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Research Article

PROGRAMMED EVALUATION AND REVIEW TECHNIQUE MECHANISM FOR UNDERWATER WIRELESS SENSOR NETWORKS

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ABSTRACT

In current era, Underwater Wireless Sensor Networks (UWSNS) has turned into an important role because of the numerous submerged situations and to reduce the effect of electromagnetic field energy for humans. There are numerous protocols has been developed to establish a communication and to find a path. But, finding of progress of the node and realistic accurate time is not comprehended well. Based on the realistic time probability values we can make a suggestion of the progress of node. In this article we concentrate the issues of node of the progress and realistic accurate estimate time by using the PERT (Programmed Evaluation and Review Technique) in UWSNS by optimistic estimated time, most likely estimated time and pessimistic time depends on the probability value we make any one suggestion such as reschedule, close control, going under satisfactory condition and re-planning.

Keyword: UWSNS, PERT, SSTCM

INTRODUCTION

In recent years, there are different types of routing protocols have been there for underwater wireless sensor networks (UWSNs), few of them are vector-based forwarding (VBF)[1],a protocol which is based on depth-based routing (DBR) [2],an underwater acoustic based a link- state based adaptive feedback routing protocol (LAFR) [3], A routing protocol which is based on distance-based reliable and energy efficient (DREE)[4],A protocol which is focused only on efficient of reliable energy [5],protocol based on efficient data gathering[6],and layer-by- layer angle-based flooding routing protocol [7], Energy efficient event driven hybrid routing protocol for densely deployed wireless sensor networks[8],Novel cluster solutions[12]and the reliable data encryption routing protocol[9],energy efficient and balanced energy consumption cluster based routing protocol[10], and for reliable data delivery based on sparsity-aware energy efficient clustering protocol [11]. In recent years, tendency toward using the cloud mechanisms [13,14]for data delivery in UWSN is also established. Though the main intention of these routing arrangements is to deliver consistent and well-organized data delivery in cruel underwater environment and these routing contemporary design objectives for UWSN-based applications, most of the existing routing patterns generally ignore the external impact interference on transmission dependability in cruel underwater environments and achieve some design purposes in special manner. In addition to that, maximum of the present routing schemes is not focusing the issue of realistic accurate time and status of the node in underwater networks. If the delivery report is not available simply we are resending the communication without considering the status of the nodes. Finally, the major existing routing schemes are based only to meet application-specific design objectives and requirements in a particular underwater scenario to overcome the problem. This paper will demonstrate the common method to find out the realistic accurate time and progress of the node in underwater wireless sensor networks through the PERT mechanism. The PERT procedure will help to provide the status of communication in realistic manner by three ways. Namely,

a. Optimistic estimated time
b. Most likely estimated time
c. Pessimistic estimated time

The final step of the PERT mechanism is to find the probability values we can make a decision of the current status. This PERT implementation is applicable to all the routing protocols for security.

This paper is organized as follows section II describes the materials and methods of proposed routing scheme and section III describes about the performance evaluation and sectionIV contains the conclusion and future enhancement.

MATERIALS AND METHODS

Proposed Routing Scheme: PERT (Programmed Evaluation and Review Technique)

To implement the PERT (Programmed Evaluation and Review Technique) procedure for finding realistic accurate time and status of the node we choose a cloud based SSTCM method [14] by using this method the activity of sensor node is monitored and the realistic accurate time is calculated in three ways such as a. Optimistic estimated time (T_o),b.Most likely estimated time(T_m),C. Pessimistic estimated time (T_p)

a. Optimistic estimated time

It is the shortest time to perform the activity. Let assume everything in the network goes well.

b. Most likely estimated time

It is the most often occurring duration of the activity. Statistically, it is the model value of duration of the activity

c. Pessimistic estimated time

This is the maximum time to perform the activity, under extremely bad conditions.

The beta distribution of the estimated time is implemented in the Figure 1.1

PERT procedure

The iterative procedure of determining the critical path accurate time is as given below.

Step1:

Compute the expected time duration of each activity by using SSTCM method and apply in this formula.

The Expected average time $T_e=((T_o +4\ T_m + T_p) /6)$

Step2:

Calculate the variance of each activity.

Variance of the activity is the square of the standard deviation $\vartheta=\sigma^2=((T_p - To)/6.)^2$

Step3:

Compute the earliest event time, latest event times, and total float of each activity.

Step4:

Compute the project length variance, which is sum of variance of the activities in the critical path.

Step5:

Find the standard deviation of the project length (σ).

Step6:

Compute the standard normal value.

$z= ((T_s-T_e)/ \sigma)$

T_s->schedule time to complete the project

T_e->normal expected project time duration

σ->expected standard deviation of the project length.

Step6: find the probability of completion of the project.

Note:

If the probability value is less than

0.3->reschedule (or) replace the project.

0.3 to 0.4->close control is required

0.4 to 0.65->going under satisfactory condition

above 0.65->resources are excess,replanning is required.

Depends on the probability value we can make a suggestion of the current situations.

Performance Evaluation

Let us assume three different time with two network routes, first one (1-2) with three different times a=1, m=7, c=13 and route (2-3), where the expected time value in milliseconds is a=2, m=14, c=26 for computing the earliest event time, latest event time, variance, standard deviation and total float for all the activities.by applying the PERT procedure formula the value of latest time event, variance and float value is shown inTABLE1.1 and the probability value of route (1-2)for 5 minutes is 0.3->it means that it needs close control and for the route(2-3) for5 minutes is 0.5->it proves that the communication is going under satisfactory condition.

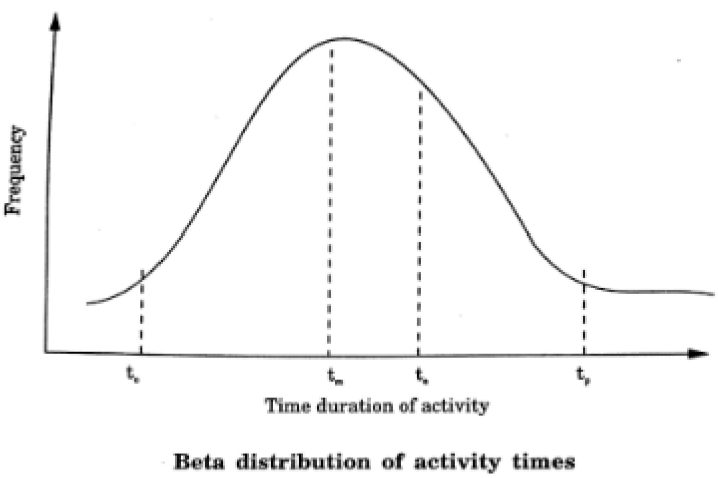

Figure 1: Beta distribution of activity times.

Table 1.1: Performance evaluation of PERT procedure

Route	Time(ms)			Expected Time	Earliest		Latest		Total float	σ²	σ
	a	m	b		Start	Finish	Start	Finish			
1-2	1	7	13	7	0	7	0	7	0	4	2
2-3	2	14	26	16	7	21	7	21	0	16	4

CONCLUSION AND FUTURE WORK

In this paper, we proposed a PERT to find progress and realistic accurate time for real-time UWSN-based underwater applications. PERT mechanism is used to check the sensor nodes progress in the network and it's applicable to all the protocols. PERT mechanism exploits details about the highly reliable link and quality information of the time and current situation of the node for successful transmissions toward the sink. Moreover, due to its monitoring node progress it helps the programmer to know about the communication status and they get the comments based on the probability values. PERT mechanism effectively reduces the ambiguity in data path loops, network delay, and energy consumption. Moreover, PERT increases the probability of status of the nodes and preserves realistic accurate time in underwater environments. The performance evaluation results show that PERT mechanism achieves excellent performance in terms of finding the realistic accurate time in average end-to-end delay, and status of the mode. Future work of this study aims to improve the proposed algorithm as mobility scenarios applications of UWSNs.

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