Implementation of Node Reservation Algorithm for Safe Trajectory Vehicle Crossing an Intersection

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Abstract_:The intelligent road transport system for automatic vehicle are integrate with wireless sensor network. The main objective of this work are vehicle crossing an intersection for safe driving without occur an accident ,no congestion ,to avoid collision and waiting time to be reduce at an intersection. The infrastructure to infrastructure are communication is implement to exchange the information between a mobile phone and intersection manager. The intelligent road transport system are used to implement Doppler estimation or Doppler frequency is change of frequency and wavelength of a wave for an observer moving relative to its source. Doppler effect are measure speed, distance, sound to calculate and it take decision automatically and it send information to intersection manager and GPS to find geographical location. The different platform or os are connect through an heterogeneous network by using mobile phone

Keywords : **Autonomous vehicle; Self-driving car; Intelligent transportation system (ITS); Vehicle-to-infrastructure communication (V2I); Autonomous intersection management (AIM);Node reservation algorithm**

I.INTRODUCTION

Wireless sensor networks (WSN), sometimes called wireless sensor and actuator networks (WSAN), are spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and 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. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on

The vehicle technology has grown rapidly in the past decade. Several systems have been installed into commercial vehicles to assist the driver to provide a more comfortable drive, including improving of the safety of the driver, passenger, and the pedestrian or cyclist. Recently, there has been a highly increased activity in the development of the autonomous vehicle research, which was initiated in 2005 by the first competition of autonomous vehicles. The Defense Advanced Research Projects Agency (DARPA) Grand Challenge was organized. In

2007, the DARPA Urban Challenge showed the progression of the autonomous vehicle. Several teams successfully developed a vehicle that has the ability to drive itself and achieve the assigned task. As a result, the self-driving car or autonomous vehicle is now successfully developed by many research groups either in universities or more recently by private companies [1-3]. They proved the performance of driving in a real-traffic environment, autonomously with the capability of safety

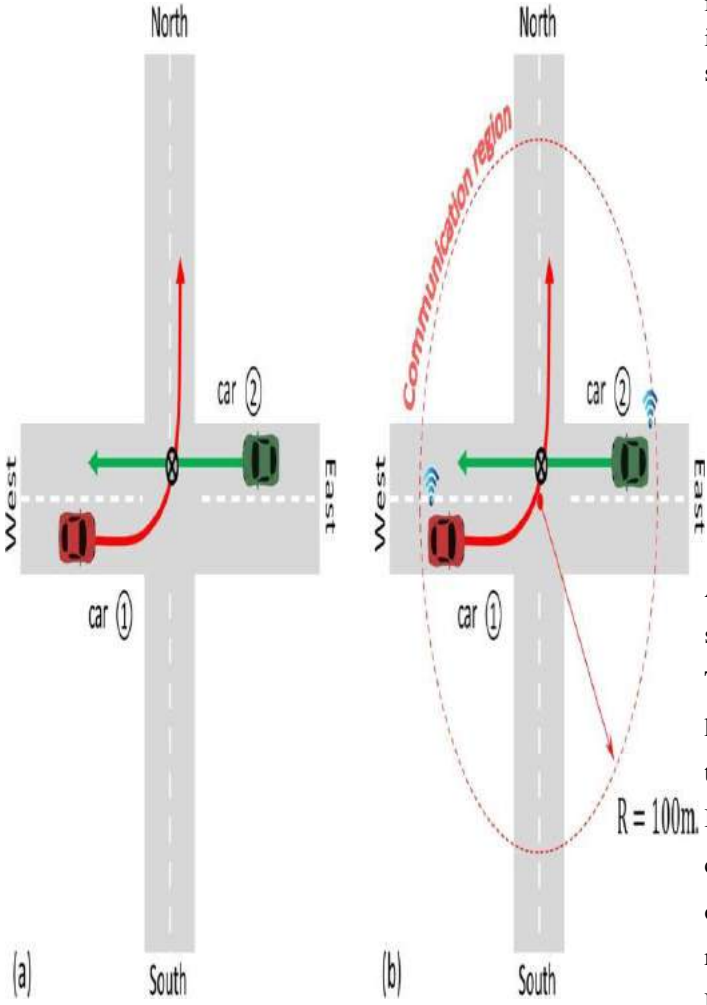
Autonomous Intersection management

Technically, autonomous intersection management relies on the communication between vehicles and intersection manager to intersection manager. The responsibility of the intersection manager is that it will prioritize the timing index, corresponding to the occupied space and tell a vehicle when it can pass through the intersection, based on the incoming, requested message from vehicles. In the same way, an autonomous vehicle will follow the policy from the intersection manager strictly and accurately. Every vehicle will get the personal timing index from the intersection manager and drive according to the received policy. The V2I communication is the tool in which the requested message from vehicle to the intersection manager is delivered and vice versa.

Crossing intersection problem

That is, the method to manage several vehicles to use the intersection area at different points of time. For the sample scenario, there are two vehicles on the different streets. The red vehicle (no. 1.) drives on the West Street and plans to go to the North Street. On the other side, the green vehicle (no. 2.) drives on the East street

and the destination is the West street. The trajectory of both vehicles is clearly crossed over.



Node Resservation

The node reservation method is able to provide the safe trajectory of vehicles while crossing an intersection. The pseudo algorithm of node reservation for intersection management is calculated by using dynamic programming which is provided in the Algorithm The management mechanism relies on the communication between vehicles and the intersection manager. To prevent the message crashing, the principle of FCFS is implemented for ordering the message queue. The intersection manager will make a service based on the sequence of the received message from vehicle

The discretization of distance and time combined with the node reservation allows the possession time of required nodes to be calculated and then reserved. The state of intersection updated and wait for next iteration and the vehicle allowed to reserve the node after the possession time of the predecessor vehicle has expired. For this reason, both vehicles are at different places or nodes at the same time

II. LITERATURE SURVEY

A key exchange information between network for a high-speed communication environment is not suitable for vehicles. The first communication from the RSU passes only group keys. Then it updates the key value in the communication with the vehicle using Bloom filters to verify the proposed method. In the proposed scheme in VANET, dispersed operations are carried out in the RSU. By reducing to a minimum the number of keys exchanged, more secure group communication can be realized. A message batch verification scheme using Bloom Filter that can verify multiple messages and handover authentication efficiently even for multiple communications with many vehicles. The process for issuing secret disposable group keys for a vehicle by a group administrator [1]

The promising emerging application within VANET is a cooperative awareness system such as the automatic identification system for the ships, where the vehicles will exchange location messages with each other to build up a map of its surrounding and use this for different traffic safety efficiency application.The new emerging applications for enhancing traffic safety found within the vehicular ad-hoc

network environments which can be classified as real-time system the extremely low delays required by traffic safety applications, the need for ad-hoc network architectures support direct vehicle-to-vehicle communication. The IEEE 802.11p standard intended for vehicle-to-vehicle ad-hoc communication in high speed vehicular network environments.[2]

A self-organized way from local interactions and mutual adaptation between the robots of two heterogeneous swarms.t he performed a simulation based on robot models derived from the footbot and eyebot robots Interaction and cooperation among the robots are based on a fully distributed approach, on minimal information exchange, and purely broadcast-based local communications relying on short-range radio signals and simple visual cues. Eyebots serve as discrete, mobile stigmergic markers for footbot navigation, with a role that is similar to the one of pheromone in ant navigation.[3]

Vehicle-to-vehicle communication system and validate the feasibility of the system GPS-related information (such as ground speed and location) was obtained through field test on To utilize the temporal visibility information to improve the performance of moving obstacle tracking

It utilize temporal visibility information todetermine the presence of occlusions a suburban road,V2I(vehicle-to-infrastructure communication) and V2V (vehicle-to-vehicle communication). V2I pattern can be used in the situation of information exchange between vehicle and roadside. Information is exchanged between vehicles which mainly focuses on providing information for safety-related applications and driving assistance. The WSU was synchronized to UTC time by implementing an estimator, and GPS had been used as a UTC time input to the estimator that changed the GPS time .The DENSO WSU (Wireless Safety Unit) was chosen as it supports the WAVE protocol with low latency and high reliability[4]

It support low-latency, reliable and efficient data dissemination It accurate sending and receiving time according to the accurate timing based on GPS technology was also collectedIt is guarantee fast reliable message exchange and switching among channels effectively;

Navigation functions are practical tools introduced in robotics for solving collision avoidance problems such as formation , rendezvous and consensus scenario and vehicles can share information about their inertia and their intention at the intersection the vehicles use this information to coordinate and pass the intersection without collision .A navigation function is practically a smooth mapping which should be analytic in the workspace of every vehicle and its gradient would be attractive to its destination and repulsive from other vehicles. So, an appropriate navigation function could be combined with a proper control law in order to obtain a trajectory for every vehicle leading to the destination and avoiding collisions vehicle needs its position, velocity and the path. This information could be easily derived from onboard or GPS instruments.

To increase reliability and robustness and to decrease communication costs by reducing complexities.The system to put more communication reliability measures in place. There is a trade off between sharing the intention of vehicles thus optimizing energy consumption and minimizing communication costs The four performance indexes including average speed of vehicles, number of stops, maximum flow of intersection and fuel consumption, [5]

The robotic vehicle must comply with traffic rules and needs to know when and where to look, in order to effectively deal with traffics . Information are necessary to autonomously accomplish intersection driving road network information and moving obstacle information It consists of two components: a dynamic sensor planning algorithm and a method for modeling occlusions. Our dynamic sensor planning method is designed to cover relevant regions.

To utilize the temporal visibility information to improve the performance of movingobstacle tracking It utilize temporal visibility information todetermine the presence of occlusions;[6]

Post-Accident Investigation Accident Investigator Node (AIN) are used a standard laptop with a tinyPEDS client to retrieve past data from the WSN. In the experiment we let the AIN query the WSN about past monitored values, which was

successfully able to retrieve and decrypt the data. The goal of the indoor tests was to observe the capability of every vehicle inside the Geobroadcast range to receive warning signals initiated by the WSN. Three VANET nodes run a application that displays hazard warnings to drivers via a visual HMI and the integrated communication system for VANET and WSN, as well as a security middle-ware secure distributed storage in sensor nodes. setting is beneficial with respect to a straightforward storage of monitored data, but also paves the way to an optional WSN and/or VANET communication over the Internet.

It has more efficient and secure storage of sensor dataVANET nodes are also highly mobile, resulting in frequent topology changes of the network,The sensor nodes are assumed to be staticThe security is to ensure the reliability and the trustworthiness of the data being communicated from the WSN to the vehicles;[7]

III.EXISING SYSTEM

In existing autonomous vehicle or self-driving car integrates with the wireless communication technology which would be a forward step for road transportation. The fundamental objectives of this work are to manage autonomous vehicles crossing an intersection with no collisions, maintaining that a vehicle drives continuously, and to decrease the waiting time at an intersection highly increased activity in the development of the autonomous vehicle research , This problem is expressed with the discrete time event, where the space and time can be solved deterministically The management mechanism relies on the communication between vehicles and the intersection manager. To prevent the message crashing, the principle of FCFS is implemented for ordering the message queue. The intersection manager will make a service based on the sequence of the received message from vehicle.The discretization of distance and time combined with the node reservation allows the possession time of re quired nodes to be calculated and then reserved

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Problem identified:

The autonomous vehicle are crossing an intersection are vehicle to infrastructure communication ,It message passing information to an intersection manager and it can be using node reservation algorithm. intersection manager waiting for vehicle communication Internet protocol has been used for communicating between vehicle and infrastructure. The wireless local area network with UDP protocol is implemented. In general, a computer is set as the vehicle server in order to generate the requested messages and send to the intersection manager over the WiFi, IP address ,so the vehicle waiting time is happen

IV.PROPOSED SYSTEM

This method based on the current technology uses Global to measure the high-speed terminal, the distance between the high-speed terminal and the base station and an included angle between the reaching direction of carrier and the moving direction of high-speed terminal. And then, when the high-speed terminal is far away from the base station, it uses measured values directly calculate Doppler frequency. When the distance from the high-speed terminal to the base station is relative close, it uses the approximating function method to estimate Doppler frequency. In this case, it can eliminate the ICI brought by the Doppler frequency under the high-speed circumstances according to the estimated value of Doppler frequency to conduct Doppler frequency compensation. To achieve the above objectives, this method is organized as follows: the first section outlines the research status of the Doppler frequency estimation in the systems and analyses the difficult-point of the Doppler frequency estimation under the high-speed environment; the second section proposes an approximating function to estimate the Doppler frequency, when the distance from the high-speed terminal to the base station is relative close; the third section gives the implementation process based on the fitting line segments to the Doppler frequency estimation; The fourth section gives comparing results to the Doppler frequency estimating error through a simple application example used the traditional

methods and the approximating function method, when the distance from the high-speed terminal to the base station is relative close.

Advantages:

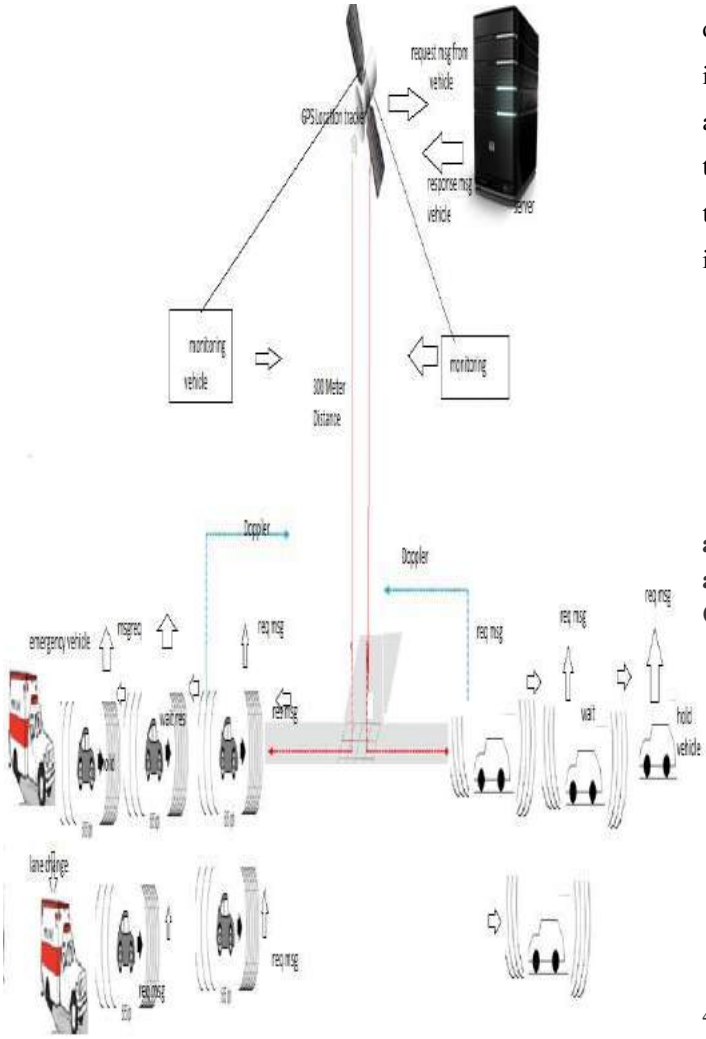
1.To avoid collision for safety driving for autonomous vehicle and decrease waiting time at intersection

2.It more efficient , simple and portable

3.It reduce congestion ,accident occur in traffic signal and without traffic signal

4.Automatically vehicle and self driving vehicle are used to portable,flexiable and alert message

V.ARCHITECTURE DIAGRAM



VI.CONCLUSION

The fully autonomous intersection management system is not widely implemented due to several factors. It focuses on increasing the performance of the traffic light system by adapting the timing of light signal. The period of red and green light timing is adapted based on the current traffic. Another approach has been working on the improvement for traffic safety, collision avoidance system. The primary objective of this work is to build a system that guarantees the collision-free crossing of an intersection and, as a secondary purpose, alleviates the traffic congestion. The standard of wireless communication for a vehicle has been recently introduced [8]. We implemented the methodology for an autonomous intersection management through the use of V2I communication. The communication protocol is designed, and the node reservation algorithm is implemented. It can be expressed that the waiting time at an intersection is decreased compared to the traditional traffic light. The limitation of this work is that the simulation is able to simulate only a multiple intersection

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