficient Topology for Wireless Scheme. This application can be save the transmission energy using binary to gray algorithm. Following are the screenshots of the sender side.
Fig: 1.6 shows the Energy saving graph with binary and gray data comparisons.

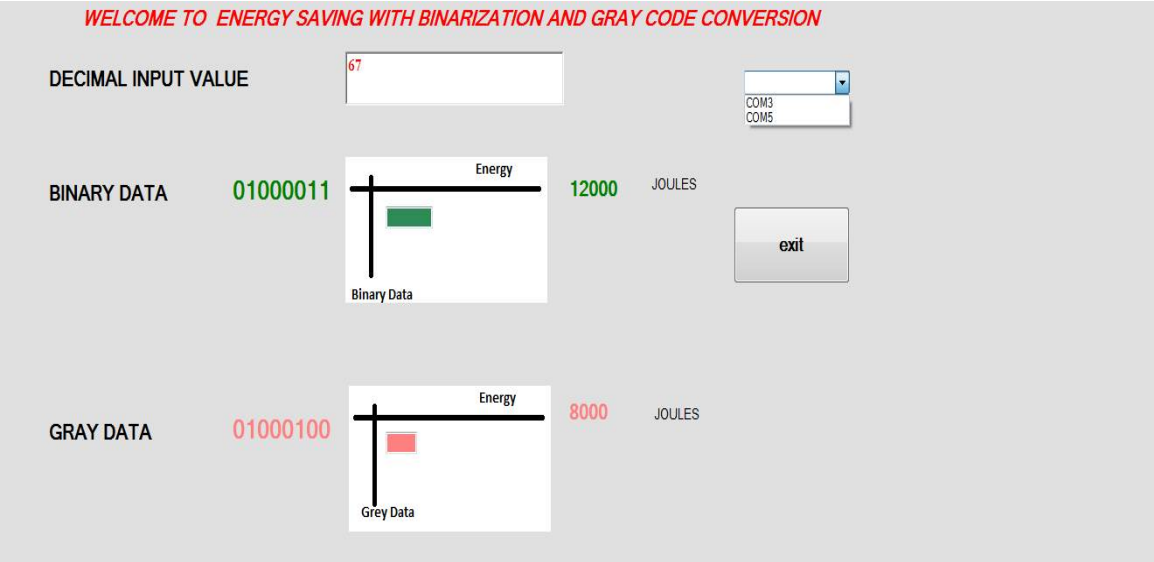

Fig: 1.6 Energy saving graph..

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This screenshot 1.7 shows the receiver side data they can be receive through the wireless sensor network. It can be display the gray data value at receiver side ultimately transmission energy save at both sender and receiver side.
Fig 1.7 shows receiver side gray data

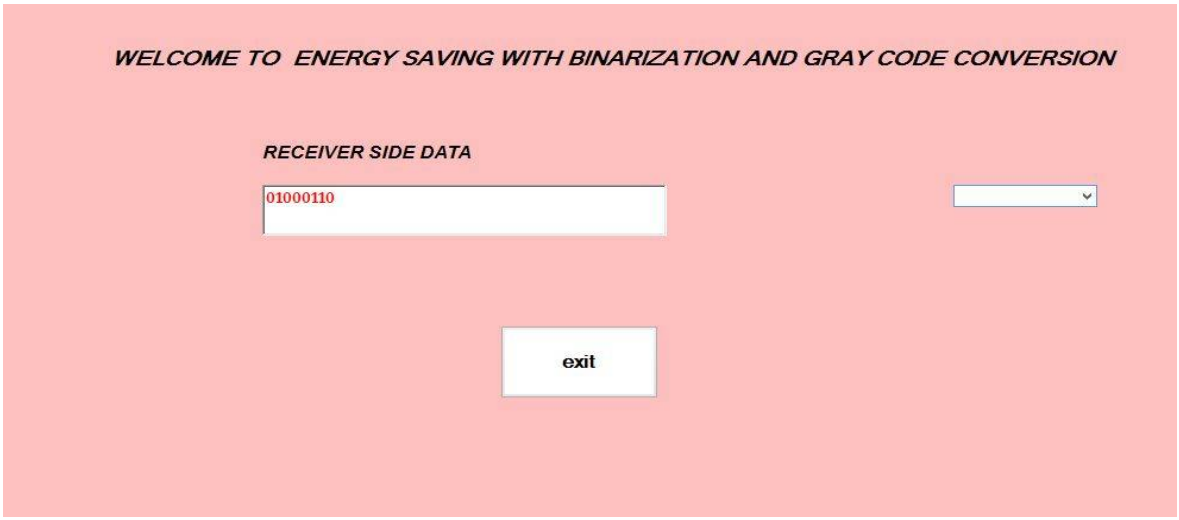

Fig: 1.7 Receiver side data

This screenshot 1.8 shows the hardware module that is Temperature sensor and Arduio microcontroller. Sensor senses the temperature as input in the form of analog and sends to the arduino.

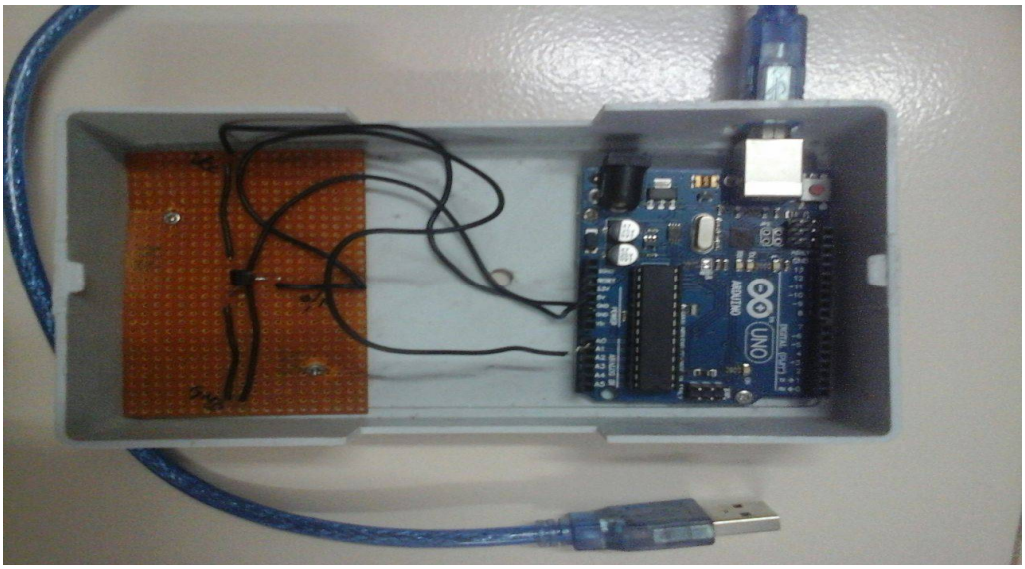

Fig: 1.8 Arrangements of Hardware Components

VI. CONCLUSION AND FUTURE WORK

This system presents survey on energy efficiency techniques in wireless sensor network. Because of difficulties in replacement of usable batteries, energy efficient communication is very important. Binary to ternary

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convert algorithm is widely use in this technique and give the better result than other technique as it saves energy at both transmitting and receiving end. Thus we can produce and wireless sensor nodes energy while data transmission and hence we can increase their life with battery consumption at both end, at cloud and client.

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BIOGRAPHY

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