SAFE DATA DISCOVERY AND DISSEMINATION IN MOBILE WSN

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Abstract **- At this time no protocol is there for Mobile Wireless Sensor Networks (MWSN), usually protocols from Mobile Adhoc Network (MANET) are exploited for MWSN. MANET protocols are so chosen as they are able to work when the node is mobile, where WSN protocols aren't suitable. WSN routing protocols cannot handle the high mobility as well as data discovery and dissemination in mobile wireless sensor network. So WSN protocols are not effective. In MANET two classes of protocols are there position based and geographic based. If there is a need for location privacy, protocol is chosen in which location is not sent as a one of the field as the case may be in geographic base routing protocol. So position based routing protocol like AODV, DSR, AOMDV and DSDV can be used. After checking them on Network simulator NS2 for Packet Delivery Ratio, Packet drop ratio, routing overhead, network throughput, total received packet, command packet it is found that DSR protocol best suited for secure Data dissemination and discovery.**

Keywords: MWSN, MANET, AODV, DSR, AOMDV, DSDV

I. INTRODUCTION

Wireless sensor network are highly distributed network of all small and light weighted nodes, which are spread over the system in large numbers for the measurement of physical parameters such as temperature, pressure, relative humidity.

Each node of the sensor network consists of three subsystems.[1,2,3]

1. Sensor subsystem which sense the environment,
2. Processing subsystem which performs local computation on the sensed data,
3. Communication subsystem is responsible for message exchange with neighboring sensor node.

The WSN is built of "nodes" [1] – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors.

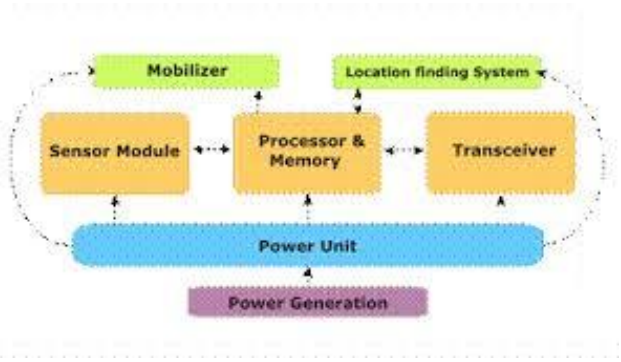


Figure 1: WSN Node

Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a processing unit usually a microcontroller, an electronic circuit for interfacing with the sensors module and a power unit, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from very small to large

A wireless sensor network (WSN) consists of spatially distributed autonomous sensors to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity. In other words, a wireless sensor and actuator network is a collection of small randomly dispersed devices that provide three essential functions: the ability to monitor physical and environmental conditions, often in real time, such as temperature, pressure, light, humidity and other daily life parameters, the ability to operate devices such as switches, motors or actuators that control those conditions and the ability to provide efficient & reliable communication. The sensor node has limited resources like energy, size, memory, computational power, communication range, bandwidth, so a large no of sensor nodes are distributed over an area of interest for collecting the information. So these nodes communicate with each other either directly or through intermediate nodes and thus form a network, so each node work as a router.

Most available wireless sensor devices are considerably constrained in terms of computational power, memory, efficiency and communication capabilities due to economic and technology reasons. WSNs nodes are battery powered which are deployed to perform a specific task for a long period of time, even years.

The main characteristics of a WSN include: [4,5]
1. Power consumption constrains for nodes using batteries or energy harvesting
2. Ability to cope with node failures
3. Mobility of nodes
4. Communication failures
5. Heterogeneity of nodes
6. Scalability to large scale of deployment
7. Ability to withstand harsh environmental conditions
8. Ease of use
9. Power consumption

Most commonly used applications of WSN in today's world are.

1. Area monitoring
2. Health related parameters monitoring
3. Air pollution monitoring
4. Forest fire detection
5. Landslide detection
6. Water quality monitoring
7. Natural disaster prevention
8. Industrial monitoring
9. Machine health monitoring
10. Data logging
11. Water/Waste water monitoring
12. Vehicular movement monitoring from fixed position

A new class of mobile wireless sensor network is introduced nowadays, as with the advancement of technology, instead of fixed WSN which may be prone to attacks or can be deceived, MWSN can be placed on mobile platform for collecting real time data, by this they cannot be attacked and deceived. The applications of MWSNs are

1. Vehicular movement monitoring by placing MWSn on vehicles
2. Water quality study throughout river
3. Water/ waste movement from source to destination
4. Wild animal movement tracking.
5. Migratory birds movement tracking.
6. Industrial product movement from source to destination.

II. REVIEW OF LITERATURE

D. He, S. Chan, Mohsen, Guizani, H. Yang [6] presents a first secure and distributed data discovery and dissemination protocol. To simultaneously and directly disseminate data items, it will allow the network owner to the authorized multiple network user with the different privileges to the sensor node and it addresses number of possible security vulnerability consists of four phases, system initialization, user joining, and packet preprocessing and packet verification. This protocol is suitable for Fixed WSN.

Niewiadomska-Szynkiewicz, Ewa, Piotr Kwaśniewski, and Izabela Windyga[7] in paper discussed about ad hoc networks which are the ultimate technology in wireless communication that allows network nodes to communicate without the need for a fixed infrastructure. This paper addresses issues associated with control of data trans- mission in wireless sensor networks (WSN) – a popular type of ad hoc networks with stationary nodes. Since the WSN nodes are typically battery equipped, the primary design goal is to optimize the amount of energy used for transmission.

A. Senthil Kumar, S.Velmurugan, Dr. E. Logashanmugam[8] Proposes a secure and distributed data discovery and dissemination protocol named (DiDrip). Data discovery and dissemination protocol for wireless sensor networks (WSNs) is liable for updating configuration parameters of the sensor nodes, also they are responsible for the distribution of management commands to all wireless sensor nodes,. As par author existing data discovery and dissemination protocols suffer from two drawbacks. First, they are based on the unified approach; only the base station can distribute data item. Such an approach is not suitable for emergent multi-owner and multi-user WSNs. Second, those protocols were not designed with security in mind and hence adversaries can easily launch attacks to harm the network. Paper has also given the evaluation results of DiDrip on NS2 SIMULATOR, which shows that DiDrip is feasible in practice

III. RESULTS

After reviewing of literature it is found that currently there is no standard for MWSNs[9], so protocols from MANETs are borrowed. MANET protocols are preferred as they are able to work in mobile environments, whereas WSN protocols aren't suitable as they are required to be energy efficient as per inherent property of WSN. WSN routing protocols provide the required functionality but cannot handle

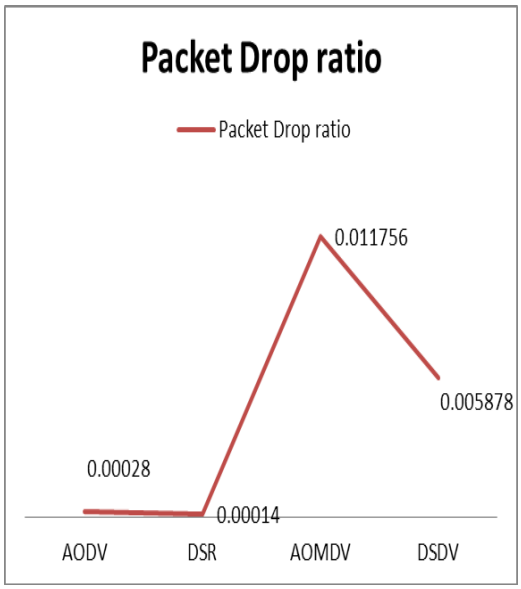
the high frequency of topology changes as well as data discovery and dissemination in mobile wireless sensor network. So WSN protocol like LEACH is not effective. Choice reduced to position based routing protocol like AODV, DSR, AOMDV and DSDV. We compare them for Packet Delivery Ratio, Packet drop ratio, routing overhead, network throughput, total received packet, command packet and get the result as shown below.

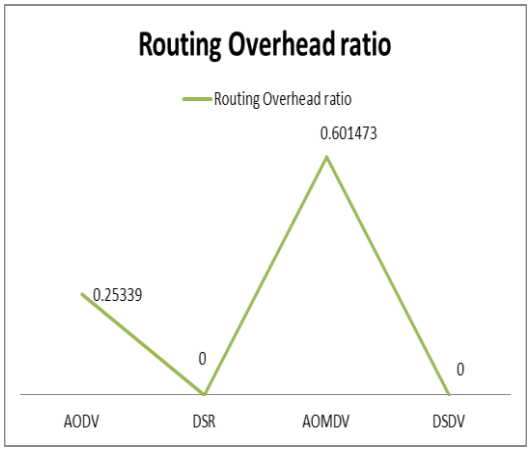
Parameter value used in the simulator

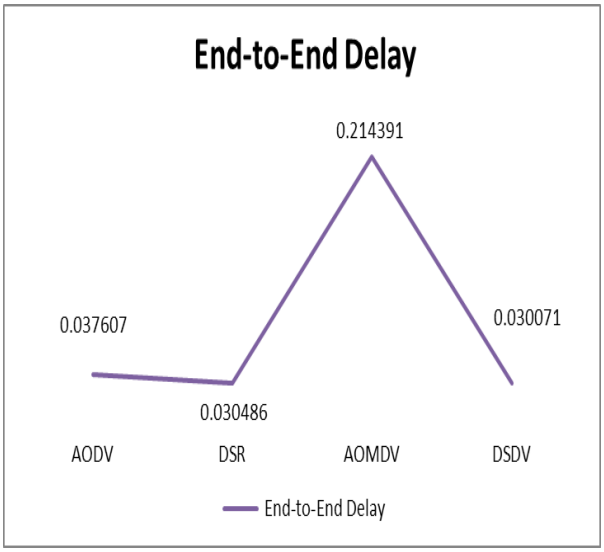
Parameter	Value
Simulator	NS2
MAC type	802_11
Propagation model	Two ray ground
Routing Protocol	AODV,AOMDV,DSR,DSDV
network interface type	WirelessPhy
interface queue type	Queue/DropTail/PriQueue
channel type	Wireless Channel
Antenna type	Omni-directional
Number of nodes	20
Time	100
Area	2000x2000

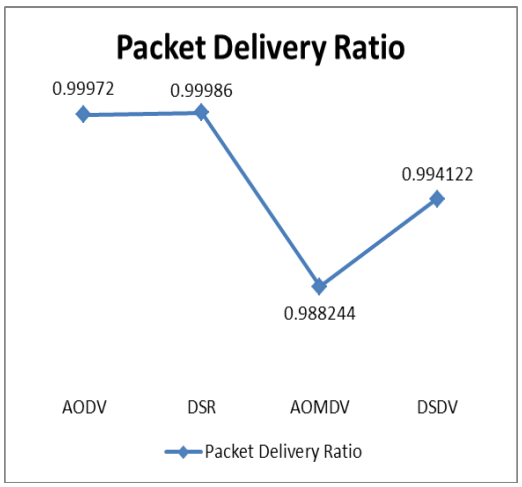
Result of AODV,DSR,AODV,DSDV protocol

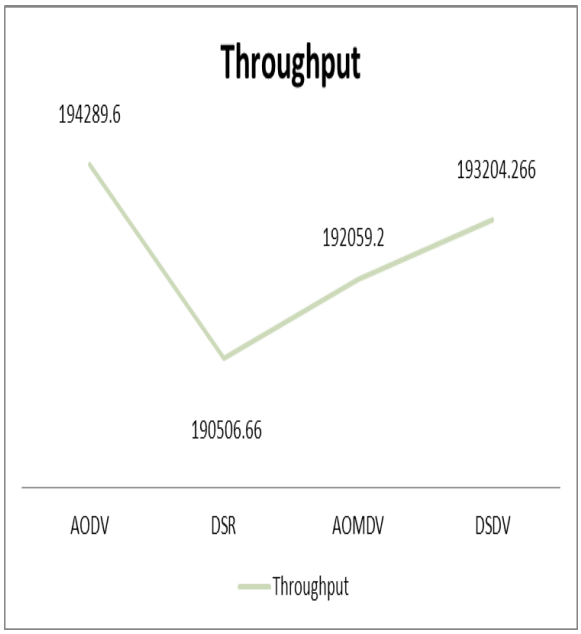
Routing Protocol	Packet Delivery Ratio	Packet Drop ratio	Routing Overhead ratio	End-to-End Delay	Through put	total recived packet	Total command packet
AODV	0.99972	0.00028	0.25339	0.037607	194289.6	7143	181
DSR	0.99986	0.00014	0	0.030486	190506.66	7144	0
AOMDV	0.988244	0.011756	0.601473	0.214391	192059.2	7061	424.7
DSDV	0.994122	0.005878	0	0.030071	193204.266	7103	0

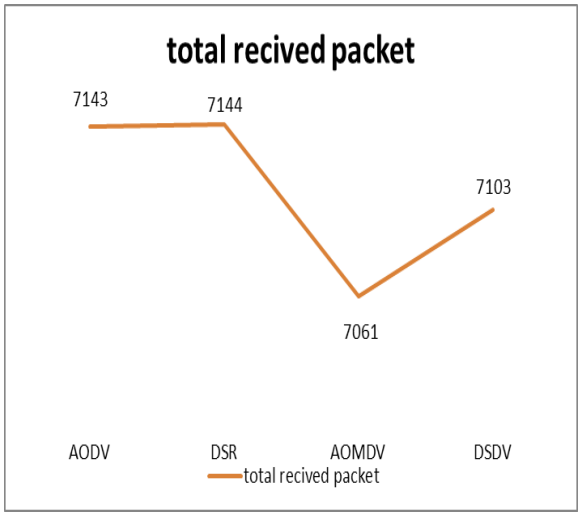


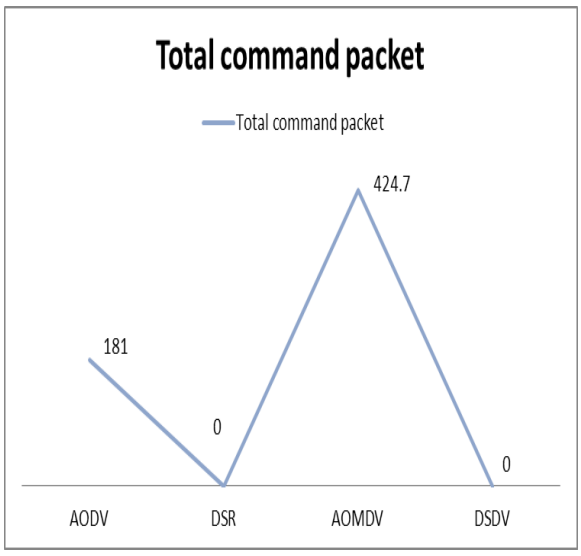












IV. CONCLUSION

Since there is no fixed topology in these networks, one of the greatest challenges is routing data from its source to the destination. Generally these routing protocols are motivated from two fields; WSNs and MANET. WSN routing protocols provide the required functionality but cannot handle the high frequency of topology changes. MANET routing protocols can deal with mobility in the network but they are designed for two way communication, which in sensor networks is often not required. In MANET two classes of protocols are there position based and geographic based. If there is a need for location privacy, protocol is chosen in which location is not sent as a one of the field as the case may be in geographic base routing protocol. in case of mobile Wireless sensor, position based MANET protocols are used for WSN. AODV, DSR, DSDV, AOMDV protocols are preferred as they are able to work in mobile environments, whereas WSN protocols often aren't suitable. After all the above protocol, it is concluded that DSR is Suitable for mobile wireless sensor network. as parameter which are fit for Data dissemination like Packet delivery ratio, packet drop ratio, end to end delay, total received packet and command packet are better in case of DSR.

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