UNDERWATER SENSOR NETWORK BASED NECESSITY OF LOCATION PREDICTION WITH MANUVERABILITY

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ABSTRACT:

Underwater sensor communication is a challenging technology for design and implementation of underwater aquatic environment. Here we established stable phenomenon related to the proposed VIKOR algorithm based, and discusses how the effect is necessary of location prediction with mobility based under water sensor network. Proposed algorithm of VIKOR is a multi criteria analysis or multi criteria decision making method, this is denoted as MCA or MCDM. this solve decision issues with non commensurable (different unit) criteria and conflicting section, satisfying that understanding is trendy for competition decision ,the resolution wants explanation that is locked to the ideal , plus the different section are calculate bestow to every established criteria different and determines the solution named compromise that is the closed to the ideal for VIKOR ranks. **Key words: Mobility, under water sensor network, location prediction, underwater communication.**

I.INTRODUCTION:

In this paper we consider the existing method issues, and presented trendy and accuracy based underwater sensor network necessity of location prediction technique and efficient mobility range. It can consist of a large number of sensor on and underwater which can communicate via aquatic connection [1] similar to the wireless sensor networks , these networks provide numerous advantages in term of coverage quality , labor , cost and deployment as opposed to traditional underwater sensor network within the last decade a lot of studies focused on the issues related to communication underwater given that RF signal would not travel underwater . The design of aquatic modem, modeling of the channel medium access. Routing and sensing issues had been the main focus of researchers [1] . Resent year many routing protocols for UWSNs have been proposed [2] . vector based forwarding (VBF) is a location based routing protocol and is suitable for UWSNs [3].It can be easily applied to mobile and dynamic networks , while it need to know the location of nodes in advance . It means that a network localization process needs need to be conducted before routing data. Moreover, the localization process seriously affected the routing performance. to reduce the restrictions of location information . Depth based routing (DBR) was introduced [4] by using VIKOR algorithm .In this algorithm only requires depth information of nodes , which can obtained by certain sensor s DBR can achieve good performance in dense networks , but when the number of nodes decreases . Larger delay and higher energy consumption will happen. Based on the packet characteristics, the authors in [5] used packet priority to make routing decision. However this method is tradeoff of end-to-end delay. Among these routing protocols, VBF is an effective routing protocol . VIKOR is accurate result based algorithm this hybrid of a research contribution. This are solve to the energy consumption and node float mobility problems. However most research on VBF assumes that the locations of nodes are known, and small research on node localization has been introduced.

In[10] author proposed under water positioning scheme (UPS),which is time difference of arrival (TDOA) based localization scheme for UWSNs , It does not require the time synchronization of the nodes. However the draw backs of UPS is that it cannot locate the nodes that reside outside the enclosed area by four anchor nodes .In this paper we study node localization of underwater sensor network and present a localization based routing protocol.

This paper segments are follows section II is background of related works .III is analyzes the basic principle of VBF and it constraints candidate forwarder the nodes during the routing process. Section IV represents the time of arrival based localization in underwater sensor networks .VIKOR algorithm methods introduced in step V. Discussion

are proceed as stage VI. In section VII we conclude the paper.

II.RELATED WORKS:

Specified in segment I. Hybrid studies on localization for underwater acoustic networks [2] , this proposal are mainly arranged for short scale stable networks [11],[12].these proposed system are constantly constructed for Short-scale stable networks[36]. For example, underwater "GPS" systems (GIB (GPS excellent Float) [13] and PARADIGM [14] have been proposal base on center float and one hop sender and receiver section. Localization for sensor nodes is centrally performed at center float .In [15], a transmitter set of rules transmitted for underwater multi-hop robot networks .that set of rules based constant scheme this suited for short-range static underwater networks. For large scale mobile underwater sensor networks, this protocol is inefficient because of the high communication cost and low convergence speed.

Location prediction has widely analyzed for telluric sensor network, and a important number of methods are intimated [16]. Commonly said to be, these method can be differentiated into types. Rangeland method and free range method [17]. The standardize agriculture area covers the rules that use constant node – node distance evaluation (i.e. range)or angular evaluate to determine localizing while the model provide no acceptance about the validity or availability of such data range [18]. Even if target-based rules can estimate many accurate segment points , this need additional hardware for distance measurement, which will implementing the sensor communication cost ,on the other hand , medium rate– free method may not need additional hardware backing, but this can only establish rough-cut section establish. If the research, we are engrossed in localization accuracy [19] . [20] further more underwater sensor networks, acoustic medium are commonly worked and rate of calculations using acoustic signals is cheaper and much more accurate, compares with that in terrestrial sensor network using radio ,thus range – based method are naturally good choices for UWSN however, due to the unique Parameter (Such as, three dimensional node deployment, junction maneuverability , and low transmission bandwidth) of UWSN, previous section range base method is unknown applicable environment[21].

Location for telluric WSN has also been analyzed in resent past [16]. In [17] , the creator proposed a rate-free localization method occupying on simultaneous Monto Carlo Localization scheme and this show that their method can over work mobility to enhance the location efficiency . In [21],the documenter proposed prognostic rules which can restraint the frequency of location positioned on sensor mobility conduct to decreases the energy department requiring while bounded the location correction . These two studies assuring that sensor nodes are moving simultaneously and the genetic aspects of target maneuverability design are may not analyzed.

In view of contrary liquiform condition large scale network and baseness node mobility location for large network scale wireless sensor network is very excellent and challenging. Like that radio may not effort in aquatic transmission has to act. The original enhancement technique to involve acoustic channels constructs for under water sensor network based on localization method. Classical under water sensor network used for multi hop localization technique [25] planetary sensor networks ineffectual due to here many number of transmission overhead . Concurrently UWSN are change node location continuously and mobile network . In under water sensor network environment many locations technique created for stable network quarterly to updating the localization output, as will energetically enhanced the transmission overhead . in addition distributing location method crested for minimum scalable UW acoustic network s[26]this improper large scale under water sensor network by cause of this maximum transmission overhead and minimum intersection hurrying . Final, large location masking plus minimum location disqualify is detected for localization scheme. Here performance analysis is specifically challenging one for UWSN technique plus rigorous resourcefulness restriction . This paper perform stable transmission method with minimum transmission overhead during improve location performance for maximum scalable under water sensor network.

III - Study of Vector Based Forwarding (VBF)

VBF protocol assumes that the nodes know their locations .this assumption can be realized by network localization or stationary node deployment . in VBF , data packets carry the positions of source node, forwarder node and sink node . besides , a virtual pipe is introduced in routing decision process . only the node in the pipe can be the candidate nodes to forward the data packets . owing to these constraints , much energy can be stored and the

network life time is enhanced figure one shows the Vector Based Forwarding technique .

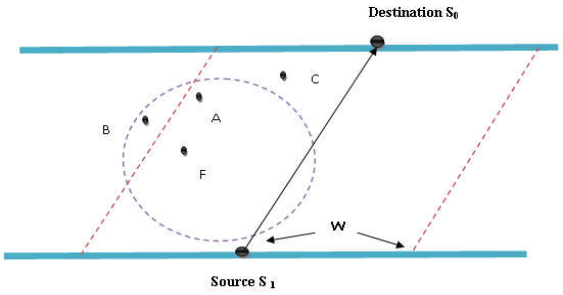

Figure 01: Vector Based Forwarding

In Figure .1 node S1 is source node and S0 is Destination node .To introduce the routing pipe vector from source node to destination node as routing vector , denoted as $\overrightarrow{s1,s0}$and define the routing radius as W and communicating range as R. In fig.1.node F is the last hop forwarded node . according to the desk model [11] . Node $\overrightarrow{A}$and node B are in the communicating range of node F , and they can receive the data packet from forwarded node $\overrightarrow{F}$. While node $\overrightarrow{B}$ is the out of the routing pipe , only node $\overrightarrow{A}$ will forward this packet .though node C is in the routing pipe , it is out of the communicating piping range of node $\overrightarrow{F}$. Next we formulates the constraints of the candidate for the warder node . let the co-ordinates of source nodeS1 , destination node S0 . Forwarding node Q and ordinary node A are (g1,g1,g1) , (j0,j0,j0), (g2,j2,t2) and (j_a, g_a, t_a) ., respectively the projection point of node A to the routing vector S1,S0 is point P , Whose co-ordinate is unknown, denoted as (g_p , j_p ,t_p) . The characteristic equation of the line S1,S2 can be written as ,

$$\frac{\mathbf{g-g0}}{\mathbf{m}} = \frac{\mathbf{j-j0}}{\mathbf{n}} = \frac{\mathbf{t-t0}}{\mathbf{k}} = \mathbf{P}. \qquad \ldots(1)$$

Where (m,n,k) is the unit vector of S1,S2 .

P is a parameter of the equation(1)

Given a certain P , the coordinate (g,j,t) of a point on the line S1,S0 can be solved by (1) . and P belongs to the interval $(-\infty, +\infty)$. as P is on the routing vector S1,S0 , its coordinate can be denoted as ,

$$\begin{cases} gv = g1 + m \times Pv \\ jv = j1 + n \times Pv \\ t\,v = t1 + k \times Pv \end{cases} \qquad \ldots (2)$$

Since WA and S1,S0 are Orthogonal . (i.e) .,

$$(\mathbf{g_a - g_w})\,\mathbf{m} + (\mathbf{j_a - j_w})\mathbf{n} + (\mathbf{t_a - t_w})\,\mathbf{k} = \mathbf{0}. \quad (3)$$

From 2 and 3 are the projection point of W can be calculate , then the constraints of the candidate forwarder node are denoted as ,

$$\begin{cases} d = \sqrt{2(\mathbf{g_a} - \mathbf{g_o}).2(\mathbf{j_a} - \mathbf{j_o}).2(\mathbf{t_a} - \mathbf{t_o})} \le R \\ d0 = \sqrt{2(\mathbf{g_a} - \mathbf{gw}).2(\mathbf{j_a} - \mathbf{jw}).2(\mathbf{t_a} - \mathbf{tw})} \le W \end{cases} \ldots (4)$$

For ordinary node A, by solving (4) , node A can decide whether it can be a candidate forever node or not .

In dense network ,desirableness factor is introduced to control the forwarding process [3]. the benefit is less energy consumption during routing process . the parameters involved in calculating of desirableness factor is illustrated in fig .2.

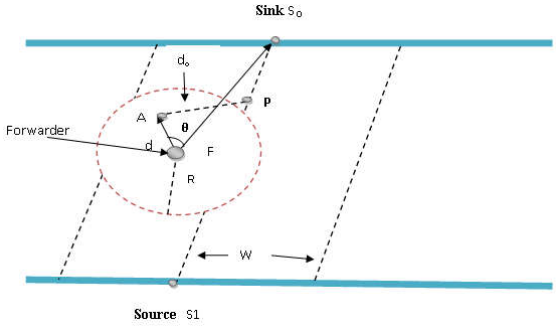

Figure 2: Characteristic involved in calculating process of desirableness process

Let α denote the desirableness factor, then **α** denote,

$$\boldsymbol{\alpha} = \frac{\mathbf{d_o}}{\mathbf{w}} + \mathbf{R} - \frac{\mathbf{d\cos\theta}}{\mathbf{R}}. \qquad \ldots (5)$$

Where d_0 is the projection destination from node $\overrightarrow{A}$ position to the routing point S1S0 vector. d denoted as the distance between forwarded junction $\overrightarrow{F}$and junction $\overrightarrow{A}$.θ is the point between angle $\overrightarrow{FA}$,$\overrightarrow{FS0}$.When a applicant node affecting a section, it will may not send on this medium immediately, instead ,based on the desirableness factor , it will hold this packet for a time interval K , which can be calculated as follows ,

$$\mathbf{K} = \sqrt{\boldsymbol{\alpha}} \times \mathbf{K_0} + \mathbf{R} - \frac{\boldsymbol{d}}{\boldsymbol{V}} \qquad \ldots(6)$$

Where d_0 is the preordained more time lag .

V is In water acoustic signal propagation speed .

the shorter the delay time K is , the node has higher priority to forward this packet.

IV- VIKOR Method:

The VIKOR method was introduced for multi-criteria analysis and multi criteria decision making scheme optimization problem.

This method concentrate on selecting and ranking from a alternative protocols , pulse calculates combining clarification for a issues with self-contradictory norm , that can advise the judgment the result target to the clarification segment . Here, the comparing result is a executable section result whatever is the folded to the a compromise and ideal mean established by same concession [22].

This provide the multi-criteria ranking index optimization on the base section of the special calculation from "ideal" to "closeness" explanation [23] . The multi criteria masseurs for compromise programming method [24] .

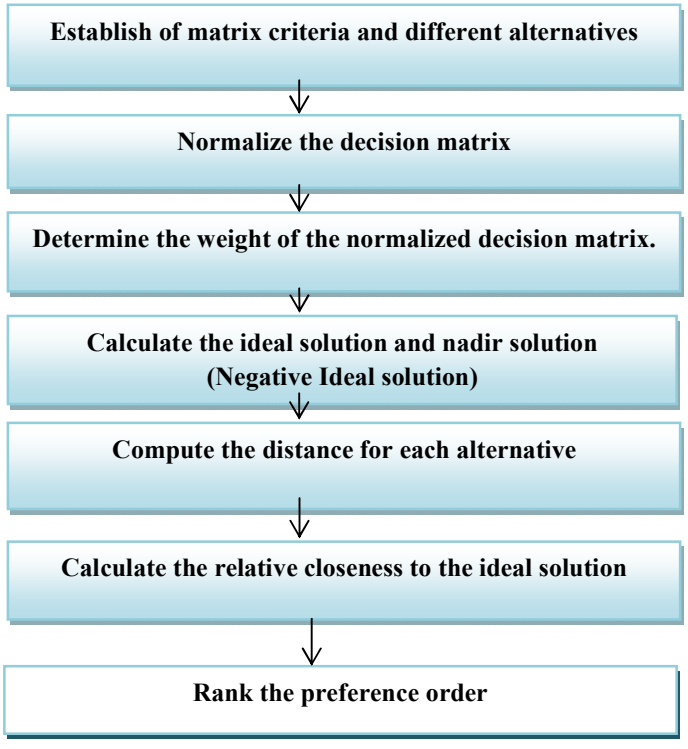

Figure 03: Block Diagram for VIKOR algorithm

Step :1 –

Calculates X_I^* and X_I

$$X_i^* = \max[(X_{ij}) \mid j=1,2,\ldots m] \quad -1$$

$$X_i = \min[(X_{ij}) \mid j= 1,2,3\ldots m] \quad -2$$

X_{ij} denote the rate of the i th standard procedure forthe substitute X ,

Step :2 –

Compute the values of S_j and R_j

$$S_j = \sum_{i=1}^{n} w_i (X_i^* - X_{ij} / X_i^* - X_i^-) \quad -3$$

$$R_J = \max [w_I (X_J^* - X_{IJ} / X_J^- - X_{IJ})] \quad -4$$

Where i= 1,2,3…n

S_J andR_J denote the utility measure and regret measure for alternative X_j in addition W_i is the weight of each criterion .

Step : 3-

Compute the values of S^* , Z^*

$$S^x = \min (S_j) , S^- = \max (S_j) , j=1,23,\ldots m \quad -5$$

$$Z^x = \min(R), Z^x = \max (Z) , j=1,2,3\ldots m \quad -6$$

Step:4-

Determine the value of Q_j for

j = 1,2…m and rank the alternatives by values of Q_j

$$Q_j = v (S_J - S^x / S^- - S^x) + (1-v)(Z_J - Z^x / Z^- - Z^x) , \quad -7$$

Where (^{x}) is indicated to the (*) value.

Where *v* the weight for the strategy of maximum group utility and 1 –*v* is the weight of the individual regret usually v = 0.5 and when *v*> 0.5, the index of Q_j will tend to majority agreement and clearly when **v** < 0.5 , the index of O_i Will indicate majority negative attitude .

this operational steps includes the use of advanced analytical technique to improve the Decision making. MCDM and MCDEA are sub discipline and well known chapters of the operation research .these objective of the study is declare the most interesting application area of VIKOR; more over the authors are concentrating to introduce the combined method in to VIKOR.

Node identification and location field occupies four bytes , localization of time stamp occupies three bytes in fourth segment is speed vector this occupies five byte and confidence value of localization message structure occupies 6 bytes based on VIKOR algorithm concept .

V- DICUSSION:

This research goal of proposed standardized procession for the (VIKOR) VlseKriberijuska Optimizacija I Komoromisno Resenje technique in few operation segments like that renewable energy and unceasing.This paper inspection for totally huge number of papers. Promulgated in 1998 to 2014, various superior journals. Many section of the research processing decision making ,renewable energy , administration science. Plus this extracting from the "Web of science and scope" information se base. Presented VIKOR algorithm provided application sides are based we are research the function , date of publication method , papers are categorization depend on the citizenship of authors, classification of the research , study purpose and name of the journals. this based on a result based study is denotes more research on VlseKriberijuska Optimizacija I Komoromisno Resenje technique this transmitted data based on one initiating information from the author . N data from N mainstay nodes, plus one conclusion information from a initiating section . In this scheme, we are discussed different experimental problems. Using few classification numbers corresponded to the MCDM modems used in range testing. in a Fuzzy environment the fuzzy VIKOR technique has been analyzed by detect issue in fuzzy environmental.

a) Preference of Ranking Order:

Ranking Order is a changing the rank order of the choosing ability of potential determination at the same time for eg., group of other alternative are varied or the scheme of alternatives are changes . The problem of ranking section offering consist at the main argument in ranking based multi criteria decision maker and decision maker . in appropriate mismatched may section of systematic concepts .

b) Offering Types in Ranking section:

Variously classified ranking reversal order in terms of VIKOR algorithm ,depends on the matrix criteria and different alternatives this based occurring issues are denominate and established , this types are denoted as stage 1 , stage 2, stage 3,stage 4,stage5.

c) Offering Types in Ranking section:

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Stage 1 is initiator are best alternative varying or non varying statement

Stage 2 is constantly staying node is changed with a worst node determining it alternatives are varied or not .

Stage 3 issues are notices plus every alternative provide a ranking .

Then decay the primary issues into a group of minimum issues outlined on dual alternative at a span and like that their weight as before . bring for the raking minimum issues and confirmation to visual conflict plus ranking of the alternative for the (maximum) primary issues.

Stage 4 is matching stage 3 , but this declined the (maximum) primary issues simultaneously . Analysis the ranking order (minimum) issues are struggle plus every representation . In case the follow alternative of three section are illustrate X,Y and Z.

Then if alternative of two issues are eliminated if raking range $X > Y$, $Y > Z$ and $Z > X$. is calculated from this alternative of two section issues . apparently , the overall environment denotes scheme of un-transceiver as we are access $X > Y > Z > X$.

Stage five is AHP and adding variant, AHP denotes Analytic Hierarchy Process this illustrate below figure.

AHP block diagram established to 6 processes in few operating environment. Exploitation of criteria's, alternatives and sub alternatives to accomplish the destination, this referred to the possibility of improved alternatives.

d) Transmission Detection:

There energy admission reduced at the keystone node. The entire node and the static node , created the location process systematic to profitable obtain issues of the localization span

determinations.Every individual node associated a node identification to each calculation , for example numerical values generating in section to distributed span estimation.In primary node get noticed and in each communication scheme so instant transmitter of a accurate information , whether if the information came from, plus like a anticipation . The primary node and destination node at every calculation . Instantly proposed of calculation reduction at any node , and can maintained the as usual calculation while forming the location section .The lower numerical acknowledgement from base station node depend the unknown numerical value .

VII -CONCLUSION:

The localization and routing issues are two major challenges for UWSNs. In this paper we investigated the localization based routing protocol for dynamic .UWSNs. Considering the three dimensional dynamic UWSNs, this both method together to design routing protocols. During the localization process, the hierarchical spreading localization can effectively locate the node in UWSNs . During the routing process here proposed VIKOR algorithm. Compared to a baseline which has the ability to move all the camera in the UWSNs. Our approach can provide a very high energy consumption is the drawback of this algorithm . Thus, a tradeoff of these routing metrics is desirable.

REFERENCES:

[1] A.Gkikopouli , G.Nikolakopoulos , and S.Manesis,"A survey on under water wireless sensor networks and applications," control &Automation (MED),2012 20th Mediterranean conference on IEEE ,Barcelona,ES ,pp,1147-1154 july ,2012 .

[2] H.H.Cho . C.Y.Chen ,T.K.shih,& H.C.Chao,"Survey on underwater delay/disruption tolerant wireless sensor network routing," IET wireless sensor system ,vol,4,no.3 .pp.112-121,2014.

[3] P.Xie , J.H.Cui,L.Lao,"VBF: Vector Based Forwarding Protocol For under water sensor networks," Networking 2006 .Networking technology , services , and protocols : performance computer and communication networks. Mobile and wireless communication system . springer Berlin Heidelberg , vol ,3976 ,pp .1216-1221 . 2006 .

[4] H. Yan, Z. J. Shi, & J. H. Cui, "DBR: depth-based routing for underwater sensor networks," NETWORKING 2008 Ad Hoc and SensorNetworks, Wireless Networks, Next Generati Internet, Springer Berlin Heidelberg, vol. 4982, pp. 72-86, 2008.

[5] Z. Guo, G. Colombi, B. Wang, J. H. Cui, D. Maggiorini, & G. P. Rossi, "Adaptive routing in underwater delay/disruption tolerant sensor networks," Wireless on Demand Network Systems and Services, 2008.WONS 2008. Fifth Annual Conference on, IEEE, Garmisch-Partenkirchen, GER, pp. 31-39, Jan, 2008.

[6] M. Erol-Kantarci, H. T. Mouftah, and S. Oktug, "A Survey of Architecturesand Localization Techniques for Underwater Acoustic Sensor Networks," IEEE Communications Surveys & Tutorials, IEEE, vol. 13, no. 3, pp. 487-502, Mar, 2011.

[7] Z. Zhou, J. H. Cui, and S. Zhou, "Efficient localization for large-scaleunderwater sensor networks," Ad Hoc Networks, vol. 8, no. 3, pp. 267-279, May, 2010.

[8] A. Y. Teymorian, W. Cheng, L. Ma, X. Cheng, X. Lu, and Z. Lu, "3D Underwater Sensor Network Localization," IEEE Transactions on MobileComputing, vol. 8, no. 12, pp. 1610-1621, Dec, 2009.

[9] J. Callmer, M. Skoglund, and F. Gustafsson, "Silent localization of underwater sensors is using magnetometers," EURASIP journal on advances in signal processing, pp. 1-8, 2010.

[10] X. Cheng, H. Shu, Q. Liang, D. H. C. Du, "Silent positioning in underwater acoustic sensor networks," IEEE Transactions on VehicularTechnology, vol. 57, no. 3, pp. 1756-1766, May, 2008.

[11] M. Erol-Kantarci, H. T. Mouftah, and S. Oktug, "A Survey of Architectures and Localization Techniques for Underwater Acoustic Sensor Networks," IEEE Communications Surveys & Tutorials, IEEE, vol. 13, no. 3, pp. 487-502, Mar, 2011.

[12] J. Callmer, M. Skoglund, and F. Gustafsson, "Silent localization of underwater sensors using magnetometers," EURASIP journal on advancesin signal processing, pp. 1-8, 2010.

[13] T. Eren, D. K. Goldenberg, W. Whiteley, Y. R. Yang, A. S. Morse, B. D. Anderson, and P. N. Bellhumenur. Rigidity, computation and randomization in network localization. In

Proceedings of Infocom, pages 2673–2684, April 2004.

[14] H. Zhu and J. Wang, "Chunk-based resource allocation in OFDMA systems - Part II: joint chunk, power and bit allocation," IEEE Transactionson Communications, vol. 60, no. 2, pp. 499-509, Feb, 2012.

[15] H. Zhu, "Performance comparison between distributed antenna and microcellular systems," IEEE Journal on Selected Areas in Communications, vol. 29, pp. 1151-1163, no. 6, 2011.

[16] X. Ji and H. Zha. Sensor positioning in wireless ad-hoc sensor networks using multidimensional scaling. In Proceedings of Infocom, pages 2652–2661, March 2004.

[17] H. Lim and J. C. Hou. Localization for anisotropic sensor networks. In Proceedings of Infocom, pages 138–149, March 2005.

[18] D. Niculescu and B. Nath. Ad hoc positioning system (APS) using AOA. In Proceedings of Infocom, pages 1734–1743, March 2003.

[19] Y. Shang and W. Ruml. Improved MDS-Based Localization. In Proceedings of Infocom, pages 2640–2651, March 2004.

[20] C. Wang and L. Xiao. Locating sensors in Concave environments. In Proceedings of Infocom, March 2006.

[21] H. Wu, C. Wang, and N.-F. Tzeng. Novel self-configurable positioning technique for multihop wireless networks. IEEE/ACM Transaction on Networking, pages 609–621, 2005.

[22] Opricovic , S., & Tzeng ,G.H (2007) . Extended VIKOR method in compariton with outranking methods. European Journal of operational Research ,178(2) , 514-529.

[23]Opricovic,S.(1998).Multi-Criteria optimization of civil engineering system.Belgrade :faculty of civil engineering .

[24]Opricovic,S.,&Tzeng,G.H(2004) compromise solution by MCDM methods:A comparative analysis of VIKOR and TOPSIS.European Journal of operatinal

[25] Y. Zhang and L. Cheng. A distributed protocol for multi-hop underwater robot positioning. In IEEE Proceedings of InternationalConference on Robotics and Biomimetics, 2004.