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ERRATUM

Erratum to: Rendezvous based routing protocol for wireless sensor networks with mobile sink

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The authors very much regret that errors have slipped into their contribution. The corrections are listed below.

2 Related works

The last two paragraphs should read:

An energy-efficient routing protocol called ring routing has been proposed by Tunca et al. [10]. It establishes a ring structure that aims to combine the easy accessibility of the grid structures and the easy changeability of the backbone structure. Since it incorporates a minimal number of nodes in the ring structure, the redundancy of data packets is significantly reduced for sharing sink position advertisement packets among the ring nodes. It devises a straightforward and efficient mechanism. The ring

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can be constructed with low overhead unlike the structures utilized in the area-based approaches as in LBDD and Railroad. On the other hand, ring routing relies on the minimum amount of inefficient broadcasts which are extensively used in area-based protocols. The drawback of the above protocols is the mobility management cost and the end-to-end delay.

A vertical and horizontal segregation-based data dissemination protocol for WSNs with mobile sink is proposed by Jain et al. [33]. The proposed method mainly focuses on message broadcasting and is not always efficient for all the applications of sensor networks. As there is no empirical validation provided for the proposed method, its applicability in real-world setting is debatable. In contrast, the focus of our work in this paper is to propose new methods for implementing mobile sink management and efficient data transmissions considering different level of heterogeneities and complexities. To this end, we develop two concrete methods. In the first method, the source node transmits the data to the closest backbone-tree node and backbone-tree node relays the data to the sink. While in the second method, the source node retrieves the sink location from the nearest backbone-tree node and transmits the data directly to the sink using the sink location. Unlike [33], which only considers theoretical analysis of the proposed method, we have to validate the proposed methods by conducting extensive simulation using the Castalia (v3.2) simulator.

4.3 Tree construction

The correct version of Algorithm 2 is given below.

Algorithm 2 Sensor Location Area Discovery

variables : $\theta = 0$; $\alpha = 0$;
(u, v): center location of the network.
(x, y): any sensor node location in the network.

Let $\pi = 180^0$;
  $C \leftarrow (u, v)$; ◁ C is the center of the network.
  for any node z in the network with location(a, b)
  Let new coordinates $(X, Y) \leftarrow (a - u, b - v)$; ◁ evaluate (X, Y) corresponding to the center C.
  Calculate $\theta = tan^{-1}$ |Y/X|
  if (X>0 AND Y<0) **then**
    $\alpha \leftarrow 2\pi - \theta$ ◁ node with location (a, b) is in 4^{th} quadrant.
    if (α lies between $3\pi/2$ *to* $7\pi/4$) **then**
      Node with location(a, b) belongs to 7^{th} octant and node can communicate from v_b with destination location (u, b).
    else if (α lies between $7\pi/4$ *to* 2π) **then**
      Node with location (a, b) belongs to 8^{th} octant and node can communicate from h_r with destination location (a, v).
    end if
  end if
  if (X<0 AND Y<0) **then**
    $\alpha \leftarrow \pi + \theta$ ◁ node with location (a, b) is in 3^{rd} quadrant.
    if (α lies between π *to* $5\pi/4$) **then**
      Node with location(a, b) belongs to 5^{th} octant and node can communicate from h_l with destination location (a, v).
    else if (α lies between $5\pi/4$ *to* $3\pi/2$) **then**
      Node with location (a, b) belongs to 6^{th} octant and node can communicate from v_b with destination location (u, b).
    end if
  end if
  if (X<0 AND Y>0) **then**
    $\alpha \leftarrow \pi - \theta$ ◁ node with location (a, b) is in 2^{nd} quadrant.
    if (α lies between $\pi/2$ *to* $3\pi/4$) **then**
      Node with location (a, b) belongs to 3^{rd} octant and node can communicate from v_u with destination location (u, b).
    else if (α lies between $3\pi/4$ *to* π) **then**
      Node with location (a, b) belongs to 4^{th} octant and node can communicate from h_l with destination location (a, v).
    end if
  end if
  if (X>0 AND Y>0) **then**
    $\alpha \leftarrow \theta$ ◁ node with location (a, b) is in 1^{st} quadrant.
    if (α lies between 0 *to* $\pi/4$) **then**
      Node with location (a, b) belongs to 1^{st} octant and node can communicate from h_r with estimation location (a, v).
    else if (α lies between $\pi/4$ *to* $\pi/2$) **then**
      Node with location (a, b) belongs to 2^{nd} octant and node can communicate from v_u with destination location (u, b).
    end if
  end if

References

The citation Jain et al. [33] mentioned in the last paragraph of Sect. 2 (Related works) is as follows:

33. Jain S, Sharma S, Bagga N (2016) A vertical and horizontal segregation based data dissemination protocol. Emerging research in computing, information, communication and applications. Springer, India, pp 401–412