

# Vehicle Monitoring using WSN with Improved NLT: A Survey

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**Abstract**— As Wireless communication gets its application in various fields, in particular this project focuses on vehicle monitoring with theft avoidance in the unmanned region through wireless sensor network and also improving lifetime of sensor network to achieve maximized sensing operation of sensor node by using clustering algorithm. Previously, traffic monitoring has been achieved through IOT in the manned regions. For achieving maximum network lifetime deployment strategies proposes three inventions, first deploy the sensors in network and then propose energy consumption model for maximizing NLT in WSN.

**Key words:** Vehicle Monitoring, Theft Avoidance, Wireless Sensor Network, Maximum Network Lifetime

## I. INTRODUCTION

Wireless communication is among technology’s biggest contributions to mankind. Wireless communication involves the transmission of information over a distance without help of wires, cables or any other forms of electrical conductors. The transmitted distance can be anywhere between a few meters (for example, a television’s remote control) and thousands of kilometres (for example, radio communication). In the proposed model various sensors such as IR sensor, Gas sensor, Biometric sensor, RFID (Radio Frequency Identification) are integrated to obtain various status of the vehicle driver. It is important to collect above said data of the driver to perform vehicle monitoring and to achieve theft avoidance.

Number of Road Accidents According to Type of Roads							
Types of Roads	Fatal		Grievous Injury		Minor injury		Non-injury
	N.A	N.P.K	N.A	N.P.I	N.A	N.P.I	N.A
National Highways	4992	5533	1754	2354	13278	22965	1024
State Highways	5120	5528	1805	2503	15605	24050	635
Other Dist. Roads	2779	2893	3345	3918	10121	13821	481
Other Village Roads	1633	1688	484	625	5876	9465	127
Total	14524	15642	7388	9400	44880	70301	2267

Table 1: Number of road accidents according to type of roads

## II. LITERATURE SURVEY

Hasar Omar Al-Sakran [1], presented a novel intelligent traffic administration system based on Internet of Things, a framework for real-time traffic information acquisition and monitoring architecture based on the IoT utilizing wireless communications. Agents can perform specific tasks with a degree of intelligence and autonomy, and interact with their environment in a useful way without human intervention thus decreasing network load, facilitating heterogeneous IoT devices, providing support for collaboration and interoperability in IoT and programmable RFID and WSN overcoming network latency, and asynchronous and autonomous execution. [2] In FPGA based Hardware Implementation of Automatic Vehicle License Plate Detection System, Surbhi Chhabra et al proposed Automatic Vehicle License Plate Detection System (AVLPDS) which extracts vehicle license plate information from an image. In this model, the utilization of the resources is directly proportional to the size of the image. That large image requires higher utilization of the resources thereby causing delay. Vishnavi et al [3] in Intelligent alcohol detection system for car proposed the progress in using a alcohol Detector, a device that senses a change in the alcoholic gas content of the surrounding air. The sensor will then analyze the amount of alcoholic vapors and offer the user some indication of the amount of alcohol present. In Vehicle Tracking and Locking System Based on GSM and GPS, R.Ramani et al [4], proposed a novel method of vehicle tracking and locking system used to track the theft vehicle

by using GPS and GSM technology. This system puts into sleeping mode while the vehicle handled by the owner or authorized person otherwise goes to active mode, the mode of operation changed by in person or remotely. The Intelligent Security System for Smart Vehicle system proposed by Prof. R. M. Sahu et al [5], Focused on designing a dynamic system that avoids all the four reasons of accident. In case of over speeding in a speed limit zone area we are going to limit a speed to a certain cutoff value. If a driver is drunk then vehicle won’t start until he or she is not able to drive, the system restrict driving without seatbelt also alarm a buzzer if driver suffer drowsiness.

Fei Ding and Aiguo [6] Song presented, Development and Coverage Evaluation of ZigBee-Based Wireless Network Applications. In re-execution of packet processing mechanism, the refresh time is 2 seconds and the packet loss is reduced to 0.54%. Therefore, in zigbee wireless network, the scale data of sensor nodes are preprocessed by the gateway which can effectively improve the transmission reliability of the system, optimize the wireless channel occupancy, and reduce the packet loss rate of the wireless network. [7] Intelligent Traffic Control System for Ambulance Clearance and Stolen Vehicle Detection by P.Priyanka et al, uses wireless technology and high speed micro controller to provide smooth and clear flow of traffic for emergency vehicle to reach the destination on time. Here ARDINO, RFID reader technology is used. Ahyan Akbas et al [8], proposed a Joint Optimization of Transmission Power Level and Packet Size for WSN Lifetime Maximization. In this model they developed a

realistic WSN link layer model built on top of the empirically verified energy dissipation characteristics of Mica2 motes and WSN channel models. We make use of the aforementioned link layer model to design a novel mixed integer programming (MIP) framework for the joint optimization of transmission power level and data packet size. Mariam Akbar et al [9], proposed Efficient Data Gathering in 3D Linear Underwater Wireless Sensor Networks Using Sink Mobility. In clustering protocol network is logically partitioned into clusters, such that each cluster selects a CH depending on the defined criteria. To minimize energy consumption, they proposed a three-dimensional sink mobility (3D-SM) scheme. Nirbhay K. Chaubey and Dharti H. Patel [10] together proposed Energy Efficient Clustering Algorithm for Decreasing Energy Consumption and Delay in Wireless Sensor Networks (WSN). In proposed algorithm, some of the nodes have to select cluster heads that, in comparison to them, have a longer distance to the BS. These nodes send their data to a further location and then their data has to go through a long distance to reach the base station (BS). It has the ability of selecting a cluster heads of clusters of the network.

### III. CONCLUSION

As per literature survey done in above section, the vehicle monitoring is done using several wireless communication technologies and sensors being deployed for sensing of various human activities. Previous work done is based on the regions with heavy or moderate traffic and areas with known traffic conditions. In these regions monitoring is performed using deployment of sensors for alcohol monitoring, seatbelt detection, traffic analysis etc.

### IV. FUTURE WORK

There is need for the vehicle monitoring in the regions with low or less monitoring such as highways and city borders. These are the areas prone to accidents and other theft activities. In future, it can be done using integration of all the above sensors and deploying them in the vehicle to be monitored. It is also necessary to focus on maximizing the lifetime of these sensors because they work on batteries. These batteries when they dissipate energy continuously will not be sufficient for vehicles travelling long distance. Thus it is important that in future these problems are considered.

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