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Effective Energy Adaptive and Consumption in Wireless Sensor Network Using Distributed Source Coding and Sampling Techniques

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Abstract

Multimedia is the process of handling multiple medium of messages over network with high rate data services in wireless cellular area networks. Communication is the process of exchanging information form one service to another. In wireless networks are significantly growth of affecting network performance and energy consumption. The major problem is end to end delay in each node and meets the quality of services. The followings are considered for implementing wireless sensor network such as reduces the network delay, propagation delay and energy consumption. The senor node can sense the encoding value and reduce the network traffic delay using mitigation method. This paper propose a unique approach to provide simple routing services with reduced traffic delay, end to end delay network performance and to achieve better performance using Distributed Source Coding and Effective Energy Consumption methods. In this paper we use optimal early detection algorithm for improving network performance and energy consumption problem. An iterative Shannon fano and Tuker method is used for finding optimal solution of each node values. Network Simulator-3 is used for simulating network environments and setup the experiments. Our proposed method shows high data rate, good performance and low energy consumptions. The results compare with existing methodologies and performance is good.

Keywords Wireless sensor networks · Effective energy consumption · Distributed source coding · End-to-end propagation delay · Optimal early detection

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1 Introduction

Wireless Senor Networks are used to variety of application in real world with various solutions. We can process real time and commercial application such as transportation, shopping, automation and industrial application. Sensor nodes are powered by batteries and life time of the battery can be differed at different characteristics due to the lower energy. Sensor node can be reducing the performance and it will affect whole performance. Therefore consumption of energy is more constraints in WSN environments [1]. In recent years, the energy consumption problem in WSN can be solved by various methods. The different approach can be applied to solve energy consumption, but the problem in communication such as network delay [2], traffic, end-to-end delay [3], scheduling and routing to be monitored [4].

The growth of smart phone and usage of smart phones are tremendously increased and provide high rate of multimedia services [5]. According to the survey of A&M University in 2015, the mobile broad band and WSN service and be increased 90 times in 2020. So the usage can be increased that lead the problem of network delay and propagation delay. Nowadays, ZigBee or Wi-Fi standards are used to handle huge amount data processing by using long time and reduced cost of services [6]. The significant contribution of Michal et al. the base station transmits the messages and end user receives message with less SNR ratio. In this case we reduce the end-to-end delay [7].

The three major types of techniques we used to solve energy and increase the network performance using sampling, data transmission/reception and compression techniques [8]. Sampling is used to reduce the number of measurements are used for WSN [9]. This is used to measure and calculate data rate, bandwidth, throughput and delay characteristics [10].

The branch and bound method are used to perform sampling method so we can add and remove the node easily. In this case numbers of relationship can be calculated by projection node [11]. Data transmission can be set using transmit data set size of input messages and measure the energy using Distributed Source Routing method [12]. According to, Cristesu et al. and Wong et al. to analyze the network performance in WSN can be applied by using parallel and distributed transaction. The communication and compression leads to identify packet loss, reduce the traffic and improve the network performance [13]. This instance the distributed transmit routing protocol used to check network delay and traffic nodes. In this paper consist of following sections, Sect. 2 describes various problems statement and reviews, Sect. 3 gives complete details about system analysis and algorithms, Sect. 4 explains different experimental results, the last Sect. 5 describes conclusion and future scope of our research work.

2 Problem Statement and Overview

In WSN measures the natural problem such as weather forecasting, transportation and location based problems. In this case the following problems can be identified and designed to measure various method like link quality, distance factor, network delay and energy consumption [14]. Recently, studies on localization planning for WSNs Many researchers like Holder suggest Ghosal and Chaudhary. Abu Chunfeng et al. In particular, it provides the performance of a comprehensive survey [15].

State-of-the-art SMC localization projects they perform projects as a background classification of localization activities in SMC. Moreover, the complex features of each the current scheme will be evaluated to identify its benefits Disadvantages. Similarities and differences of each scheme Inquiring based on important parameters [16], Localization accuracy [17], calculation costs [18], communication costs and sample numbers [19]. Challenges and directions Discusses future research activities for each parameter, this is a teaching study for localization projects WSNs.

Most of the SMC based localization schemes related to the above have not been decided yet. First, mentioned Patterns or observations on randomly selected samples the stage is not specified. Neighbouring nodes of 1- or 2-hop the unknown node is defined as the actual pattern around or without any interruption of the computational anchor. For most schemes such as MCL, MCB and others [20]. This is repeated for an invalid filter Patterns, resulting in greater localization time and energy Consumption. Second, it is a common trade-off between calculated cost, communication cost and localization accuracy to achieve the desired or perfect localization accuracy.

And much more they transfer some computational costs for localization Accuracy, which leads to high energy expenditure [2122]. Then, sample Depreciation is another problem in adopting an important model Most SMC based schemes do not consider the back distribution process. In addition, the number of iterations in the sample and the filtering process are undefined and the exact number of iterations. In addition, most SMC based schemes make an effort Manage their filter area to increase filtering efficiency, but it does not matter whether the observations are adequate in such a limited area, it can lead to diversity Observations are declining [23]. Finally, most existing MCL-based there is no significant localization delay in the schemes behaviour for time-critical monitoring systems.

i. We introduce distance source coding method to implement sampling and compression techniques.
ii. In WSN harsh environment the distributed and parallel transaction approach are used to reduce the traffic
iii. We analyze the properties of effective energy consumption using loop tree and hop by hop routing methods
iv. The performance of network can be verified and simulate by using random early and mitigation methods

The Fig. 1 describes basic WSN network for weather forecasting of AWS report.

In this case routing can be differed by various hop nodes and travelling path. In user environment the hop can be added and removed that situation life time of the sensor can be reduced. Kraus-Kuhn-Tucker et al. coordinates are investigative resource allocation in each node and verify the allocation in each node and verify process allocation strategies. In this fixed and adaptive routing strategies are designed with the QoS constraints in terms of acceptable ration and end-to-end delay [6].

In multi user and multi hop environment the packet forwarding and resource allocation can be reduced. The orthogonal frequency division multiple access techniques used to provision that reduce the energy and delay in WSN. Generally the end-to-end delay and propagation delay can be derived into various paths like the processing delay can be monitored at different time intervals, the native ready queue mechanism can be implemented at each time, the low energy can be monitored by input and numbers of active hop in WSN. The above observation the following characteristics can be experimented and simulated,

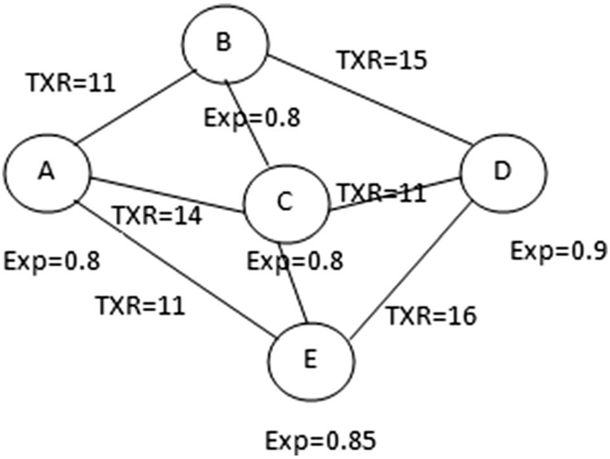

Fig. 1 A small weather forecasting node—report from AWS

such as network delay, energy consumption, propagation delay, network traffic and network performance [5].

Specifically we focuses on optimal solution to reduce the energy while the nodes are in active state and monitor power allocation and utilization in each stage during transmission, select effective energy and encoding delays.

3 System Model and Formulation

In this section we propose the wireless sensor network formulation, energy consumption, effective use of power allocation and delay requirements in each node.

Consider Fig. 2, N is the set of sensor nodes with the Area A and the time period T, We assume that

i. The nodes measure the value f each incoming and outgoing packets (P)
ii. The difference time intervals (T) can be report each packet delay
iii. Nodes can be transmit the packet via each multi hop node and maintain same average power

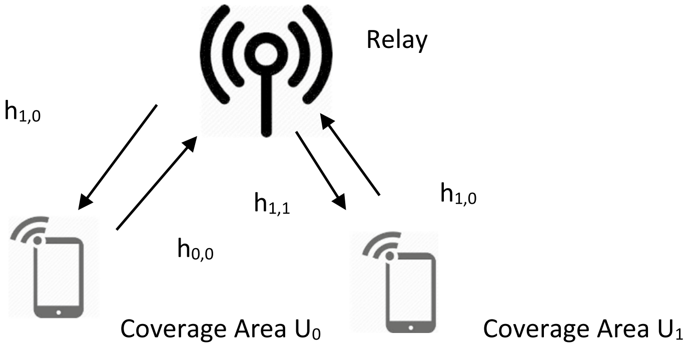

Fig. 2 Model of delay aware and energy constraints networks

iv. The sink signal can be generate by are A with radius of r
v. The transmission rate can be varies and maintain neighbourhood status of each node

The following are the set of notation used to calculate sampling and distributed message passing environments.

N	Set of sensor nodes.
T	Time slot at each node.
e	Estimation factor at T.
P_f and P_r	Packet delivery ration.
ACK	Acknowledgement of each packet.
a,b	Incoming packets.
S	Continuous source function.
Mi	Number of calculating node in each hop.

The following are the main contribution of this paper to implement following.

i. An efficient energy consumption techniques used to allocate power to each sensor node and calculate estimation factor to next hop
ii. Signal to noise ratio calculated to produce continuous source information payload
iii. We calculate encoding code to maximum of QoS service in network delay and propagation delay calculation
iv. We investigate delayed network, traffic flow in each node and dropping of each packet value can be measured using store and forward mechanism

By applying Gaussian random variables is used to calculate distance factor of S, continuous source function.

$e[S_i] = 0$, where $i = 0,1, \ldots, N-1$ and l is fixed to apply random variable at each node slot of r.

$$P_{f,r} = e[S_i] = e-(j2\pi N)$$

where f, r—forward and reverse packet information.

4 Proposed Distributed Source Function

In this section describes preliminaries network model and energy conservation model in distributed networks.

4.1 Preliminaries

$G = \{V,E\}$, V—set of sensor nodes and E—set of links in each node pair in WSN.

Let e—estimation factor with respect to i, j and τ—neighbour node in each hop following are the destination of each option.

i. The sensor node sense the information in give area A with the particular time slot T. In this paper this sink node can be calculated by τ

ii. Each node can have a sensing technique and sensing area and each cycle can be represented Round R. Therefore we can evaluate network life time using R.
iii. All the sensor node having limited energy which can be calculated by transmission count form

$$T_x = \left(1/P_f \times P_r\right)$$

iv. Sensor node distance can be measured by GPS location point and calculated information can be obtain

$$T_x(l, d) = \begin{cases} l.e[S_i] = 0 & \text{if } d \geq 0 \\ l.e[S_i] + T_x = 0 & \text{if } d < 0 \end{cases} \tag{1}$$

where d—distance function.
v. To save the energy sensor node have lower power consumption and produce with less distance calculating point.

The following algorithm used to calculate each node (R) points and minimize the Distribute source function estimation factor.

Algorithm 1: Calculate Estimation Factor (f)
Input: S – Senor nodes
Output: E – {0,1,....N-1} values
1. $e[S_i]$ <- 0
2. M = 0
3. Each R Round cycle can be increased based on incoming packet value
4. while R>=0
   $e[S_i]$=0 where d>=0
   R_i<-R_i +1
   $e[S_i]$= R_i
5. Now we can destination the d

$$T_x(l, d) = \begin{cases} 1 & \text{if } e[S_i] = 0 \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

4.2 Network Model

In this method is used to apply routing algorithm in each routing path and collect routing information by high date rate,

This process can be measured by tow results.

i. Network propagation delay: $NPD_x = \left(e\left[S_{i,j}\right] / \left(T_{xi,j}.e[S_{i,j}]/d_{i,j}\right)\right)$
ii. Delay of each sensor node: $DS_{i,j} = \alpha.e[S_{i,j}] + (1 - \alpha).(e[S_{i-1,j-1}]) + \cdots$

where $\alpha = d_{i,j} + d_{i-1,j-1} + \cdots$

In this case the neighbour node and metrics to be calculated by using estimation factor and each GPS sensor location points.

4.3 Energy Consumption

By applying distributed source coding and sampling algorithm to calculate minimum distance in each node value and guarantee the lowest cost path.

For example P1, P2, P3 are set of points and C[P1], C[P2], C[P3] cost of each node values.

The average energy consumption can be applied by using Fig. 3.

The distance d can be sinking and energy can be set by sensing area A and round R.

$$T_X(l, d) = \begin{cases} l.d & R - r/2 \le d \le R \\ l.d(R^2 - N) & -R \le d \le R \\ 0 & d = r/2 \end{cases} \tag{3}$$

The effective energy consumption is very important and it increases network performance.

4.4 Multiple Groups

We assured that in wireless sensor network have multiple number of network nodes and each node have highly correlation factor with each hop. So we can take any two measurement points in steps apply quantization operations. The following graph shows that the energy consumption factor and delivery ratio values. Here the delivery time various based on number of consumption of energy (Fig. 4).

The experiments are done by using Opnet and Network simulator tool with input of sensor nodes and their throughput. The graph (a) specifies number of sensor node and coverage rate. The sensor node is fixed as 105–109 and increase the coverage rate. Compare with existing methods our proposed method gave good coverage results while increasing the coverage area. Existing methods EHPCC with k = 1, 2, 3 and our proposed method EPDM (Efficient Energy distributed source coding and sampling technique method) provides good coverage results. In graph (b), the graph is taken for energy consumption and delivery ratio. Using Network simulator input sensor node as 100 and coverage area as 25 means increase

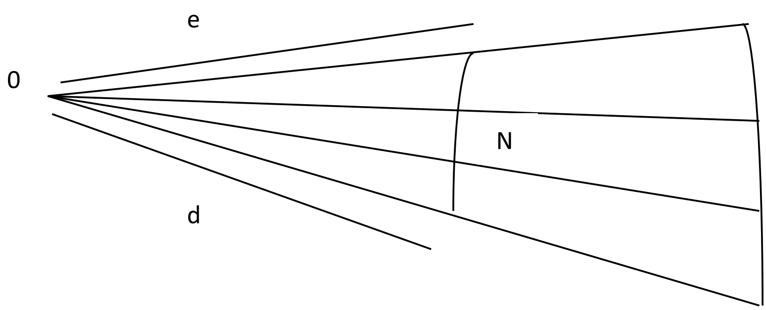

Fig. 3 Average Energy Consumption factor at each T

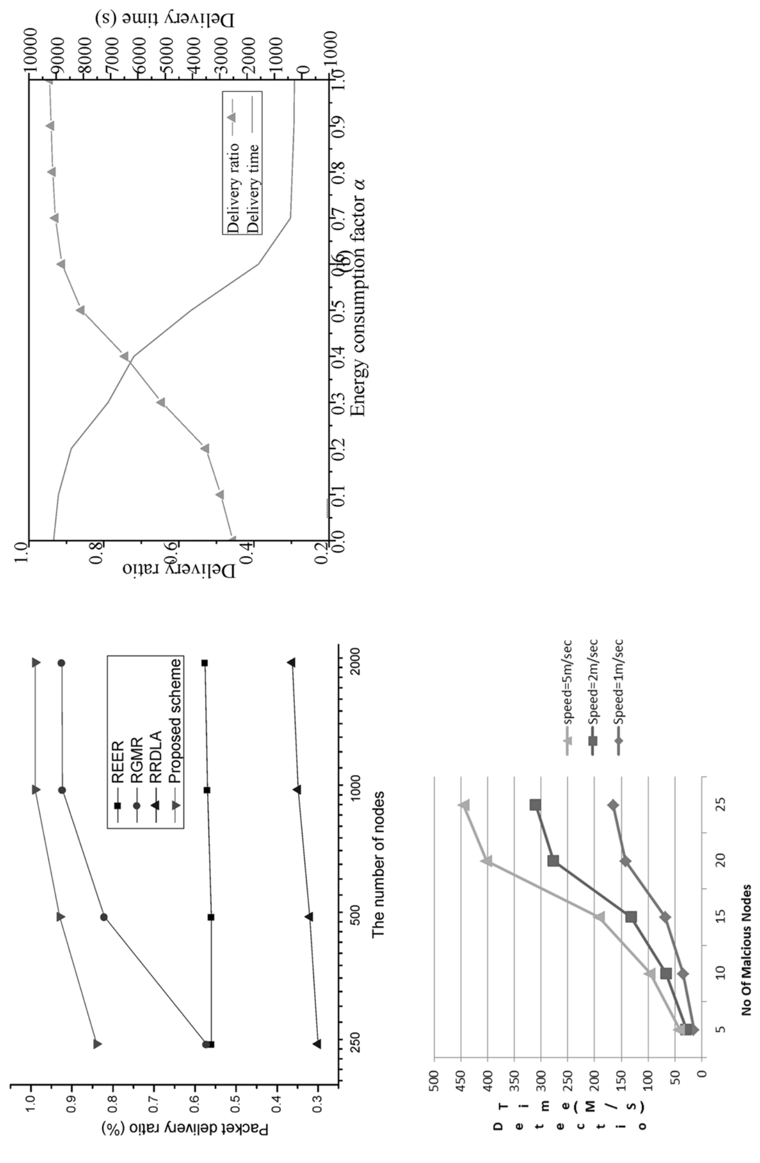

Fig. 4 Result of Energy consumption and delivery ratio factor based on sensor nodes

the delivery time means energy consumption and delivery ratio is decreases. So based on above result the delivery point is fixed at one interval means we get good energy consumption values. Graph (c) shows that while sending a packet number of packet are delivered to

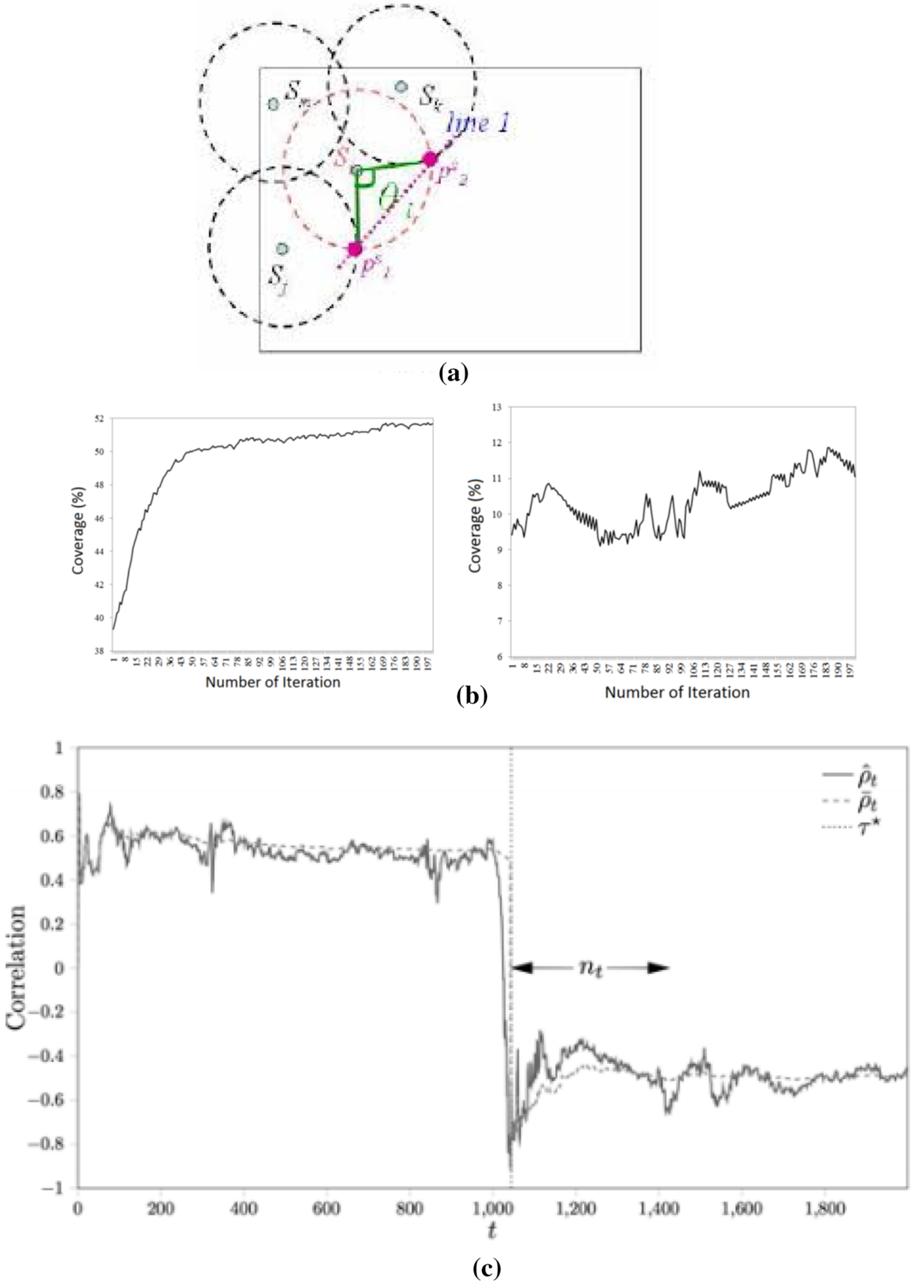

Fig. 5 Geographic results based on coverage and iterations

exact coverage area and number of affected by malicious attacks. The graph is considered for number of malicious nodes and detection time with respect to speed (delivery time).

4.5 Discussions

We compare the energy consumption are using various factors such as network delay, propagation delay and packet loss rate,

i. The Distributed source function applied to sample each hop values
ii. Coordination function applied to each cooperative node operations
iii. The Energy consumption accuracy and estimation factor can be verified by different time slot intervals
iv. Wireless networks are sink the various measurement groups and reduce the required energy
v. Applied Distance based, Geo graphic routing applied to process sense node
vi. The Distributed source function and combined utilization algorithm are check the efficiency of the network

The Fig. 5 shows that the Network simulator results of coverage constraint and iteration results of various coordinate position. In (a), S_i, S_j, S_m, S_k are the coverage area and P1, P2 are sensor nodes between coverage results. Coverage point set as S and find network delay, propagation delay and packet loss rate. The graph (b) Number iterations and coverage. If iteration increases means coverage results also increased. In graph (c), delivery time and correlation factors. The delivery time is fixed at t = 1 ms and correlation factor various based number of coverage constraints and energy consumption. Compare with existing results our proposed results gives better performance and coverage results.

The utilization of WSN is compared with existing methods such as EHPCC (Enhanced Hybrid Principle component convolution method with three stages k = 1, 2, 3). The results of existing methods with various iterations while increasing number of sensor nodes means coverage constraints and energy efficiency is decreased. The accuracy rate is differed so quality of services is major constraints. Our proposed EPDM (Efficient Energy distributed source coding and sampling technique method)provides good results while increasing sensor nodes means based on estimation calculation and round cycle method the coverage areas automatically configured. Each coverage constraint.

5 Conclusion

This paper work a Distributed Geographic based network protocol are implemented to reduce the network delay, propagation delay and energy consumption by using following features, Sensing of encoding method and reduce the network traffic delay using mitigation method. The wireless sensor networks are calculated energy constraints and consumption among various sensor node values. The main purpose of this paper calculated end-to-end delay, network propagation delay with minimum power consumption. This work guaranteeing the high packet delivery ratio and WSN control flow message can send from to another for sink process. The performance optimized by using control messages and low-power overhead are reduced. Moreover small distance coverage variances are measured arrival and departure of incoming and outgoing packet status. The existing methods are not possible to find low power energy and active sensor node results. The proposed distributed source coding and sampling techniques provided better results and compare with existing methods our method gave better coverage result with respect to iteration and delivery factor. The proposed scheme achieved by various method for ensuring energy efficiency and network performance. In future the optimization-based scheme to improve energy value.

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