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A PATH FOR HORIZING YOUR INNOVATIVE WORK

"VEHICLE COLLISION ALERT"

MR. CHETANKUMAR B. KAMBLE[1], DR. H. R. DESHMUKH[2], PROF. S. A. CHANDURE[3]

1. M. E. First Year, Department of Computer Science & Engineering, IBSS College of Engineering, Amravati.
2. Prof and HOD, Department of Computer Science & Engineering, IBSS College of Engineering, Amravati.
3. Asst. Prof, Department of Computer Science & Engineering, IBSS College of Engineering, Amravati.

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Abstract: This paper deals with the forecasting of collision events in Vehicle Ad hoc Networks (VANET). Using significant parameters of each vehicle such that: position, speed, acceleration and direction, it is possible to avoid a possible collision. We present a collaborative forecasting module for VANET. The proposed module is focused on the estimation of these parameters using a kinematic model of each vehicle. As a result, each vehicle of the network could have a posterior global view of the dynamics of its network. The forecasting module is embedded in all vehicles of VANET and estimates the parameters of the Subject vehicle and those of its neighbors. Estimated parameters is used beforehand to generate alerts in case potential risk. The communications between nearby vehicles (V2V communications) and the Road side infrastructure (V21 communications) is carried out by DSRC protocol (Dedicated Short Range Communication).Simulation results illustrate the estimation vehicles Parameters.

Keywords: VANET communication; DSRC; Kinematic, Equations; Estimation; Road safety; Forecasting module;

Corresponding Author: MR. CHETANKUMAR B. KAMBLE

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INTRODUCTION

Faced with the growing development of intelligent transportation systems (ITS) and with the arrival of the embedded telematic, the vehicles are become more and more sophisticated. Consequently, make the intelligent road and therefore both interactive and communicative constitute a new concept in advanced driver support systems. The whole of developed applications and conducted research in ITS relate to the improvement of the road safety. In order to fulfill the main objective that is the collisions avoidance, the vehicles must exchange its significant information namely: position, velocity, steering angle or next movement etc. The most problem faced by the drivers using the road are, especially, due to the deficiency of the communication between vehicles. The majority of accidents can be avoided if one of the drivers is alerted just-in-time before the occurrence of collision events. The question which arises is: How the drivers can detect and avoid, a priori, a possible danger. Some research does not deal really the problem of the road safety. This is seen in, the messages sent that are either messages of alarm for dangers already occurred or messages of information Vehicle-to-vehicle communications one of the solutions that vehicles enable to exchange the necessary information such that: position, velocity, acceleration, steering angle, etc. It is worth noting that the estimation of the same parameters is one of the solutions

which allow the vehicle to detect beforehand a possible risk. Our work intends to propose a forecasting module embedded in vehicle that contributes to reduce the road traffic collision. We present the structure of conceptual scheme for communication model in V ANET taking into account the forecasting module based on estimator part of this model. This structure is focused on the estimation of the necessary vehicle parameters that may imply the traffic collision. Each vehicle of this model introduces the technical alert nearby vehicles in case when the vehicle forecast the occurrence of any risk (Estimation, Generation Risk, Decision, and Reaction). This does not mean that estimations should allow the prediction of accidents accurately, but the distinction between a high-risk situation "collision" and a low risk situation "no accident".

WORKING

Presentation of a Communication by Network:

Assuming a communication network (V ANET) is constituted by N vehicles divided into two groups. The first group contains just only one vehicle which is the vehicle in question (SV) and the second group contains the other vehicles or neighbor vehicles (OV) [6]. In our model, each vehicle of the network is equipped by an estimator, and thus the vehicle could have a posterior global view of the dynamics of its network. The estimation of future state is carried out using an embedded forecasting system. This system estimates the parameters of its vehicle and those of its neighbors, such parameters are: position, velocity, acceleration, steering angle, or heading angle etc.

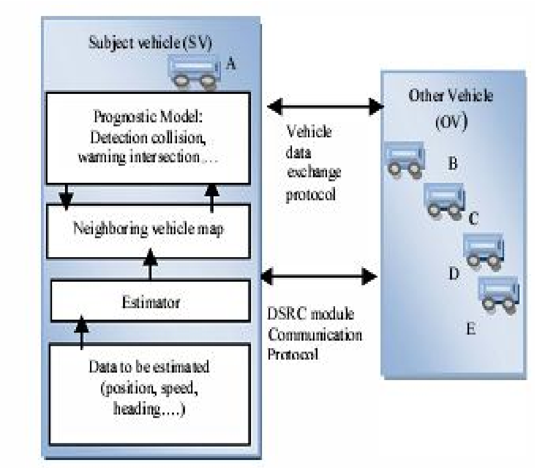

Figure4. The proposed architecture communication model in VANET

The proposed architecture communication model in V ANET The architecture has significant common elements useful to Multiple warning applications. These include: The Neighboring Vehicle Map layer in each vehicle has several functions This layer is seen as a bridge between the subject vehicle and the other vehicles, it transmits and receives the estimates of the vehicles, then translates the generated risk on a display board.

• It passes the GPS position, speed, and heading information produced by its Estimator to the Vehicle Data Exchange Protocol Entity for transmission to other vehicles.

• It receives the GPS position, speed, and heading messages sent by other vehicles from the Vehicle Data Exchange Protocol Entity.

• It transforms this information to relative coordinates and plots it on the Neighboring Vehicle Map. Thus our architecture requires the standardization of two protocols, shown as the Vehicle Data Exchange Protocol

And Communication Protocol in figure 5. Vehicles need to send position, speed, heading, and possibly other data in a format understood by all vehicles. This is the Vehicle Data Exchange Protocol (VDEP). The VDEP messages need to be sent over a communication protocol and radio standardized across vehicles. In our case this is 802.11 p Dedicated Short Range Communications [5].

The position, speed and direction are important information in the inter-vehicle communication to avoid a possible collision. The estimation of the same parameters used beforehand to generate alerts to a potential risk, for this reason a forecasting module is integrated into the proposed communication model. The operation of this module is shown in the following figure:

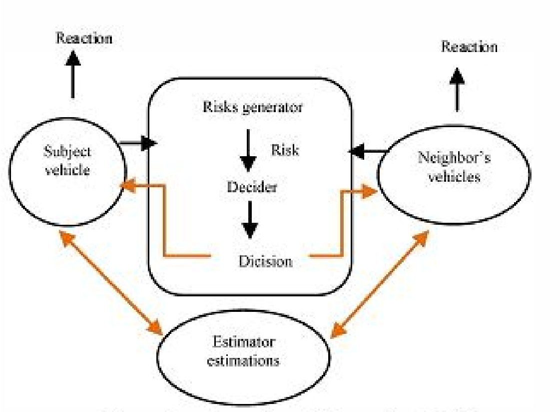

Figure5. Operation of forecasting Model

Figure. Operation of forecasting Model

CONCLUSION:

In this article we have detailed kinematic modeling of vehicle type, than we are focused on the movement estimation of the vehicle by the programming of the kinematic model equations. Our contribution treats a suggested scheme, this architecture is based on the estimation of some important parameters in the inter-vehicle communication as: position, velocity, and direction. This model allows to each vehicle to have an estimation of the future state network, this estimate is calculated by an embedded estimator in each vehicle. The estimator output is an input of a forecasting module that detects the potential risk presence, chooses an appropriate decision and transmits it to nearby vehicles. To implement our architecture, we started with the simulation of the estimator using the kinematic equations of vehicle type. Our future work is to extend our simulation model for all network nodes, i.e. implement both the estimator of all neighboring nodes and the communications protocol ensuring transmission of the calculated estimations at real time.

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