A Routing Algorithm Based on Dynamic Forecast of Vehicle Speed and Position in VANET

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Abstract
Reactive routing protocols such as GPSR, and Ad hoc On-demand Distance Vector (AODV)routing determination on an interest or need premise and keep up just the courses that are at present being used, along these lines lessening the weight on the system when just a subset of accessibleroutes is in use at any time. Communicationamong vehicles will just utilize an exceptionally set number of routes, and therefore reactive routing is especially suitable for this application situation.
In this paper, we take the position that VANETs would to be sure end up being the systems administration stage that would support the future vehicular applications.We analyze the factors that are critical in deciding the networking framework over the future vehicular applications. We dissect the elements that are discriminating in choosing the systems administration structure over which the future vehicular applications would be conveyed and demonstrate that there are dynamic examination endeavors towards making VANETs a reality in the near future.

Keywords
GPSR, Ad-hoc On-demand Distance Vector (AODV), VANET

I. Introduction
In the recent years, vehicular systems administration has picked up a ton of ubiquity among the business and scholastic examination group and is seen to be the most important idea for enhancing proficiency and security for future transportations. With the wireless technology becoming pervasive and cheap, several innovative vehicular applications are being examined. We arrange these applications into two primary classifications–

A. Safety Related [1]
Applications like road conditions warning, collision alert, deceleration warning merge assistance, etc. will be grouped under security related applications where the fundamental accentuation is on timely disseminations of safety discriminating alarms to close-by vehicles.

B. Internet Connectivity Related [2]
Accessing messages, web searching, sound and video streaming are a percentage of the network related applications where the accentuation is on the accessibility of high data transmission stable web integration.
While Info-stations and 3Gfundamentally give the vehicle to foundation (gateway) communication (V2I) in the context of vehicular communication, VANETs assumes a more generic framework that includes both the vehicle to vehicle communication (V2V), vehicle to passenger communication (V2P) and limited V2I communication with higher accentuation on the V2V communication. It is imperative to comprehend that the V2I communication model in VANETs is not all around characterized and a large portion of the present proposition accept the vicinity of restricted or irregular internet connectivity [3].
In this paper, we the benefits of utilizing VANETs based approach as a part of comparison to a pure V2V or V2P or a pure V2I based solutions and take a position that a tight integrationof the V2V and V2I functionalities would turn into the best model for the future vehicular applications. In particular, we underscore that the poorly characterized V2I communication infrastructure in VANETs would head towards the supposed "3G" methodology where there is pioneering usage of the best accessnetwork. We believe that the latency concerns identified with the security applications would be served by the high data transfer capacity, low inactivity V2V base and thedelay tolerant internet connectivity based applications and the security concerns would be tended to through the V2I framework [4].

The fundamental elements that would impact the adoption of VANET architecture for future vehicular applicationswould be -
1. Extensive development of intuitive and interactive media applications
2. Low latency prerequisites for security applications
3. Increasing concerns about privacy and security

While there are solid motivations to receive the VANET architecture as pointed above, there are likewise a few examination challenges that needs to be addressed beforeVANETs could become widespread. They include -Data dissemination techniques, Lack of simulators for protocol evaluations, Security and Privacy concerns, Market penetration/Bootstrapping issues, collision avoidance capability and Automatic incident detection and Driver distraction studies [5].

We contend for the accomplishment of VANET architecture and elaborate on the above mentioned research challenges in the accompanying areas with a plan to persuade the peruse that there is in reality a dynamic effort towards bridging these gaps and VANETs with a hybrid V2I- V2P infrastructure would indeed become a reality for the future vehicular networking applications.

II. Objectives
Routing in VANET has the following problems to be analyzed:
1. Traffic information such as section travel time, density and flow rate must be analyzed.
2. Traffic congestion, Road conditions and information can be exchanged between vehicles, including speed, acceleration, direction, and position, which can greatly improve the vehicle safety.

Proposed approach uses the vehicle-to-vehicle, vehicle-to-passenger and vehicle-to-infrastructure communication to ease congestion is specially based on beacon messages.

3. Total profit is collected as the driving time and waiting time of vehicles.

III. Related Work
As of now, the Car-2-Car Communication Consortium [6] recognized guidelines for offering vehicle-to-vehicle trades furthermore reference protocol planning, however did not describe channel and traffic models, channel utilization, and routing algorithms yet. This leaves the floor to further study and recommendation,

especially in the context of routing.

To be sure, the basic thought of VANETs gets from the unquestionably comprehended model of mobile ad-hoc networks (MANETs), framework less systems where wireless hosts communicate with each other in the absence of a fixed infrastructure Multihop data correspondence in VANETs is normally given through area based ad hoc routing protocols [7], a class of multihop routing for ad hoc networks.

Traditionally, multi-hop routing for MANETs can be arranged into proactive and responsive algorithms: in proactive routing algorithms, each node in the mobile ad hoc network maintains a routing table that contains the ways to every conceivable destination. If the system topology by regional standards changes, every single routing tables throughout the network have to be updated.

In the event that the hubs in the system are sensibly mobile, the overhead of control messages to upgrade the routing tables becomes prohibitive. Reactive routing algorithms, on the other hand, find routes only on demand. Routes are designed when they are required, keeping in mind the end goal to minimize the communication overhead. A detailed review of routing algorithms in mobile ad hoc systems can be found in [8], which were of late incorporated by numerous commitments.

In this framework, an interesting approach is represented by position-based routing algorithms, which oblige data about the physical position of the partaking hubs and it is precisely the class of algorithms envisaged to be implemented in VANETs, due to the continuous localization process performed by GPS devices equipped on vehicles.

In such schemes (like Location Aided Routing (LAR) [8]and Distance Routing Effect Algorithm for Mobility (DREAM) [9]), the forwarding decision is primarily based on the position of the packet destination and the position of the node's immediate one-hop neighbors. A point by point study of protocols that do use geographic area in the routing decision is presented in [10].

IV. Proposed Work

A. Implementation Architecture

VANETs are a manifestation of mobile ad-hoc networks to provide communications among close-by vehicles and in the middle of vehicles and between vehicles and nearby fixed equipment. To this end, exceptional radios and sensors would be embedded within the car. The V2V-V2P communication infrastructure assumes the presence of high bandwidth with low latency [11].

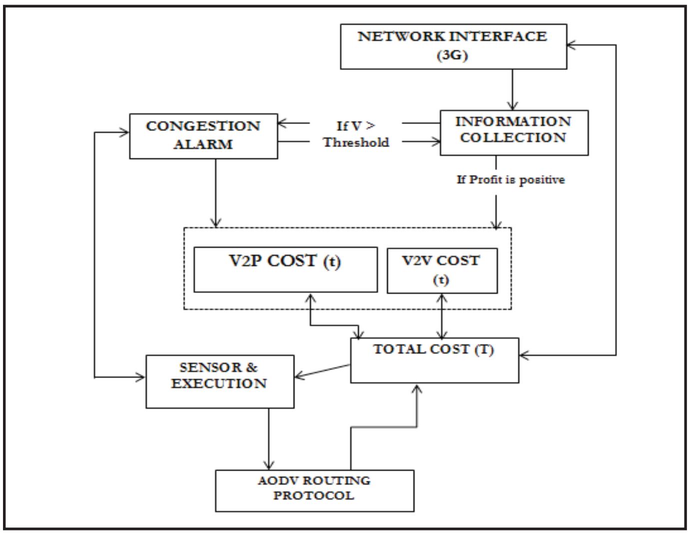

Fig. 1: System Architecture of Proposed Solution

The radios regularly work on unlicensed band making the range free. V2V-V2P would be the security related application since the inactivity necessities for these applications are extremely stringent. The V2V-V2P foundation in VANETs can give low inactivity information scattering from the purpose of effect to the close-by vehicles utilizing short range radios.

B. Simulation components

Using NS-2 to simulate network transmission through the establishment of a statistical model, for the evaluation and design of network protocols to provide a good test platform and experiment, compare SWF-GPSR with AODV routing protocols. For comparison performance of the forwarding strategies, select three key markers for assessing for evaluating routing protocols for data collectionand analysis of results.

(i) Time efficiency: Time efficiency is used as the main efficiency factors.

Basic fuel charges: 550

Net profit: (Driving charge + Waiting charge) – fuel charge

(ii)Speed: Speed and acceleration are computing factors of efficiency of sensors.

Speed= Distance covered/ time

(iii) Route length: The number of nodes through which data packet from the source node to the destinationnode successfully posted, that is, the count of hop.

Route length= current position(x, y, z) - previous position(x, y, z)

(iv). Link Stability: The number of routing link changes in simulation time.

C. Implementation Processing

Implementation processes as per following simulation steps:

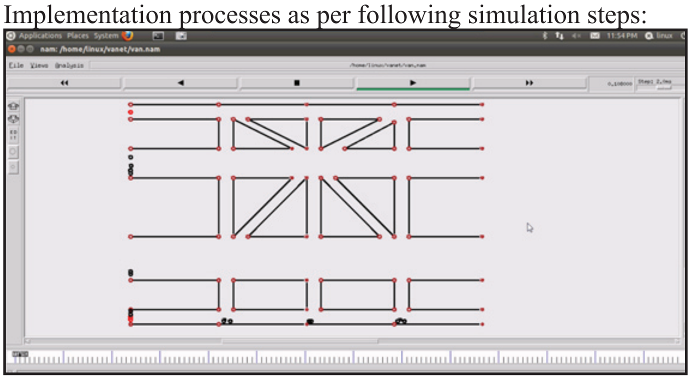

Fig. 2: Initialization of Simulation of VANET

Fig. 2 presents the initialization of simulation in which black circles are the vehicles and red are the passengers that standing at the corners of the roads.

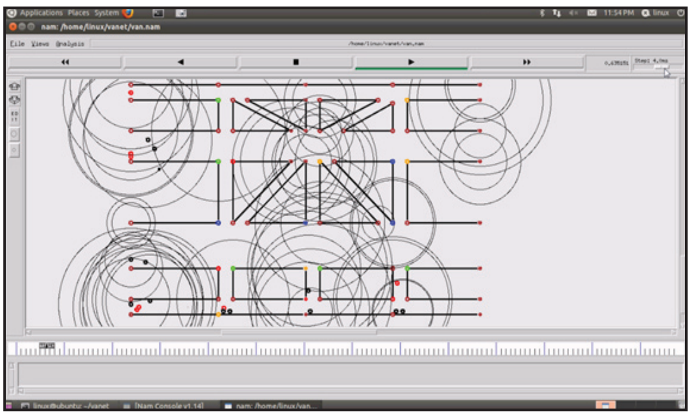

Fig. 3: Proposed Solution Showing Sensor & Execution Work

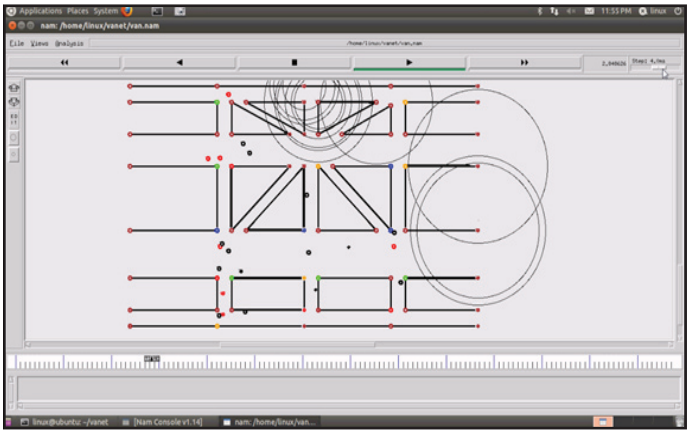

Fig. 4: Proposed Solution Showing Congestion Control and Alarm

Fig. 3 presents the working of sensors. As the entire black loop generating are the execution of information collection process using the sensors according to greedy approach. Fig. 4 presents the congestion control and alarm process. As the entire black dots dropping from the sensors are the executions of congestion control and alarms.

V. Simulation Results

The new set of issues is composed of two groups:

1. Basic expense
2. Net profit

The simulation results are drawn on the basis of profit computed from the proposed solution. The profit is computed in terms of cost i.e. time (sec).

Fig. 5 presents the results of existing SWF-GPSR protocol in which we can see that the profit value is even in negative.

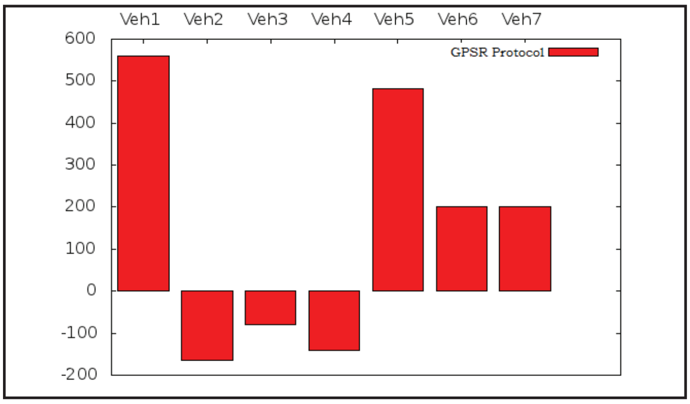

Fig. 5: Results of existing SWF-GPSR protocol

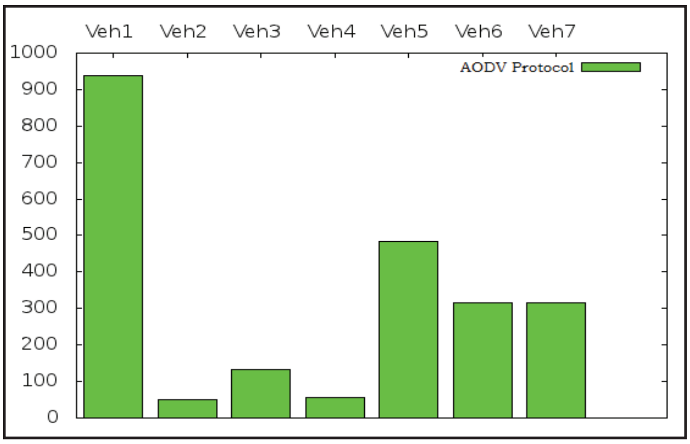

Fig. 6: Results of proposed AODV protocol

Fig. 5 presents the results of proposed AODV protocol in which we can see that the profit value is nearly 1000 in positive.

Comparative Analysis

Thus the enhanced solution provides better efficiency than the existing SWF-GPSR routing protocol. Further AODV proposed method will increase the processing speed of the project. It also implements the congestion alarm to enhance the security and traffic control.

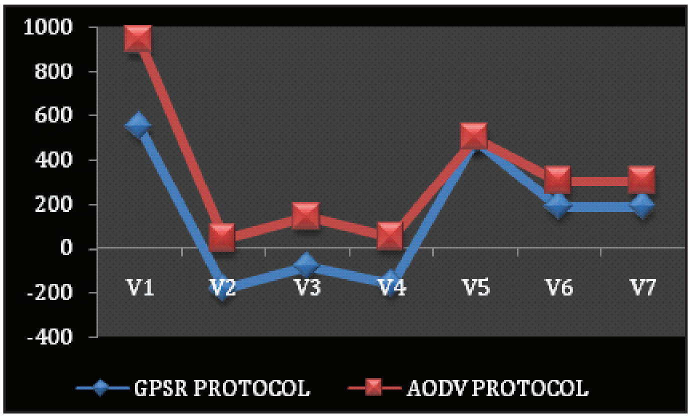

Fig. 7: Comparison results of GPSR and AODV routing protocol

VI. Conclusions

In this paper, changes in the distance and location from the relative speed of vehicles,according to types of vehicles,makes heuristic gauge for vehicle velocity in light of wave variances in equilibrium theory, achieves collection of the nodes of stable relative velocity, then designs the proposed AODV routing protocol to predict continuity and change timing ofvehicles speedand change timing of vehicles pace, and after that processes position that vehicles may happen in, figuring out the most brief course before limit sending model is enacted. The outcomes demonstrate that the proposed AODV convention has better power and higher execution.

The next step of research is to enhance the speed forecasted curve division rate and cutoff speed processing routines and more proficient VANET routing algorithm for particular city road.

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