*Research Article*

# Model Study of Tour Planning for Mobile Data Gathering Mechanism in WSN

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*Abstract*

*Wireless Sensor Network (WSN) which is used for monitoring various applications. While transmitting the data from source to destination (server), the amount of energy consumption of the sensor node is high. Sensor nodes are close to the sink so it consumes more energy as they have to collect the sensed data and send it to the Server. If these sensor nodes fail, then the other nodes can't reach the data sink. So to overcome that problem we used M-collector. The M-collector has a powerful transmitter, receiver and battery. It works like a mobile base station and collecting data while moving in the field. It starts the collecting information continuously from the sensor, finally transports the data to the server. Our mobile data-gathering scheme improves the scalability and solves intrinsic problems. M-collector will separate each zone that will reduce the network faults. This method improves compatibility and assures that energy consumption among sensors is homogeneous.*

*Keywords: Mobile data collector, wireless sensor network (WSN).*

## 1. Introduction

Wireless Sensor Network consist of a small number of data collection devices and hundreds or more sensor nodes. The sensor nodes have the form of low cost, low-power, small size devices, and are designed to carry out a range of sensing applications, including environmental monitoring, military surveillance, fire detection, animal tracking, and so on. The sensor nodes collect the information of locally and then forward the sensed information in a wireless medium to an M-collector, and it is fused, analyzed to find out the global status to identify their position with a high degree of precision, such as tracking of goods, forest fire detection, and etc. Typically, the sensors closed to the sink are run out energy. It is due to fact that these sensors are necessary to forward all other nodes information. If these nodes are cut off, the operation life span of the networks finish, hence the whole network becomes unable to communicate with the sink. This rises dropping the energy consumption as a main challenge. An M-collector serves as an information carrier and move the whole network to collect the data of each sensor via single-hop communication.

Using M- collector, we can stay away from the energy consumption due to multi-hop communication. In this paper, we assume that given one mobile element as M-Collector and the objective is to design smallest number of necessary tours to wrap the network such that every sensor node is also on the tour or single step away from the tour.

## 2. Existing work

In Existing work, the Multi-Hop Data Gathering Algorithm (MH-DGA) is consider as many M-Collector is attached together and as results to decrease the Link broken by automatic modification in the route and making longer network lifetime than in a network with static data sink or in a network which uses the mobile collector (which can only move along straight lines, reaches maximum distance to the base station and also increase the capacity of the network).
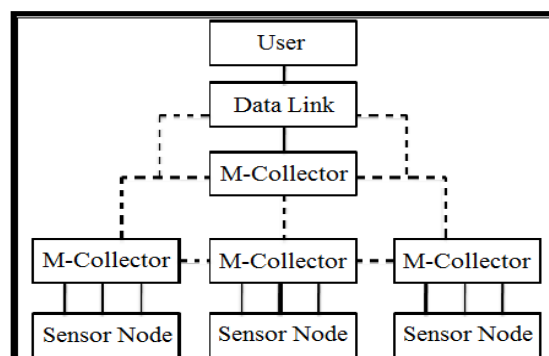


**Fig.1** Multi-Hop Data-Gathering

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In Fig. 1, this concludes that Multi-hop mobile data-gathering algorithm is raising the greatest distance to the Sink node and the coverage area of the network.

## 3. Proposed work

The heart of tour planning for mobile data gathering is mobile collector (M-Collector) .It consist of Zigbee module and L293D Driver IC for driving M-Collector. When M-Collector is move towards the sensor node i.e., LDR then it collect data and at the same time it transmit to server (PC, Laptop, mobile, etc). The server shows the output of our system. In the output server shows the intensity of light because we use here LDR as a sensor. We use the Arduino which control all operation .The observer seen the output on the server.
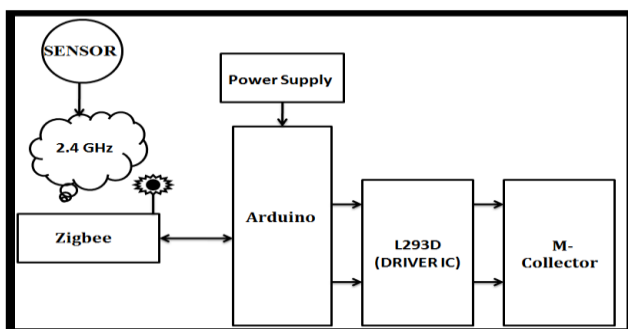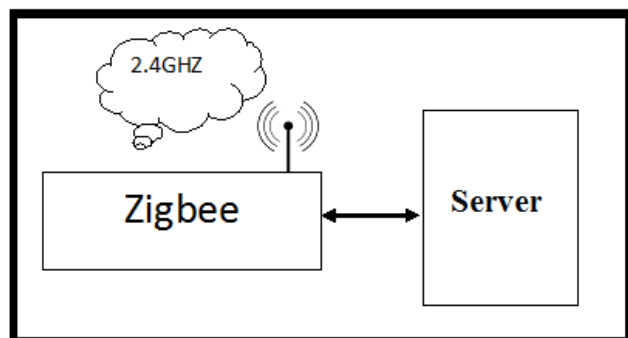


**Fig. 2** Block diagram of Transmitter section



**Fig. 3** Block diagram of receiver section

## 4. Hardware Description

### 4.1 Zigbee module

Zigbee Module having less-cost and it consume less power. It is wireless mesh topology standard network. Zigbee network is called as mesh network topology, this network expands over a large area and it includes thousands of nodes. Zigbee modules are able to switch over and use the information with other Zigbee devices. It allows the technology to be usually deployed in wireless control and it monitors various applications. The less power equipment has longer life and smaller batteries. It can be generally used in involuntary control equipment. The mesh networking topology provides more reliability and more range.

Zigbee module network has the following characteristics:

i. Electric power-saving.
ii. Reliability.
iii. Less cost.
iv. More ability and safety.

The Zigbee module used in industry, home automation, remote control, vehicle automation, medical, agriculture automation and lighting control automatic, etc.



**Fig.4** Zigbee module

### 4.2 L293D (Driver IC)

L293D is used with M-Collector. L293D is a dual integrated circuit (IC) and it is also known as driver IC. It work like current amplifier and it receive low current signal and provide a high current signal. This signal is used to drive the motors.
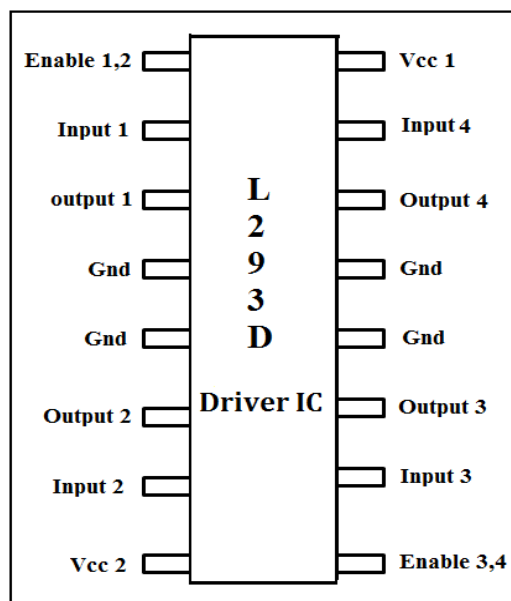


**Fig.5** Pin diagram of L293D

### 4.3 Sensor

Light Dependent Resistor (LDR) is the sensor. It is mainly useful in light and dark sensor circuits. In general the LDR resistance is very high but it is drop

when it illuminate. A Light Dependent Resistor (LDR) is a sensor. It has a resistance which changes according to the sum of light decreasing on its surface. Light Dependent Resistor (LDR) are frequently used in circuits where it is required to identify the existence of light frequently to make a light trigger key.
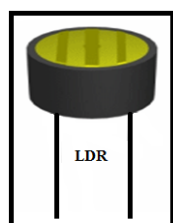


**Fig.6** LDR Sensor

*4.4 Moving Collector*

Moving Collector is also called as M-Collector. If these sensor nodes fail, then the other nodes can't reach the data sink. So to overcome that problem we used M-Collector. The M-Collector has a powerful transmitter, receiver and battery. It works like a mobile base station and collecting data while moving in the field. It starts the collecting information continuously from the sensor, finally transports the data to the server. Our mobile data-gathering scheme improves the ability of system and solves intrinsic problems. M-Collector will separate each zone that will reduce the network faults. This method improves compatibility and assures that energy consumption among sensors is homogeneous.

*4.5 Arduino*

Arduino is the microcontroller which is used to control all the operation.

## 5. Flowchart
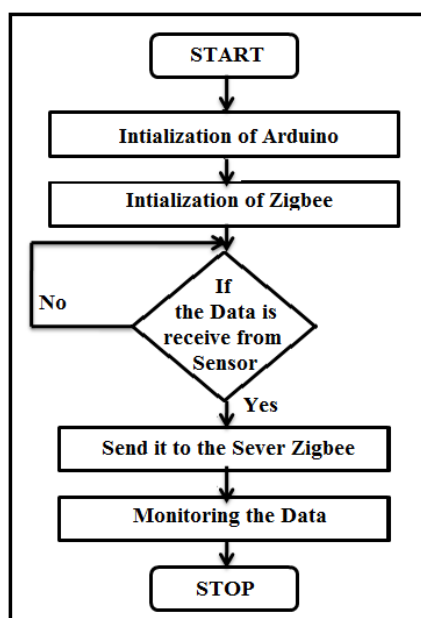


## 6. Advantages

1) It reduces the delay during transmission and reception.
2) It required less power during operation, so the lifetime of battery is increases.
3) A common advantage is that they can get high stability.
4) It used the uniform energy consumption.
5) The tour of the M-Collector can be predictable.

## Conclusion

The large scale networks data gathering scheme for, a mobile collector (M-Collector) is introduced like mobile base station. The Single-Hop data gathering scheme improves the scalability. It also solves the intrinsic problems large homogenous networks. The above scheme is suitable only for the partially connected applications. A single M-Collector is used to improve the data gathering tour.

## Future scopes

1) A future work is to devise a path planner that could generate a path to guide an M-Collector for data collection in real time.
2) It is use in such of application that having low data rate.
3) It is use in a Design of Greenhouse Monitoring & Control System Based on Zigbee Wireless Sensor Network.
4) It is use in Multi-Level Parking Vacancy Monitoring System.
5) It is use in Environmental Monitoring.

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