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WSN Mechanism using AOL by setting RWPB Handover Mechanism

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Abstract
Sensor nodes are dynamic in nature and the nodes tend to move dynamically during the course of time. The movement is done beyond boundary limitation using its random approach and the data transmission is done accordingly depends on the way it moves. Such approach is termed RWP and its works based on the node movement velocity within the boundary addressed using RWPB. The sensor node velocity distribution is uniformly distributed and the velocity is affected when the nodes are restricted within boundary. In this work, the concept is addressed with the node movement using sensor node handover mechanism. The work further addresses the delay distribution by minimizing the risk of active sensor node and its velocity distribution. The delay distribution is addressed with the latency avoidance inorder to avoid packet loss and its delay. Overall the work uses the concepts of RWPB along with efficient handover mechanism avoids sensor node delay when there is change in velocity and thus provide efficient hand over mechanism.
Keywords: Delay distortion, RWPB, Packet loss, RWP

1. Introduction

The movement of sensor node is traced with the assistance of RWP. The movement of sensor node is accessed using the concepts of legs for efficient data transmission among nodes. Generally, the leg connects one or more nodes and it varies when the nodes moves in and out of its boundary. The distance between nodes is accessed with leg and the number of legs between nodes declares its velocity and its count within the mobile node boundary. The leg and the RWP is linked between sensor nodes is depicted in the Fig 1. Delay node movement leads to attacks[1] due to the lag shown by the node while moving from one boundary to another. Node congestion [3] is the primary source of delay that leads to attack.

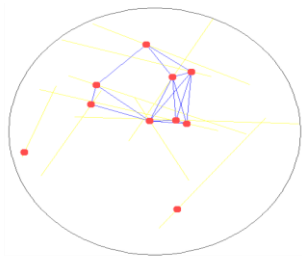

Fig 1: Sensor node Connection

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The dynamic position of every node[2] is evaluated using RWP and the boundaries along with the node distance are traced. The overall count of nodes within the boundaries is evaluated based on the legs and its connection. The numbers of cross section between nodes are received by counting the overall legs and its count. The concept of Mobile Assisted location (MAL)[3] evaluated the node distance [4]and in this case mobile nodes are replaced with the sensor nodes to track its exact location timely. The node performance is truly depends on its distance and the node velocity. The above figure depicts node position within the boundary and the legs represent its connection. Legs are two way connections as it connects node on both of its ends.

The overall node position and its movement is organized automatically that depends on node configuration and its connection among nodes [legs].

When a node 'A' linked with the node 'B', then when there is new node 'C'enters the boundary, then all the nodes are connected in parallel with other nodes in the boundary. The legs get disconnected when the node moves out of the boundary or moves a long distance.

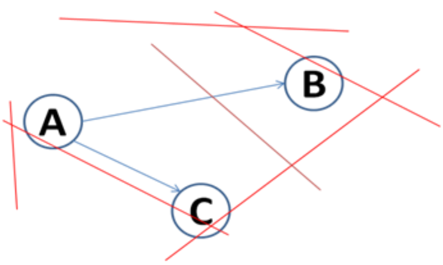

Figure 2: Connection among nodes

The legs are represented as legs. The legs give many data paths and its possibilities evaluated with the connection among all other nodes. The possibility of node movement is evaluated with the overall count of nodes and its connection. These concepts addressed when the nodes are static. When the nodes moves dynamic,the leg cross configuration among legs that assists node to change its position.

For every transaction among nodes its positions are fixed and its velocity is evaluated. The next possibility of node movement is tracked based on the node position and its transaction.

When a node moves from one position to another in terms of its boundary, the concept of node handover mechanism is implemented in order to provide node control. The handover mechanism and its principle for shifting node position give overall node control within the node boundary. The cross boundary along the handover mechanism is dealt with the sensor node and its range. The energy level of node[4]is affected when the nodes moves frequently as its energy efficiency is very feeble.

The energy level of node is based on its efficiency bandwidth [6] i.e the transaction time period between nodes to exchange its information.

The connection between legs is evaluated using RWP to eradicate node connection problem and the node behaviour is tracked using its ZigZag trajectories. Its applicable to proactive sensor nodes [8] to measureits complex problem and also focus on un-uniform behaviour of nodes within its vast boundary. The boundary differs based on node count and makes new nodes static and absorbs the change happened within the range.

The trajectory faces various problem based on the following measures when there is a change in velocity that deals with

i. Node state

ii. Node range

iii. Node behaviour

These entire factors will assist sensor nodes to organize [5] itself and paves way for self organizing node structure [7].

2. Related Work

The context aware routing mechanism[9] uses RWP that has numerous issues while tracking node dynamic position. The primary issues are with node velocity that evaluates the node position based on its static or dynamic movement. Secondary, the node range varies depends on the overall node count that focus on node behaviour and its data transmission. Thirdly, the performance of node decreases when there is change in its velocity. The latency is primary deals with the node position that moves in and out of the boundary. The neighbouring node is also accessed during the node movement within the boundary. The lag is measured based on node movement and only few nodes makes successful attempts in data transmission within the boundary. The node velocity stops few nodes due to the lag caused during node movement. The work of Y. Shang et.al addresses this concepts focusing on node movement and its overall connection and its location that addresses the concept of selfish nodes[10].

The node behaviour and its characteristic are evaluated using

i. Node efficiency

ii. Its velocity distribution

iii. Handover mechanism

The work of Nissanka et al [12] address the concepts of sensor nodes and its boundary.

The MAL configuration for tracking node line of sight along with the overall obstruction caused is also addressed by the above work. The parallel issues arose with the existing issues are spare nodes and GDOP concepts. All these issues focused on node positioning and its behaviour.

The work of [10][11][14]highlights the spatial arrangement of sensor nodes and also figure out the metrics to restrict the vast use of sensor nodes. It also introduces the concept of watch dog to monitor sensor node movements and its efficiency metrics. The work of Nissaka et.al [12] compares RWP with Sensor Assisted location to track nodes movement within its boundary.

While addressing RWP the sensor node path should also be tracked and it’s been done with global coordinate system location. It’s addressed in the work of R. Nagpal et.al[13]. When the node moves from one location to other its initial and final postion is set by Ancher free model and its addressed by N. Priyantha et.al [15].

The dynamic node movement is tracked by robust node positioning method and its addressed by C. Savarese et.al [16]. Hence the overall node adhoc position is maintained, tracked and stored its position are addressed by D. Niculescu et.al [17] and C. Savarese et.al [18].

3. Proposed Work

The proposed work addresses the overall issues highlighted in the existing work and tries to provide versatile solution using RWPB and MAL addressing the node velocity distribution with node handover mechanism.

MAL sensor nodes addresses sensor node to evaluate its distance and the neighbour node conflicts with AFL. Anchor Free Location (AFL) algorithm tracks node position and its location. AFL is compared with AODV for tracking node position along with its distance. AFL [6] implements anchor nodes that provide guidelines for setting WSN boundary.

The observation is when the Anchor node moves within the WSN boundary it address handover mechanism as there is a shift in anchor node as the earlier node moves out the boundary and new anchor node is depicted. Figure 3 shows the position of anchor node 'A' that resides within the boundary. The anchor node 'A' controls overall WSN and every node is monitored to track its behaviour. The responsibility of the anchor node is shifted when the present anchor node moves between boundaries and handover mechanism is implement between anchor node shift.

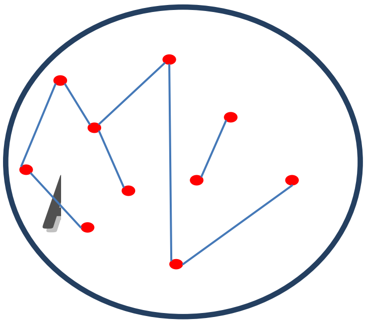

Figure 3: Anchor node in WSN

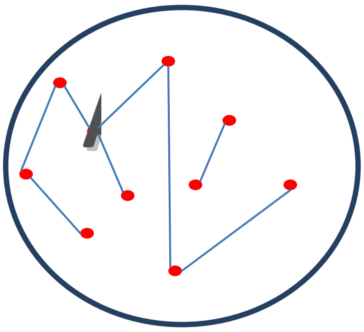

Figure 4: Handover Possibility one

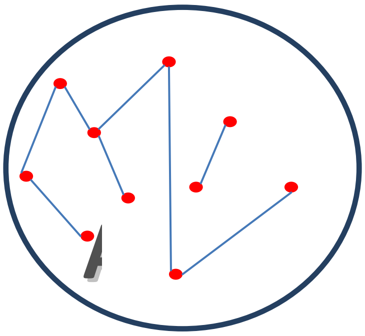

Figure 5: HandoverPossibility twoAFL nodes

The node distance is evaluated based on

$$ci = \frac{\sum \sqrt{(Xi - Xj)^2 + (Yi - Yj)^2}}{\sum_h i} \qquad i \neq j, alllandmarksj. \qquad (1)$$

AFL makes the initial relation between nodes that ensure overall node position and its relation. The AFL conjunction between nodes makes anchor node shift when there is change over between nodes.

$$x(i) = Rho, i \frac{h3,i - h4i}{\sqrt{(h3,i - h4i)2 + (h1,i - h2i)2}} \qquad (2)$$

$$y(i) = Rho, i \frac{h1,i - h2,i}{\sqrt{(h3,i - h4i)2 + (h1,i - h2i)2}}$$

The eqn [3] and [4] ensures secure data connection and thus ensure node optimization with AFL with summation count of overall nodes within the boundary.

$$E = \sum_{i=j}^{n} ||dm(i,j) - ds(i,j)||\,2 \qquad (4)$$

4. Findings and Simulation result

The work addresses the node position movement while shifting from one boundary to other with the overall measures to evaluate node consistency while it moves from one boundary to another.

The node ranges evaluated with RWPB ensure valid handover mechanism and finally address RWM replaced with RWPB to balance the node velocity with equal distance distribution.

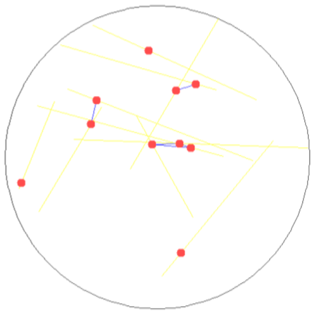

Figure 6: Sensor connection range of .3

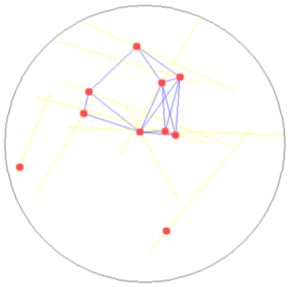

Figure 7: Sensor Connection of range .5

Above figure 6 and 7 addresses RWPB over RWM showing the node boundary to track the node position using the variable red colored dots depicts as nodes and its position in the boundary and its legs.

The range and its behaviour is executed with the overall leg count. The range is set with the overall leg count that sets the node count within the boundary.

The internal shift among nodes is replaced with the node position using the leg position with the support of anchor node and its keeps the track of overall node transaction within the boundary.

5. Future work and conclusion

The work addresses the node count and its position using handover mechanism to track the next anchor node. The work also address the node range and behaviour setting its behaviour for anchor node shift that extends the work of present anchor node when its moved up from one location to another. Thus the consistency is maintained within the node boundary for setting up new anchor node using RWPB concepts.

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