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IMPROVEMENT OF LINK STABILITY AND PERFORMANCE FOR WIRELESS SENSOR NETWORK USING ASSOCIATION EXPIRATION TIME ALGORITHM

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Abstract - A Wireless Sensor Network (WSN) consists of a number of sensor nodes equipped with frequency transceiver that can communicate with each other to perform coordinated sensing tasks across a given area. In wireless sensor networks that use time-synchronous based networks, the integration synchronizes time with post-routing services. In general, responsive techniques are superior to many innovative time synchronization protocols for communication overhead. In the general case, the presence of existing methods causes data time to scale poorly with the network size. To overcome the problems of introducing a new method Association Expiration Time (AET) Algorithmbased data transmission quickly and efficiently over their network. This is more secure and easier to transfer data from source to destination on the network. We identify a special class of sensor networks that are elastic to this scalability limit. For this class of external applications, we propose a network compensation strategy that scales well with both network size and node density. The Network must implement this problem and use an efficient data collection model on the network. Our proposed method has to implement this problem and use efficient data collection model on the network. Multiple geometries based on link settings. There are two channels like vertical channels take different parameters to display results like throughput, delivery rate, delay, link stability.

Keywords — Wireless Sensor Network (WSN),Association Expiration Time (AET) Algorithm, time synchronization protocols.

I. INTRODUCTION

Wireless sensor networks (wireless sensor networks) have a network of many sensor nodes that are distributed and connected wirelessly in a multi-hop manner. In wireless sensor networks, wake-up and sleep times, TDMA scheduling, collection of sensor data and events, and orderly coordination of cooperation among multiple sensor nodes require that sensor network nodes have an accurate common time. The precise common time achieved by one of the methods described is time synchronization. Wireless sensor networks have cheap and imperfect hardware clocks and each clock at a node can drift away from each other in time.In wireless sensor networks, the major problem is data loss. The main reasons for data loss are the failure of the sensor node, data congestion during periods of poor data transmission and channel quality. The problem of data loss has been affecting the security and reliability of wireless sensor networks. Our proposed scheme uses a loss node elimination scheme based on a method to identify link stability for reducing data loss in wireless sensor networks.The nodes that listen to both messages estimate the channel gain and the desired transmission power to reach the target

Integrated Time Synchronous Routing. Using an optimization strategy, the destination node selects the Potential Node Selection node, and signals through the beacon message which was the selected node. In the following time interval, each node already knows its neighbors, and this information is used to evaluate the benefit value of the repeater selection. Each node then sends to the coordinator with its benefit value and related neighborhood information in the data message. The coordinator will use this information for Potential Node Selection. The information is about which nodes are selected as relays in the next coordinator.

1.1 Time synchronization in WSN

Time synchronization is essential for many applications in wireless sensor networks, such as moving target tracking, event detection, speed estimation, and environmental monitoring. It is essential that many sensor nodes of a wireless sensor network have a common time reference for many applications. Moving over, clock synchronization also helps to save energy in the WSN as it provides the possibility to group nodes into sleep mode. Synchronization is called Reference Broadcast Synchronization (RBS), which is used for single-hop time synchronization, where a node is selected as the reference node and then broadcasts a reference message to all other nodes for synchronization.

1.2 Quality of service

The basic problem in communication networks is the transmission of messages to achieve a specified throughput (number of services) and quality of service (QoS). The quality of service can be based on different services, installation environment, economic considerations, and applications, one or more message delays, expiration date messages, bit error rate, packet loss, economic cost of transmission, and transmission power. Refer to QoS to specify. Use basic network topology. A communication network consists of nodes, each of which has computing power and can send and receive messages wirelessly or by wire over a communication link. The basic network topology includes fully connected, mesh, star, ring, tree, and bus. A single network may include several interconnected subnets of different topologies.

1.3 Energy Consumption on network

The protocol must preserve the resources of every node in the network. A single node failure in relay networks is usually unimportant if it does not lead to a loss of sensing and communication coverage; ad-hoc networks, instead, are oriented towards personal communication and the loss of connectivity to any node is significant. In the routing protocol design of mobile nodes, many issues need to be considered in order to offer many important properties such as scalability, QoS support, security, low power consumption and so on.

II. RELATED WORKS

Hybrid electro-optical internal data center network with remotely-dependent traffic models customized based on machine-specific data-based services. In this regard, using statistical-based analog demonstrations, the benefits of optical circuit switching are due to its potential to handle the large and highly dense data services unique to certain applications [1]. The motivation behind this approach is to evaluate the traffic patterns generated by the servers hosting the different services and use machine learning to predict multiple steps before a large amount of traffic appears. This allows a priori scheduling and distribution of optical switching circuits for offloading large amounts of data traffic from electronic packet switches [2].Deep learning is the latest breakthrough in the field of machine learning / intelligence, and it seems to be a viable method for network operators to configure and manage their networks in a smarter and autonomous way. Although deep learning has gained extensive research attention in many other fields (such as computer vision, speech recognition, robotics, etc.), its application in network flow control systems is relatively new and receives little attention [3].In addition, the rise of large-scale cluster computing, especially for the development of ultra-large-scale high-performance computing systems, poses a huge challenge to traditional electronic interconnection networks in terms of bandwidth and power consumption. Optical technologies with higher bandwidth and lower power consumption have long-term potential for next-generation efficient, rack-integrated computing platforms designed to improve interconnect performance [4].Only when these optical paths have different wavelengths can they be shared. As traffic grows exponentially, the demand between source-destination pairs in a network may approach or exceed the capacity of a single fiber. In this case, space division multiplexing (SDM) networks seem to be a viable option, and new network sharing technologies have become critical [5]. This circuit allows on-chip spatial multiplexing and de-multiplexing and fiber core switching. Using this device, experiments verify that for different group sizes and different power ratios, multicast and / or grooming can be successfully completed with the entire output port [6].

It is very difficult to predict it accurately with a traditional linear method. On this basis, the change trend of the traffic is based on the multi-scales of LSTM network lessons and burst information extraction to complete future traffic prediction [7]. Possible and Trustworthy Use of Optical Packet Switching Technology for Data Center Networks This research report adopts two concepts: coupling optical switches and shared electronic buffers, also known as hybrid switches, and introducing TCP congestion control algorithms (Common country assessment) to control the transmission of optical packets [8].The first and more traditional policies (models) assume that each setup and teardown request is processed separately, while the other two strategies (models) assume that setup and / or teardown request groups are handled together by wavelength selective switches [9].In addition, some high-performance computing applications always show certain specific communication modes and different topologies with various capabilities associated with these modes. In order to implement a business model adaptive HPC system, a hybrid network architecture based on an optical circuit switching (OCS) topology can be reconstructed, which can be adjusted to different classic topologies [10].The input and center stage switches are unbuffered crossbars, and the output stage switches are buffered crossbars. In the middle stage and the deterministic dispatch (TRIDENT) call and queue this switch is a three-level Clos network switch, and the switch is cell-based [11].A unified network layer connection model is based on the CLOS switching network to meet the needs of the connection. The hardware cost and forwarding delay are then evaluated to compare with the out-of-bandwidth threshold (BDT), which determines the most appropriate switching mode for a coin exchange. The adaptability of IP switching and optical transmission network switching at different switch granularities and port rates is based on hardware costs, optical port costs, and forwarding delays in the simulation platform [12].In response to the above-mentioned problems, the existing offloading method of optical packets is based on the traffic conditions of optical packet switching nodes, and uses a deflection routing method of a learning method. However, there are still unresolved issues, such as handling the complexity of controlling dynamics in the entire network, flexibility, and congestion [13].

Optical packet and circuit integration (OPCI) nodes can provide a flexible optical path for high quality of service, and dynamic optical packet to best serve the same infrastructure. The OPCI node is compatible with various optical formats by low polarization-dependent loss optical switches with nanosecond switching speed and burst mode amplifiers with low gain fluctuations [14].

However, the high reconfiguration delay of optical switching technology makes it challenging to effectively use optical circuits to switch between these hybrid networks. The numerical results confirm our hypothesis that it is feasible to implement a hybrid system with similar system-level and user-level performance as Hadoop, while achieving power consumption and cost with the hybrid network [15].Align the data center flow with the actual traffic. Consider the "rat stream", which often happens, but with a small number of bytes, while the "elephant stream," happens occasionally, but there are huge numbers of bytes. Traffic classification flows with different characteristics, research various machine learning (classification) techniques, such as C4.5 and Naive Bayes discretization, and compare their performance in terms of accuracy and classification speed [16].

The optical switch system is based on three newly developed core joint switching subsystems: an electro-absorption (EA) -based joint switch and ns conversion speed, and an acousto-optic modulator (AOM) as the main joint switch and microsecond switching speed, And a free-space mirror based switch with MS switching speed [17].

An efficient spectrum window plane (SWP) based heuristic algorithm and multi-layer traffic grooming based on auxiliary graphs (AG) are developed for OTN-based network algorithms for routing and spectrum resource allocation. That small-granularity-based spectrum defragmentation (for example, 5 GHz) can achieve a bandwidth blocking probability (BBP) close to that of pure OTN and multiplexed OTN in dense wavelength division multiplexed (DWDM) networks [18].

Traditional routing schemes cannot handle these situations. The routing of the case-based decision system in a packet-switched network tracks the state of the network. It also designed a graph-aware neural network to suggest and modify solutions from past cases. The low-level structure of the neural network is learned from functional accessories not only from each independent vertex, but also from the neighbors of each vertex [19].It implements multiple shaping algorithms for frame preemption and simultaneous recording of switching delays and queue utilization statistics. In addition, the evaluation of the linear topology with four switches is based on high link utilization, which indicates that the benefits of the above mechanism are performed compared to conventional Ethernet switching [20].

III. IMPLEMENTATION OF PROPOSED SYSTEM

3.1 Association Expiration Time (AET) Algorithm

Association Expiration Time (AET) Algorithm designed for sending messages from any node to any other node in wireless sensor network. The general design goal of the AET Algorithm is to optimize the packet behavior in sensor networks with high mobility and to deliver messages with high reliability. To improve the performance of the existing position based greedy routing protocols, the proposed AET approach incorporates weighted score based strategy, which uses combination metrics of position, speed, and direction of motion and link stability of the neighbor nodes. The position, speed, direction of motion and link stability information of their neighbor nodes are collected from and it is used to select the most appropriate next forwarding node.Using the weighted score of all neighbor nodes, the source/packet carrier node can decide the neighbor node which has efficient forward progress towards the destination node.

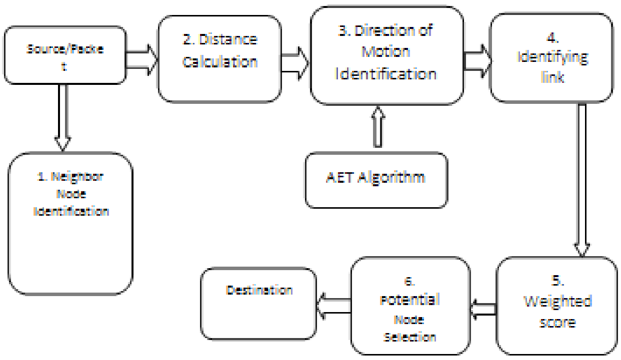

Fig. 3.1 Association Expiration Time (AET) Algorithm

It selects a node which has high weighted score and forwards the packet to it, which reduces link breaks and enhances reliability of the route. Unlike other existing routing protocols, this approach not only uses the one hop neighbor's position, speed and direction of motion information, but also considers all neighbor's position, speed, and direction of motion and link stability. The AET approach is appropriate for intelligent vehicles. AET creates static clusters, thus retrieving data from nearby ones making the application easier.

Identifying Link Stability

Despite the open problems in WSNs, there are already a high number of applications available. In all cases for the design of any application, one of the main objectives is to keep the WSN alive and functional as long as possible. Our findings show that routing stability is subjected to not only the quality of a link but also to the implemented routing protocols, deployed environment and routing options available. More importantly, next hops with low usage rates are shown to experience a higher probability of disconnection from the Neighbor respective source nodes, causing them to be short-lived.

According to identifying link stability method is determined based on the three step process, which are:

1. Estimation of neighborhood stability based on Energy;
2. Estimation of neighborhood stability based on link loss and
3. Manipulation of lifetime of mobile nodes.

Potential Node Selection

However, most existing works focus on selecting sensor nodes which are the nearest to the target for tracking missions and they did not consider the correlation of the location of the sensor nodes so that these approaches cannot meet all the goals of the network. This work proposes an efficient and potential node selection approach for tracking a target in a distributed wireless sensor network. The proposed approach combines the potential-based node selection strategy and particle filter prediction considering the spatial correlation of the different sensing nodes. With these motivations, we propose an efficient and potential node selection strategy to dynamically choose the best set of sensor nodes for target tracking in WSNs. It combines the potential-based node selection strategy and particle filter prediction.

Thus, potential node selection method can balance energy consumption and guarantee the tracking reliability with the optimal set of sensor nodes and minimize working nodes so as to decrease the energy consumption significantly.

The entropy-based method is based on the potential node selection method, the weighted distance node selection (in which a node is selected once in accordance with its own information usage) and the mean square errors, implementation time and energy cost.

Algorithm

S: Set of nodes in the network

N: Number of nodes in the network

Step1: Initializing the network (Nodes (N))

Potential Node Selection (PN), Identifying Link Stability

N_i *= 0 to number of nodes*

R_i *=Routing stability*

R_n*= Sends neighborhood*

P_N*= To dynamically select the node selection*

Step2: for (i =0; i<= number of nodes; i++)

{

If (R_i*) = Usage rates // next packet transform path selection*

Then

$R_i = R_n$

End if

$If\ (S_n \leq T_N)\ then$

Node is recognized as prediction nodes

$Else\ if\ (mv > Th_d) then$

$Else\ if\ S_n > N_i$

End if

Sender S

Compute $m||pad(m)$

Transform m into $m' = f(m||pad(m))$

Send m' *to receiver*

Receiver R

Compute $m||pad\ (m) = f^{-1}\ (m)$

Recover (m)

End

3.2 Rapid Packet Transmission Algorithm

Packet losses avoid both in low node and high node density, resulted from packet drops. However, if there is more than one node receiving lowest duplicate packets, then the nodes' distances from the border will be compared and the node nearest to the border will be chosen Rapid Packet Transmission Algorithm (RPTA). The combination of location-based and time reservation based methods ensures high delivery and lower end-to-end delay avoid of packet delivery. This resulted in farther nodes having lower reservation ratio. It is expected from the proposed scheme to yield reduce in redundancy by reducing packet drops which resulted from packet collisions and channel fading, hence increase successful delivery rate.

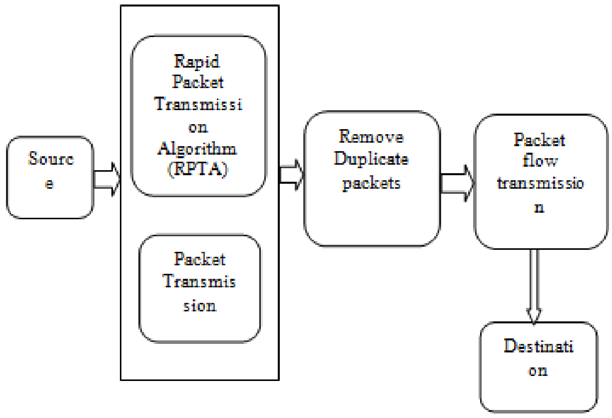

Fig. 3.2 Rapid Packet Transmission Algorithm

Algorithm Steps:

N = Number of packet loss between two packet arrival

If packet loss = =TRUE then

If [(n+1) T min<=packet inter-arrival time< (n+2) T min]

then

Wireless loss

Else

Congestion loss

End if

End if

Tia = current packet inter-arrival time

μia = mean packet inter-arrival time

δia = standard deviation inter-arrival time between two packet arrival

if packet tloss = TRUE then

If Tia -> μia> δia then

Wireless loss

Else

Congestion loss

End if

End

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While the communication is necessary to increase the lifetime of the sensor network, an important implementation is to reduce duplicate packets which are considered as a serious issue in these networks.

IV RESULT AND DISCUSSION

A Wireless Sensor Network (WSN) is a specialized network significantly used for monitoring the desired locations. The major problem of the WSN is the loss of data at the instant of transmitting data between the source and destination. In order to reduce the data loss, link stability identifying is used, in which an effective for transmitting data to the destined node is selected. A novel idea for information-accuracy-aware potential nodes selection based on a derived information accuracy model which formulates an explicit relationship between information accuracy and the number and position of jointly sensing nodes.

4.1 Average Throughput

Average throughput defines the average rate of successful delivery packets over the communication channel. It is measured in terms of bits per second (bits/sec). The average throughput is computed as follow:

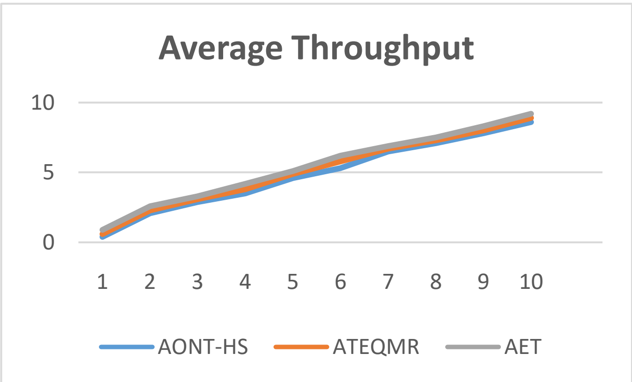

Fig. 4.1 Average Throughput

$$Average\ Throughput = \frac{total\ amount\ of\ data\ that\ destination\ receives\ from\ the\ source}{time\ taken\ by\ the\ destination\ toget\ the\ final\ packet}$$

Number of packets	AONT-HS	ATEQMR	AET
1	0.4	0.6	0.9
2	2.1	2.3	2.6
3	2.9	3.1	3.3
4	3.5	3.8	4.2
5	4.6	4.9	5.1
6	5.3	5.8	6.2
7	6.5	6.7	6.9
8	7.1	7.3	7.5
9	7.8	8.0	8.3
10	8.6	8.9	9.2

Table 4.1 Comparison in terms of Average Throughput

In table 4.1, comparison evaluation of throughput between the existing and proposed research methodology is given. From this graph, it is proved that the proposed research methodology achieves better performance than the existing research methodology. The existing methodology cannot perform better in case of an increased number of data packets, thus it reaches a saturation level at the time of 9.2.

4.2 Delay Analysis

The node delay analysis and the transmission range, impact on delay and delay distribution is investigated.

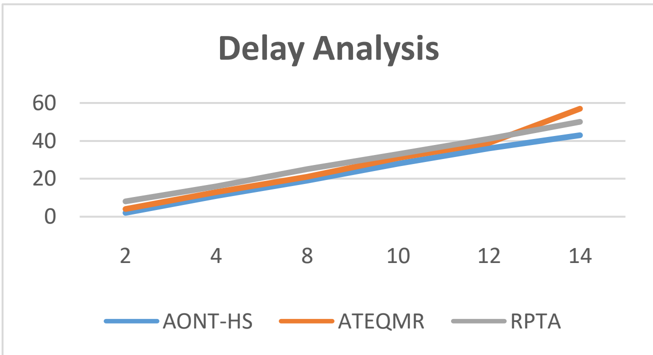

Fig. 4.2 Delay Analysis

Figure 4.2 shows the comparative analysis between the nodes and delay of the proposed RPTAand the existing ATEQMR.

Table 4.2 Delay Analysis

From table 4.2, it can be observed that the performance of the proposed algorithm is better when it is compared with the existing algorithm in terms of delay with various number of nodes.

Link Stability

The assessment of long-term routing stability complements rather than replaces existing instantaneous link quality link stability techniques. Instantaneous assessment is necessary for evaluating the quality of routing options under dynamic environmental settings, while long-term routing instability highlights the potential bottlenecks in the network.

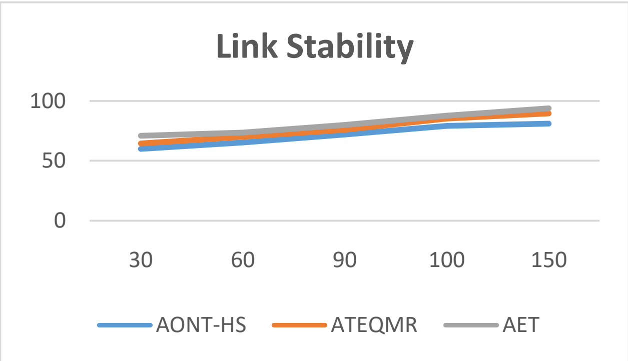

Fig. 4.3 Link Stability Analysis

Above figure is show the link between node to node stability the proposed method AET compare to previous method AONT-HS and ATEQMR high stability 93.8%.

V. CONCLUSION

In this work use efficient data collection model on the WSN. We must clarify the motivation for the time synchronization method. A recipient is a node that is in the same direction as the sender, but uses a total avoidance delay to send packets. Some protocols generally discard the entire original path and issue a new round of route discovery process, but only one link in the path break. We will discuss some common uses of time synchronization in sensor networks. Our proposed model use AET is much better than

Delay	AONT-HS	ATEQMR	RPTA
2	2	4	8
4	11	13	16
8	19	21	25
10	28	31	33
12	36	39	41
14	43	57	50

other protocols, because it has higher throughput and node link stability.

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