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An ACO and Mobile Sink based Algorithm for Improvement of Ml-Mac for Wsns using Compressive Sensing

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Received: 12 December 2017 Accepted: 4 January 2018 Published: 15 January 2018

Abstract

WSN is becoming key subject of research in computational basic principle because of its great deal of applications. ACO(Ant Colony Optimization) constructs the redirecting or routing tree via a method by which, for every single circular or round, Base Station (BS) chooses the root node in addition to shows the following substitute for every node. In order to prevail over the actual constraints with the sooner work a new increased method proposed in this research work. The proposed method has the capacity to prevail over the constraints of ACO routing protocol using the principle with reactivity, mobile sink and also the compressive sensing technique. In this paper we measure the main parameters that affect the wsn that are network lifetime, packets dropped, throughput, end to end delay and remaining energy for proposed algorithm and simulation results have shown that the proposed algorithm is highly effective.

Index terms— mobile sink; ACO; compressive sensing; MLMAC.

1 Introduction

Wireless Sensor Networks (WSN) is an arrangement of hundreds or many small scale sensor hubs that have capacities of detecting, building up remote correspondence between each other and doing computational and preparing operations. Wireless sensor networks are used in many applications.Multi-layer Mac Protocol is an effective technique used in WSNs. It is designed with two main features: less active time and lesser collisions. Sensor hubs in ML-MAC have a very short active time which would lessen the vitality required to communicate with other nodes. Eventually, the number of collisions in cases where two or more nodes try to send at the same time is minimized in ML-MAC. This spares the vitality required to re-send the corrupted packets along these lines expanding system lifetime.ML-MAC demonstrate much better execution of the vitality utilization contrasted and the current MAC conventions. In this paper we further try to optimize the ML-MAC protocol by applying the techniques of Compressive sensing and ACO(Ant Colony Optimization). ACO: ACO calculation depends on the conduct of genuine ants. While moving a few ants discover food store pheromones while in transit to their homes, and alternate ants take after pheromones saved before by different ants. Over the long haul, pheromones dissipate, opening up new conceivable outcomes, and ants coordinate to pick a way with vigorously laid pheromones. Along these lines, ants meet to most optimum path from their home to a food deposits with just pheromone data [1]. ACO depends on swarm intelligence. In swarm knowledge complex aggregate conduct rises up out of the conduct of numerous basic specialists. ACO has taking after qualities. The correspondences in the WSN have the many to-one property in that information from an extensive number of sensor hubs have a tendency to be amassed into a few sinks. Since multi-hop routing is by and large required for far off sensor hubs from the sinks to save energy, the hubs close to a sink can be loaded with transferring a lot of activity from other hubs. This problem is called the "crowded centre effect" [8] or the "energy hole problem" .It results in vitality consumption at the hubs close to the sink too early, prompting the partition of the sink from whatever is left of hubs that even now have a lot of vitality. In any case, by moving the sink in the sensor field, one can maintain a strategic distance from or moderate the energy hole problem and expect an expanded system lifetime. Comptressive sensing: Compressive sensing (CS) is recent technique of simultaneously sensing and compressing that is highly appealing for fully distributed compression in wireless sensor networks (WSNs). WSNs observing ecological marvels over expansive geographic territories gather estimations from an extensive number of circulated sensors. Compressive Sensing gives a viable method for revelation and remaking of capacities with just a subset of tests. The issue of information examining and accumulation in remote sensor systems (WSNs) is getting to be basic as bigger systems are being sent. Expanding system size stances noteworthy information gathering challenges, for what concerns examining and transmission coordination and system lifetime. To handle these issues, in-system in-network compression techniques are getting to be vital answers for develop network lifetime.

II.

2 Related Work

Z. Li and Q. Shi [3] proposed another vitality successful QoS routing convention. The calculation is to speeds up the joining of ant colony algorithm by using SNGF to optimize routing candidate nodes; the pheromone is characterized as a blend of connection burden and transmission capacity delay.

S. Okdem and D. Karaboga [4] acquaints another methodology with routing operations in remote sensor systems (WSNs).

Compressive Sensing gives a powerful method for revelation and remaking of capacities with only a subset of samples.

Customary CS depends on consistently circulated tests which limits reasonableness of CS based recuperation. To improve the adaptability of sampling and implementation, D. C. Dhanapala et.al [5] proposed approach utilizes irregular walk based examples.

3 III.

4 Proposed Alogithm

The proposed algorithm follows following steps:

i. Initialize ML-MAC based remote sensor system.

ii.

Check if "a" every single current nodes '1/b' ideal percentages end up being dead if yes then exhibit no. of utilized bees speaking to any arrangement of hub equal to zero else proceed next stride.In the event that a % 1/b== 0 ??. (1)

iii. "X" is no. of appointed bees "j" is any hub that needs to end up the CH in that round "Y" is the set of hubs that previously chosen as CHs Cluster head in past '1/p' round. An ACO and Mobile Sink based Algorithm for Improvement of Ml-Mac for Wsns using Compressive Sensing W. Yan et.al [6] introduced a very simple deterministic measurement matrix design algorithm (SDMMDA), based on which the data gathering and reconstruction in wireless sensor networks (WSNs) are greatly enhanced. C.Caione et.al [7] compared Distributed compressed sensing (DCS) and Kronecker compressive sensing (KCS) two structures against a typical arrangement of artificial signals legitimately worked to typify the primary attributes of characteristic signs. J.Wang et.al [9] separates the system into a few groups and cluster heads are chosen inside every group. At that point, a mobile sink speaks with every cluster head to gather information specifically through short range correspondences. The ACO calculation has been used in this work keeping in mind the end goal to locate the ideal mobility direction for the mobile sink.B.Nazir and H.Hasbullah provide a mobile sink based routing protocol for prolonging network lifetime [10]. N.Vlajic and D.Stenvanoic performed analysis of zigbee-based wireless sensor networks with path constrained mobile sink [11]. Y.Nizhamudong et.al [12] evaluated the cost of route wireless sensor network with a mobile sink. Manish Kumar Jha et al. [13] gives an enhanced time synchronized relay node based ML-MAC convention for WSNs. Manish Kumar Jha et al. **??** S. Singh et al. [2] proposed a ACO method and discovered the sink area for which the quantity of sensors is least among every accessible area in the matrix. In their calculation, they process aggregate of separations of the objectives from that sensor, which are in its reach. At that point they include these totals for all sensors in the network. This separation compares to the given sink area. Then rehash same procedure for registering the separation by changing the sink area in the lattice. That sink area for which the separation is least is picked and this sink area requires least number of sensors to cover all objectives. Check whether "rnd" is less than threshold value if yes than set as cluster head (CH) and report all hubs else wait and join with mean set cluster head.

5 X (j)

.

6 IF rnd ? TH(n)

vi.

Find relay hub from Cluster Head. vii.

Apply Ant Colony Optimization (ACO) on CHs to discover short routes way amongst CHs and sink. viii.

Apply compressive sensing and Communicate information and update vitality dissemination. ix.

Check whether dead is equivalent to no. of hubs "n" if yes then Join with mean set (CH)cluster head else go to step 2. Is dead == n IV.

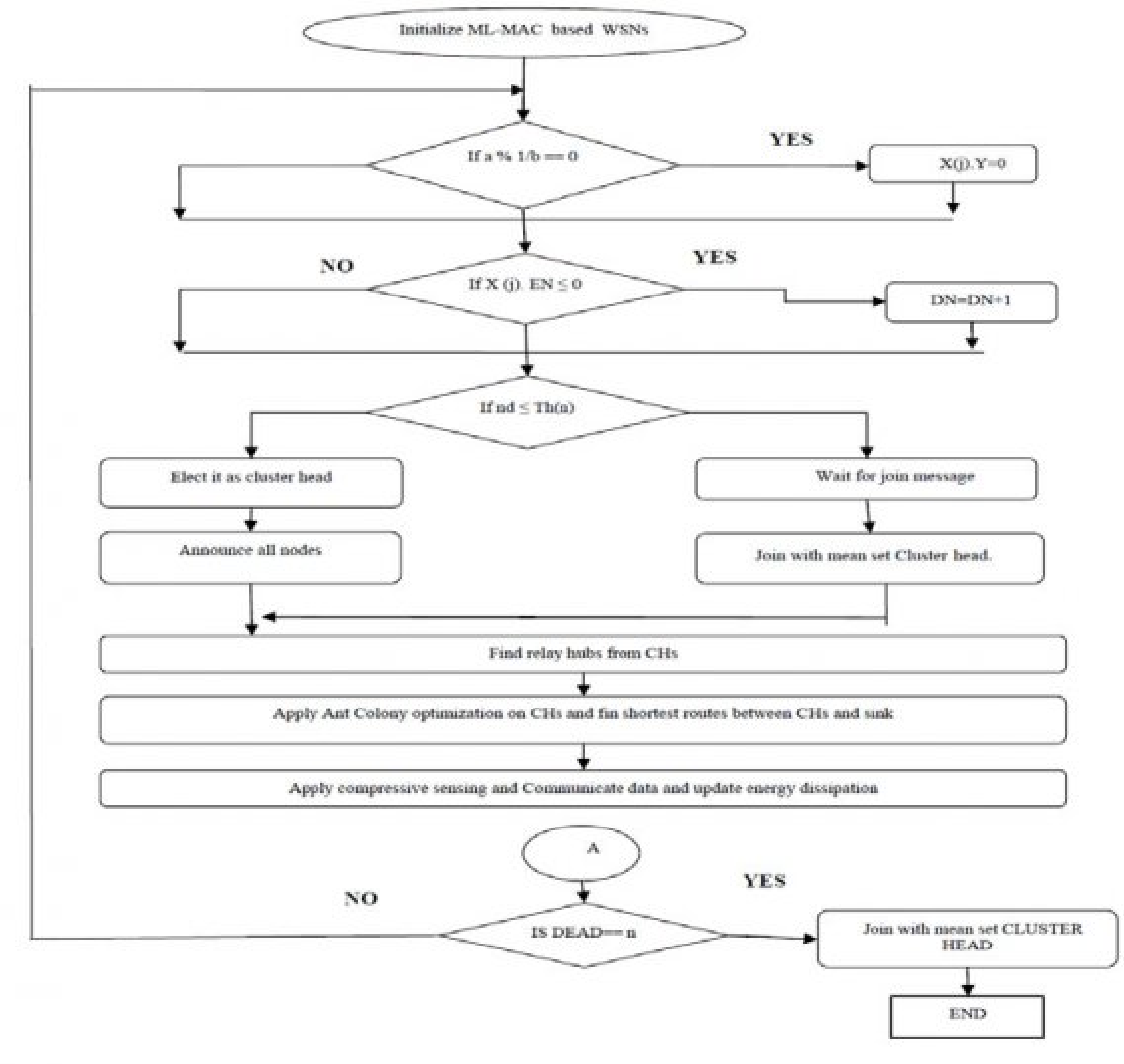
7 Experimental Setup

For performing the simulation we are using MATLAB 2010a version 7.10.0.499 32-bit.We are using windows 7 core i5 processor with 64 bit operating system and 4GB RAM.

V.

8 Experimental Results

The main objective of simulation is to evaluate the performance of proposed algorithm .In the simulations we refer to network with nodes varying from 100 to 600.we get the following results which the effectiveness of algorithm.



FLOWCHART OF PROPOSED ALGORITHM

Figure 1:

2

	Exiting	ACO based ml-mac	Mobile sink and aco baesd ML-mac
100	19.4779	24.4513	24.4516
150	29.9045	37.7087	37.9928
200	40.6416	51.7361	51.9828
250	51.0113	65.2385	65.5300
300	62.0976	79.0836	79.2515
350	71.2310	92.5709	92.8383
400	83.0392	105.8739	106.5069
450	92.3126	120.0419	120.3627
500	103.9739	133.6166	133.9290
600	124.2635	160.6876	161.1973

Figure 2: Table 2 :

3

	Exiting	ACO based ml -mac	Mobile sink and aco baesd ML-mac
100	3620	4980	4964
150	5565	7682	7790
200	7570	10586	10652
250	9509	13367	13419
300	11572	16803	16238
350	13226	19032	19028
400	15459	21801	21880
450	17206	24655	24733
500	19325	27435	27537
600	23144	32994	33127

Figure 3: Table 3 :

4

	No. of nodes		ACO based ml-	
Year 2018 32 Volume XVIII Issue II Version I ( ) E	No. of nodes			
Global Journal of Computer Science and Technology	100 No. of nodes No. of nodes	Exiting 0.6436	ACO based ml-mac 0.1084	Mobile sink and aco baesd ML-mac 0.1201
	150	0.9438	0.1041	0.0984
	200	1.2171	0.1371	0.7141
	250	1.6492	0.1637	0.3470
	300	1.7300	0.1816	0.1746
	350	2.0176	0.1938	0.1898
	400	2.1084	0.2368	0.2278
	450	2.5062	0.2529	0.3223
	500	2.8251	0.3051	0.3415
	600	3.2361	0.4563	0.4070
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Figure 4: Table 4 :

5

	Exiting	ACO based ml-mac	Mobile sink and aco baesd ML-mac
100	128	10.2000	19.3600
150	129	2.7867	6.0667
200	121.5000	8.0700	17.7400
250	109.6400	12.2800	27.3240
300	104.2667	17.0633	16.8733
350	112.1143	18.6229	16.6343
400	103.5250	33.4975	17.3000
450	107.6444	16.2111	16.0378
500	103.5000	16.1300	15.9260
600	104.2667	28.0100	30.7883

Figure 5: Table 5 :

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