Real Time Safe Spacing and Collision Avoidance System Using VANET

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Abstract-VANET has some predictable status for tracking the intelligent vehicle technology and the communication protocols between two vehicles by using safe spacing algorithm. A series of vehicle tracking technologies keeping a safe spacing and also maintaining its speed in need to track the vehicle which is supposed to be the target. A very important category is driver assistance and car safety, brake warning sent from preceding car, tollgate and collision warning, information about road condition. The proposed method collision avoidance (CA) system issues warnings to drivers before they reach a potentially dangerous zone on the road and evaluating the performance of emergency messaging via wireless CA systems.

Keywords-Safe-spacing,Vehicle-tracking, Collision avoidance, braking model, Greenberg's Logarithmic Model

1 INTRODUCTION

Vehicular ad hoc network is used to communicate among nearby vehicles and road side equipment(Roadside unit).RSU are communicating nodes it provides each other with information such as safety warnings, and traffic information. Vehicles and Road side units are DSRC devices, it works in 5.9GHZ and bandwidth of 7.5MHZ approximate range of 1000m (1km) in paper [6].DSRC is one way or two way short to medium range wireless communication, it provides communication between vehicles and road side equipment's in specific location (e.g. toll plaza) in paper [5].Vehicle communication system can be more effective in avoiding accidents and traffic congestions, each vehicle can solve their problem individually. Vehicle to vehicle communication supports services such as car collision avoidance and road safety by exchanging warning messages across vehicles in paper [11].

2 PROBLEM IDENTIFICATION

Without CA system the vehicles cannot receive the emergency message at the potential dangerous zones. RSU is used to give traffic information, and safety warnings.so that delay is high in emergency message and only applicable for 100m to 1km.

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3 PROPOSED METHOD

First vehicle to vehicle safe spacing algorithm and vehicle tracking technique is used.

3.1 Safe Spacing Algorithm

Vehicle to vehicle safe spacing algorithm is used to adjust the velocity of current vehicle to the front vehicle. Vehicles are travelling in same direction means to find the distance between one and another for safety traffic and each vehicle can collect the information such as travel time, flow rate, density. Safe spacing is used to communicate between two vehicles in paper [8]. In addition series of vehicle tracking without knowing the road condition to keeping safe spacing to target vehicle and adjusting its own speed to track the target vehicle smoothly

3.2 Vehicle Tracking

Vehicle tracking involves mutual interaction of multiple vehicles so, the vehicle tracking model is an interaction model. Vehicle tracking is way of monitoring the location and moving status of vehicle so, that the driver is follow specific route and approximate speed. Vehicle tracking is used to track the vehicles movement status, vehicle location, position of vehicle and by using vehicle tracking can find the vehicles speed, distance, and velocity. Two conditions can track vehicle as follows the destination of the front vehicle is same as the destination of current vehicle and the velocity of front vehicle approximates the velocity of current vehicle. The velocity of regulating the distance with safe spacing and, vehicle tracking can be easily completed. Vehicles are at corner the spacing can be computed by knowing the velocities of both vehicles.

3.3 Design of Vehicle Tracking

Initialize the vehicle and compute the distance of position and control the speed. If the condition is no there is no vehicle in in front of front vehicle. So again compute the distance and control the speed. If the condition is yes there is vehicle in in front of front vehicle to compute the distance by the difference of velocity and speed

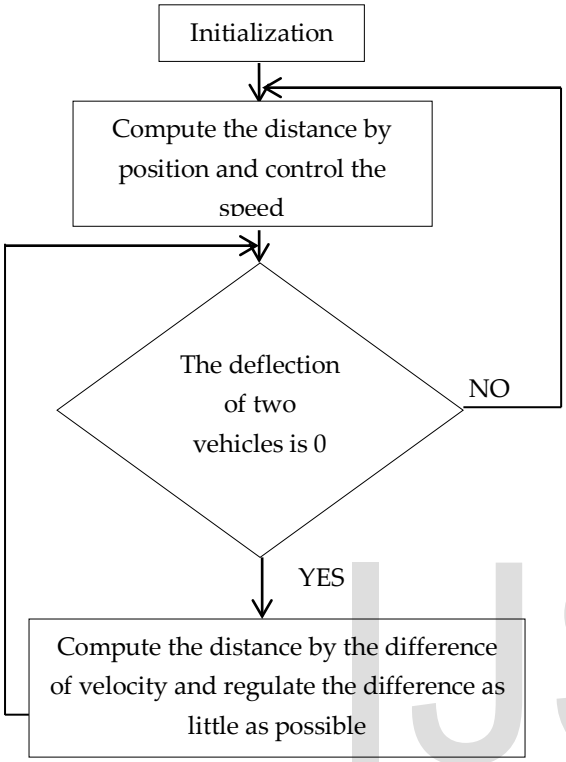

Fig. 1 Flow diagram of vehicle tracking

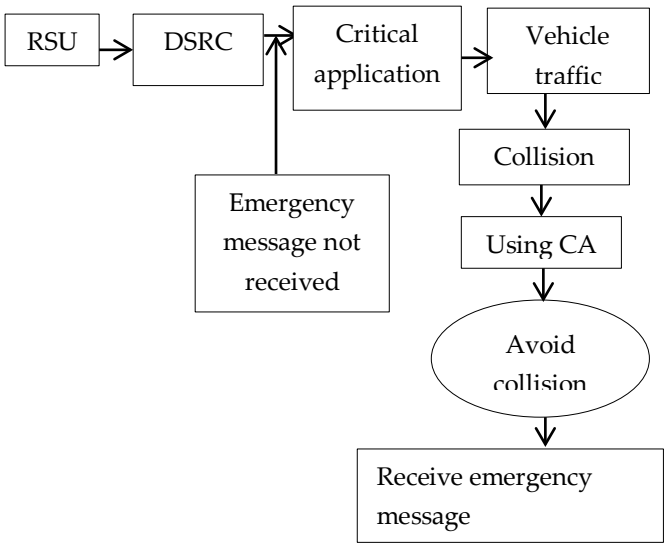

Fig .2 Block diagram of CAS

CA system is fixed in accident zone on road side.it covers nearly 1 to 6km.CA system can generate an emergency message to drivers before 2km they reach the potential dangerous zone in paper [7].Before critical application the emergency message is not send means on that time vehicle traffic and collision will occur. Due to that by using CA system can avoid collision and receive the emergency message. Before critical application the emergency message receive means on that time vehicle traffic and collision will not occur.

3.4 Dichotomized Headway Model

This model is mainly used to find the distance between front of one vehicle to front of subsequence vehicle and the inter vehicle spacing is 50m.

3.5 The Braking Model

This braking model is used to warn (or) attention for drivers. If two vehicles are going on the road means on that time the front vehicle is going to turn right means on that time the current vehicle can automatically slow the speed and applying automatic brake control.

3.6 Greenberg's Logarithmic Model

Greenberg's Logarithmic Model is an interesting observation in that the number of car crashes in an accident is not monotically increasing function of vehicle density. If the traffic density is high automatically vehicles go too slowly because those vehicles can block the preceding vehicles.

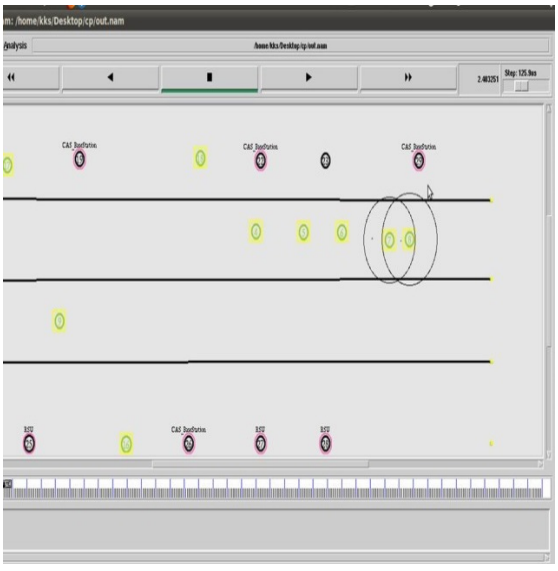

Fig. 3 Vehicles transferring the data

The above screen shot shows vehicles are in moving condition at the same time vehicles can transferring the individual data to other vehicles. Individual data means vehicles speed, distance, velocity and position. The big

circle denoted as the vehicles coverage area. The two big circles show individual vehicles coverage area. The big circle covers only the short distance to the front vehicle. Each and every vehicle having some coverage area to communicate the front vehicle.

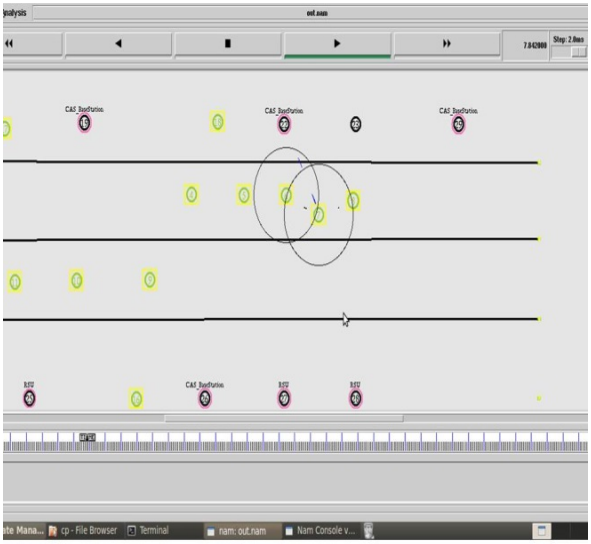

Fig. 4 CAS giving first priority to the fast going vehicle

Vehicles can transfer the individual data to each vehicle and CAS can generate an emergency message and giving first priority to fast going vehicle. Fast going vehicle can receive emergency message from CAS base station and it transfers its own moving status to other vehicles.

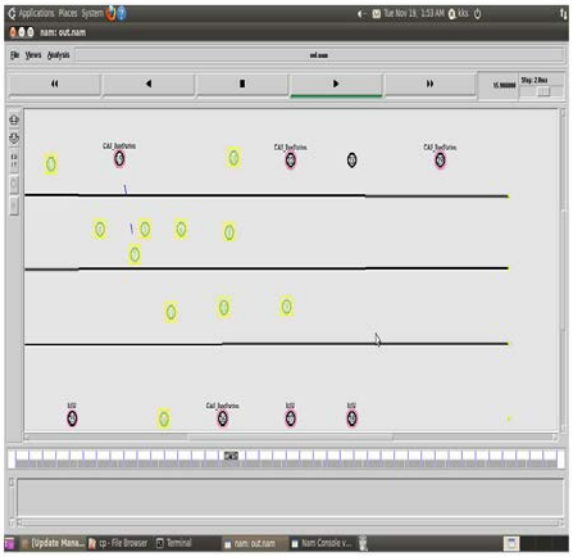

Fig. 5 Second CAS also giving first priority to fast going vehicle.

Fast going vehicle can reach the next CAS base station and CAS giving first priority to the fast going vehicle.

4 APPLICATIONS

1) The Public Safety Application

It is used to avoid accidents and collision warning systems reduce the number of vehicle collision.

2) Traffic Management Application

Traffic management application focused on improving traffic flow and reducing congestion as well as accidents. Traffic monitoring, traffic light scheduling and emergency vehicle these are all to controls the traffic.

3) Traveller Information Support Application

Local information's such as local updated maps, location of gas stations, parking areas and local museums can be downloaded from selected infrastructure places. Comfort Application the passengers easy to communicate each other vehicles (or) ground base destinations such as internet host (or) PSTN.

5 CONCLUSIONS

In this paper we proposed a vehicle to vehicle safe spacing algorithm, vehicle tracking and collision avoidance system in real time application. VANET is used to improve road safety and travel comfort by inter vehicle communications. The proposed model is simulated in ns2 and output is shown by using network animator. Vehicle to vehicle safe spacing algorithm is used to adjust the velocity of current vehicle to front vehicle. Vehicle tracking is used to track vehicles movement status, location, and position of vehicle. The tradition of controlling vehicles to run or wait by traffic a light at cross roads has been altered by a vehicles contact each other and exchange the messages. Vehicles near to the accident site can slow down (or) stop before colliding with the preceding vehicle (or) vehicles further away can quickly change their lanes. The CA system must keep the latest road information more frequently to the drivers when the detection of traffic density by the safety application with in this critical range. Collision avoidance system is fixed in dangerous zone on road side. It nearly covers 1km to 6km. It can generate an emergency message to the drivers, before 2km they reach the potential dangerous zone.

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