IJCTA, 9(24), 2016, pp. 343-348 ISSN: 0974-5572

Vanet Monitoring Using Sensor to Prevent Intellectual Transportation Traffic

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ABSTRACT

Wireless Sensor Networks (WSNs) can have high demands for real-time data transmission and processing, but this is often constrained by limited resources. Cloud Computing can act as the backend for WSNs to provide processing and storage on demand. Sensor-Cloud infrastructure is becoming popular that can provide an open, flexible, and reconfigurable platform for several monitoring and controlling applications. Most common technique for knowing the location of vehicle is with the help of GPS. In the proposed system introducing the concept of determining the traffic Congestion in way of travelling using pre condition monitoring with sensor nodes.

Keywords: (WSNs),GPS, VANET Cloud Computing, sensor detector

1. INTRODUCTION

Traffic congestion is becoming huge problem especially in cities. VANETs are widely emerging in many developed countries as a less expensive, distributive and collaborative traffic congestion system. It basically requires some basically consist of three parts: sensing, processing, and communicating. WSNs are mainly used to monitor environmental conditions, such as temperature, sound, and vibration and pressure . The applications of WSNs can be applied in many areas.

WSN components:

- A radio transceiver with an antenna for transmitting and receiving data.
- A microcontroller for interfacing with the sensors.
- Energy sources like batteries or other power supply.

Cloud Computing is a collection of virtualized resources that can be assigned on demand. The elastic resources capability of the Cloud is the main motivation for integration WSNs with the Cloud. inexpensive devices to be incorporated in vehicles itself and communicate with geostationary satellite to accumulate the data and fetch into the system. Each node in a sensor network is loaded with a radio transceiver or some other wireless communication device, a small microcontroller, and an energy source most often cells/battery. The nodes of sensor network have cooperative capabilities, which are usually deployed in a random manner.

Fig. 1. Figure shows a typical WSN setup for traffic condition monitoring. Sensor Nodes are mounted on cloud computing server. Here Cloud Computing server act as a base station. The sensor nodes communicate with the base station, The base station collates the sensor information from sensor node data and transmits it to the travelling vehicle .So Travelling vehicle communicate directly with the Base station server rather sensor node . So sensor detect the traffic with precondition monitoring to determine congestion.

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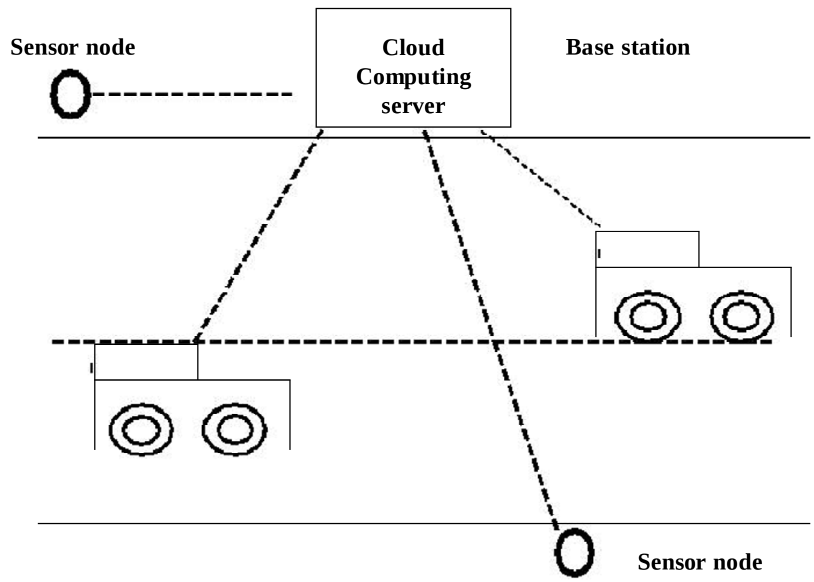

Figure 1

2. RELATED WORK

Wireless sensor networks (WSNs) can be used for monitoring the railway infrastructure such as bridges, rail tracks, track beds, and track equipment along with vehicle health monitoring such as chassis, bogies, wheels, and wagons [1]. Condition monitoring reduces human inspection requirements through automated monitoring, reduces maintenance through detecting faults before they escalate, and improves safety and reliability. WSNs enable continuous real-time capture of data. However, WSNs need to be able to handle the harshness of outdoor long-term condition monitoring; often in hostile environments and must minimize energy usage as the nodes are not attached to a wired power supply. They typically use low-power sensors powered by batteries although authors are investigating alternative power supplies such as local energy generation. Hence, the network to enable data capture has to be carefully designed to overcome these factors and prevent transmission errors, latency, network outages, missing data, or corrupted data.Vehicular ad hoc networks (VANETs) vehicle-to-vehicle and vehicle-to-infrastructure communications which can be a reliable and secure system for efficient traffic contro l[2]. Considering the broadcast nature of the medium, multi-hop routing, multiple communication paradigms and short duration of vehicle to vehicle sessions, the establishment of VANET according to modern day needs can be critical. So while on the road if there is no base stations in nearby, there is actually not a problem because due to the ad hoc network structure all the nodes create a network by hopping the signal eventually to the nearest base stations. Moreover, through VANET, each vehicle can communicate with the other vehicle through V2V network. So, with the ad hoc network created within the traffic can be controlled. Whenever a car will come into a close proximity within a certain region which can make congestion in the road, by V2V the car will send message to the other car and create enough room in the road so that when the green signal turns on every car can move comfortably without making a huge traffic jam due to congestion. Smartphones serve as a technical interface to the outside world[3]. These devices have embedded, on-board sensors (such as accelerometers, WiFi, and GPSs) that can provide valuable information for investigating users' needs and behavioral patterns. Similarly, computers that are embedded in vehicles are capable of collecting valuable sensor data that can be accessed by smartphones through the use of On-Board Diagnostics (OBD)sensors. This paper describes a prototype of a mobile computing platform that provides access to vehicles' sensors by using smartphones and tablets, without compromising these devices' security. Data such as speed, engine RPM, fuel consumption,GPS locations, etc. are collected from moving vehicles by using a

WiFi On-Board Diagnostics (OBD) sensor, and then back hauled to a remote server for both real-time and offline analysis. We describe the design and implementation details of our platform, for which we developed a library for in-vehicle sensor access and created a non-relational database for scalable backend data storage. We propose that our data collection and visualization tools.

Due to the fast development of ICT including smart phone, Internet, computer and wireless communication, the vehicle industry can be revolutionized and shifted to a new era. In this paper, we introduce the concept of cloud computing enabled real time vehicle services with special focus on customized services like healthcare, resource sharing, parking and dining etc. A three-tier V-Cloud architecture is proposed with detailed explanation about each sub-layer.. In certain area when parking is a problem, drivers will prefer to pay s little investment on their navigator or smart phone so that they can easily find a suitable parking lot within a short time. More importantly, when the car is stopping with large amount of resources like memory/flash, power and computing capability, it can rent such resources to other vehicle users who is in need and is willing to pay some expense. In summary, the three tier V-Cloud architecture can provide some innovative and real time services based on cloud computing techniques. It is worth noting that BASN with context-aware reasoning and knowledge processing techniques can largely improve drivers' safety, comfort and convenience.

Traditionally, the vehicle has been the extension of the man's ambulatory system, docile to the driver's commands. Recent advances in communications, controls and embedded systems have changed this model, paving the way to the Intelligent Vehicle Grid. The car is now a formidable sensor platform, absorbing information from the environment (and from other cars) and feeding it to drivers and infrastructure to assist in safe navigation, pollution control and traffic management. The next step in this evolution is just around the corner: the Internet of Autonomous Vehicles. Pioneered by the Google car, the Internet of Vehicles will be a distributed transport fabric capable to make its own decisions about driving customers to their destinations. Like other important instantiations of the Internet of Things(e.g., the smart building), the Internet of Vehicles will have communications, storage, intelligence, and learning capabilities to anticipate the customers' intentions.

The concept that will help transition to the Internet of Vehicles is the Vehicular Cloud, the equivalent of Internet cloud for vehicles, providing all the services required by the autonomous vehicles. In this article, we discuss the evolution from Intelligent Vehicle Grid to Autonomous, Internet-connected Vehicles, and Vehicular Cloud. The urban fleet of vehicles is evolving from a collection of sensor platforms to the Internet of Autonomous Vehicles. Like other instantiations of the Internet of Things, the Internet of Vehicles will have communications, storage, intelligence and learning capabilities to anticipate the customers' intentions. This article claims that the

Vehicular Cloud, the equivalent of Internet Cloud for vehicles, will be the core system environment that makes the evolution possible and that the autonomous driving will be the major beneficiary in the cloud architecture. The use of Sensor-Cloud architecture in the context of several applications. The Sensor-Cloud architecture enables the sensor data to be categorized, stored, and processed in such a way that it becomes cost-effective, timely available, and easily accessible. Earlier,most WSN systems which were included to several controlling/monitoring schemes were closed in nature, zero, or less interoperability, specific application oriented, and non extensible. However, integrating the existing sensors with cloud will enable an open, extensible, scalable, interoperable, and easy to use, re constructible e network of sensors for numerous applications. However, due to the limitations of WSNs in terms of memory, energy, computation, communication, and scalability, efficient management of the large number of WSNs data in these areas is an important issue to deal with. Sensor-Cloud infrastructure is becoming popular that can provide an open, flexible, and reconfigurable platform for several monitoring and controlling applications.

ALGORITHM

Routing Table

VANET play an important role in dissemination of traffic and emergency information of traffic among vehicles moving on roads. However ,because of high mobility of vehicular nodes, maintenance of routing table generates high network traffic. Routing table contains information about the topology of the network. the proposed system use the following table with routing table information. Here routing table contain the vehicle entry, vehicle moving and non moving vehicle information.

Vehicle Entry	*Vehicle moving*	*Non Moving vehicle*
|	✓	–
|	✓	–
|	✓	–
|	✓	–
|	✓	–

Congestion control

The main objective of congestion control is to best exploit the available network resources while preventing sustained overloads of network nodes and links. Congestion control mechanisms are essential to maintain the efficient operation of network. Ensuring congestion control within vehicular ad hoc networks address special challenges, due to the characteristic and specificities of such environment such as high dynamic

Architecture Diagram

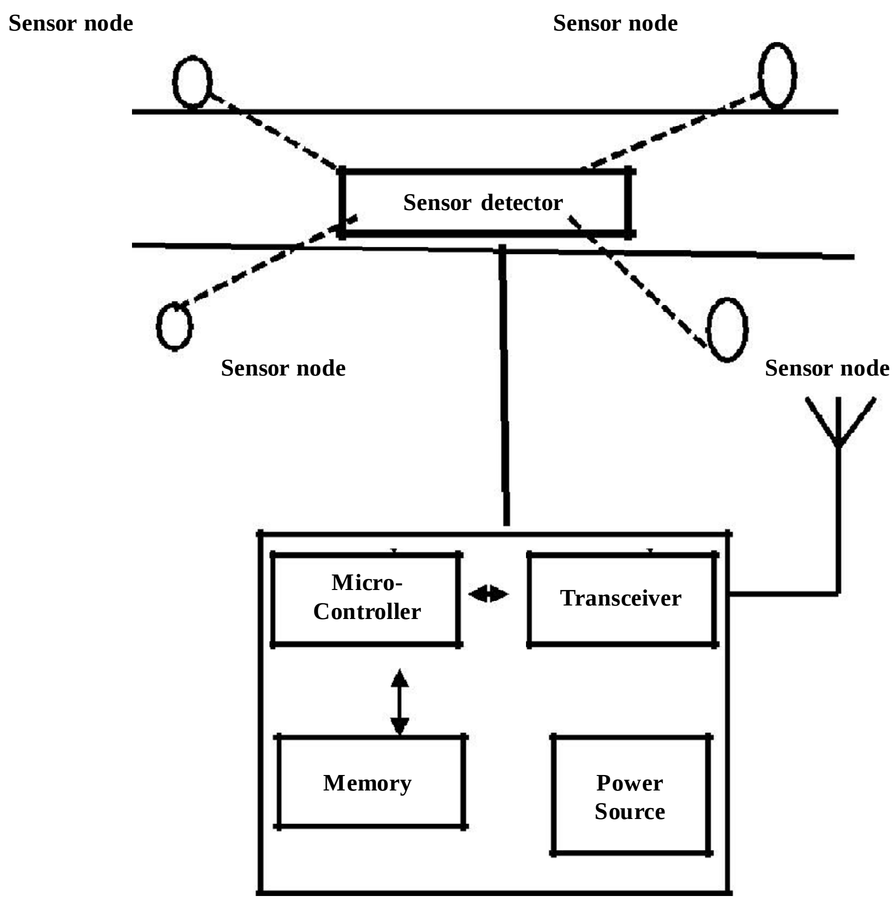

Figure 2

SENSOR TABLE

Sensor node	*Description*
Accelerometers	To measure vibrations on infrastructure
Fiber-optical sensors	Convert a linear or angular displacement into a signal suitable for recording.
Temperature sensor	To monitor the temperature of the atmosphere
Time domain reflectometer	Converts the travel time of a high frequency

Simulation Result

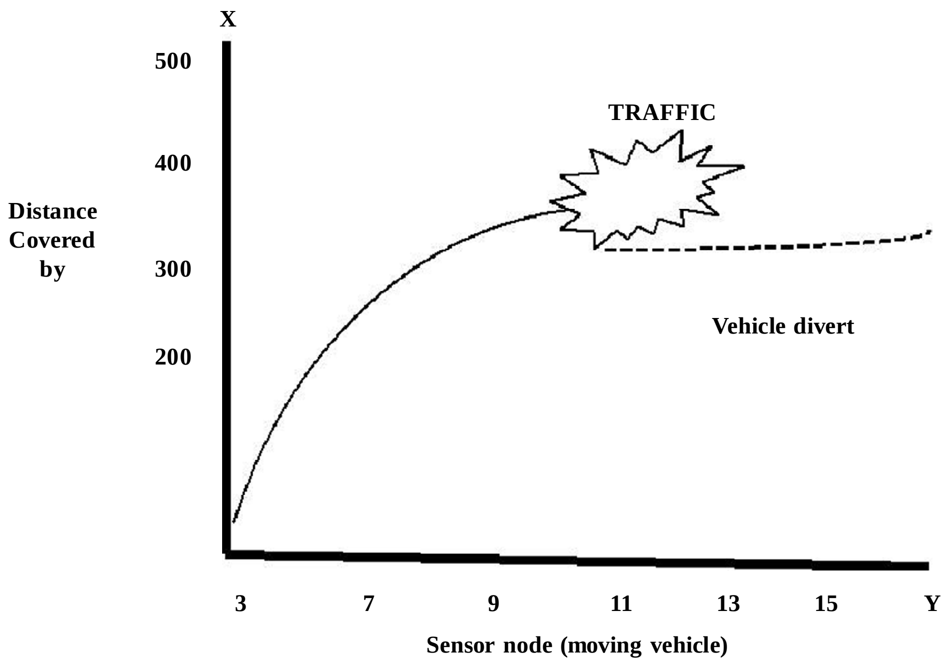

Figure 3: Performance Graph

and mobility of nodes, high rate of topology changes, high variability in nodes density and neighborhood, broadcast/geocast communication nature. In this system congestion can be identified by non moving nodes (10 or 15 vehicles) with same point. the sensor node detect the congestion made in the road network.

In fig 2 ,The sensor detector connected in each sensor node in VANET .The microcontrollers used in sensor nodes are ultralow-power microcontrollers to conserve energy.

In the Fig 3 shows the performance graph between the Distance covert by with moving vehicle.After some point congestion make occurred in the rode network.When Sensor node

Detect the traffic .The vehicle can be diverted in to another way.

3. CONCLUSION

This paper prevent the traffic Congestion for the use of VANET monitoring system with use of sensor node.Here Cloud computing server act as a base station for to communicate sensor node and Travelling vehicle.The sensor detector have the micro controller and transceiver . Finally in this way to determining the traffic Congestion with help of sensor node.

FUTURE WORK

In the future work based to overcome the difficulty of short life time of battery power , to improve the sensor battery power .

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