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An Effective Localized Broadcasting Approach in VANET'S

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Abstract: Location information is crucial for most applications and protocol designs in vehicular ad-hoc networks (VANETs). Localized Information with Geographical Restriction (LINGER) as a communication protocol, for persistent information to the vehicular users. LINGER is to dispatch the information in localized areas of a mobile network without requiring the knowledge of the vehicles routes or destination so that, even in dynamic traffic scenarios, information can be sent from source to destination. To efficiently use LINGER, without choosing a single node to transmit the information for all nodes in a Region of Interest (RoI), we combine FPAV (Fair Power Adjustment for Vehicular Adhoc Network), a power control algorithm by using optimum power to transmit the information that avoids the delay and collision.
Keywords: Global positioning system, Region of Interest, Persistent Information

I. INTRODUCTION

In a geographical area where a piece of information needs to be periodically distributed, LINGER drives the information from the data source to the area of interest, and, once there, it aims at keeping the information content within the area so that passing-by users can receive it. In traditional approaches, this is obtained by object tracking techniques that keep tracking the objects and publish the information to the users. In highly dynamic environments, however, these approaches are not efficient as the target objects in VANETs are typically vehicles that present high mobility. Their locations keep changing in a large range so that the tracking and information publication algorithms have to be frequently invoked to obtain the instant locations of the objects. To deal with the above problem, we go for Localized Information with Geographical Restriction (LINGER). It does not require knowledge of the network environment or of privacy sensitive information on mobile users, such as vehicles routes or final destinations, nor the prediction of mobility patterns. Furthermore, it is implemented through a very lightweight Communication protocol. All these facts make LINGER a practical solution, which can be implemented in real-world vehicular communication systems. Too efficiently use LINGER, without choosing a single node to transmit the information for all nodes in a Region of Interest (RoI), we combine FPAV (Fair Power Adjustment for Vehicular Adhoc Network), a power control algorithm, with LINGER which finds the nodes optimum transmission range of every vehicle. It allow the users to send beacon messages to inform the nodes current position, direction, velocity, etc. the power used to transmit beacons can be adjusted, so that the overall network bandwidth used for beaconing can be kept under control By combining these two approaches it eliminate the existing problem by using optimum power to transmit the information that avoids the delay and collision which is shown in simulation results.

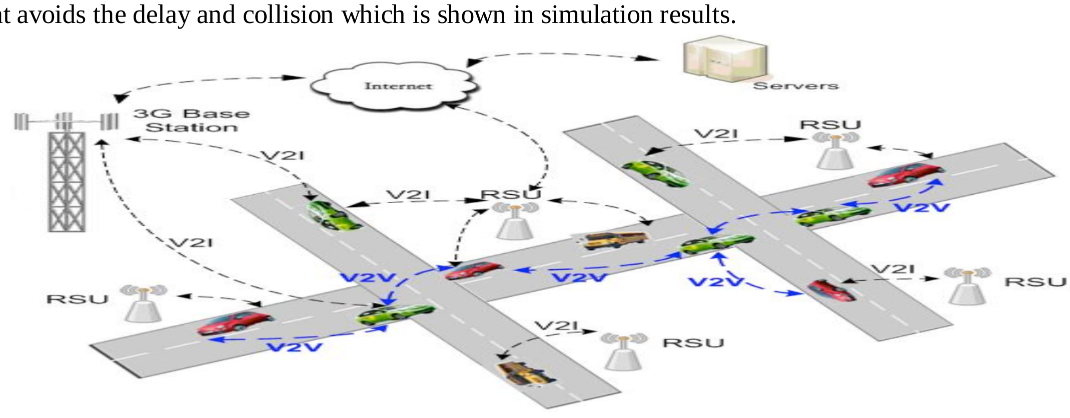

Figure 1.1 Basic Structure of VANET

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The objective of the project involves,

A. Location based advertisements emphasizes reliability in order to achieve higher coverage of vehicles, while information delivery which broadcast emergent information to approaching vehicles.
B. To enable the best nodes to transmit the packet without waiting.

II. LITERATURE SURVEY

According to [1], A distributed protocol, named LINGER (Localized Information with Geographical Restrictions) for persistent localized broadcasting. Given a geographical area where a piece of information needs to be periodically distributed, LINGER drives the information from the data source to the area of interest, and, once there, it aims at keeping the information content within the area so that passing-by users can receive it. The main objective of LINGER is therefore different from the one of geographical routing schemes, which aim at delivering an information content at a given location but are not concerned about information persistency within a geographical area.

According to [2], Vehicular ad hoc networks (VANETs) using WLAN technology have recently received considerable attention. The evaluation of VANET routing protocols often involves simulators since management and operation of a large number of real vehicular nodes is expensive. The behavior of routing protocols in VANETs by using mobility information obtained from a microscopic vehicular traffic simulator that is based on the on the real road maps of Switzerland. The performance of AODV and GPSR is significantly in enhanced by the choice of mobility model, and we observe a significantly reduced packet delivery ratio when employing the realistic traffic simulator to control mobility of nodes.

According to [3], Mobility is the distinguishing feature of vehicular networks, affecting the evolution of network connectivity over space and time in a unique way. Connectivity dynamics, in turn, determine the performance of networking protocols, when they are employed in vehicle-based, large-scale communication systems. Thus, a key question in vehicular networking is: which effects does nodes mobility generate on the topology of a network built over vehicles such has been quite overlooked by the networking research community unveiling the physical reasons behind the peculiar connectivity dynamics generated by a number of mobility models.

According to [4], When considering safety-related communication, two types of messages can be identified: periodic and event driven. Periodic exchange of “status” messages that contain the vehicle’s position, speed, etc. (also called beacons) can be used by safety applications to detect potentially dangerous situations for the driver (e.g., a highway entrance with poor visibility). It is assumed that every equipped vehicle will also contain a global navigation satellite system (GNSS). E.g. Global Positioning System (GPS) to determine its absolute position. On the other hand, when an abnormal condition (e.g., an airbag explosion) or an imminent peril is detected by a vehicle, an event-driven message (also called emergency message in the following discussion) is generated and disseminated through parts of the vehicular network with the highest priority.

According to [5], Communication with a fair delay tolerance may instead be provided by intermittent store and-forwarding between nodes. The system provides public broadcast channels, which may be openly used for both transmission and reception. The analysis is based on a queuing model to study the interactions among the mobile nodes in a street. The continuous connectivity paradigm has also been assumed for asynchronous services with generous tolerance of delay in the delivery of data.

According to [6], A node will send its beacon at maximum power, as this in general guarantees that more nodes will receive the beacon, resulting in increased safety conditions. On the other hand, the higher the power used to send beacons, the higher is the network load generated by the beacon exchange activity. After presenting our fairness problem and formally defining it in terms of a maximum optimization problem with an extra condition per node maximality, an approach to solve his problem based on power control, and provide an optimal algorithm, called FPAV (Fair Power Adjustment for Vehicular environments) .The results show FPAV’s fairness and effectiveness in confining the network load generated by the beaconing activity below a certain desired threshold .we discuss the issues that must be dealt with when bringing FPAV into a real scenario. Implementing an admission control mechanism to drop all non-safety related packets before being sent to the control channel, or minimizing the packet generation rate.

III. EXPERIMENTAL SETUP

The LINGER protocol covers both the routing and the persistence phase. A single metric referred to as lingering index is used to select the most suitable information bearer in either phase. We design LINGER with simplicity in mind; in particular, we do not make use of outside information that may not be readily (if at all) available to mobile nodes. Rather, in order to compute its index, a

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vehicle requires knowledge only of its own movement to date. This allows us to define a lightweight communication protocol for bearer selection and information transfer between old/new bearers. The lingering index computation algorithm and the communication protocol are detailed below.

Broadcast in a network begins with transmission from a source node. In blind flooding solution, all receivers relay the message upon its reception and ignore the subsequent copies of the same message. Because of shared wireless channel, blind retransmission lead to contention and collision in transmissions among neighboring nodes, which degrades reliability. Sender oriented approaches and receiver oriented approaches are used to address this problem. The receiver oriented approaches are based on local timers, which differentiate the broadcast time of each node by setting different timeout.

Sender oriented approaches achieve instant retransmissions. Sender dedicates one or more forwarders which are then able to retransmit immediately. This appears promising approach for warning delivery. LINGER along with FPAV algorithm is used by considering a scenario in which a set of vehicles (also called cars, users, or nodes, in the following) is moving along a road. Periodically, users send beacon messages to inform the nodes in their vicinity of their current position, direction, velocity, etc. For clarity reasons in the problem formulation, we assume that the beaconing frequency is the same for all the nodes in the network. However, the power used to transmit beacons can be adjusted, so that the overall network bandwidth used for beaconing can be kept under control.

In principle, a node will send its beacon at maximum power, as this in general guarantees that more nodes will receive the beacon, resulting in increased safety conditions.

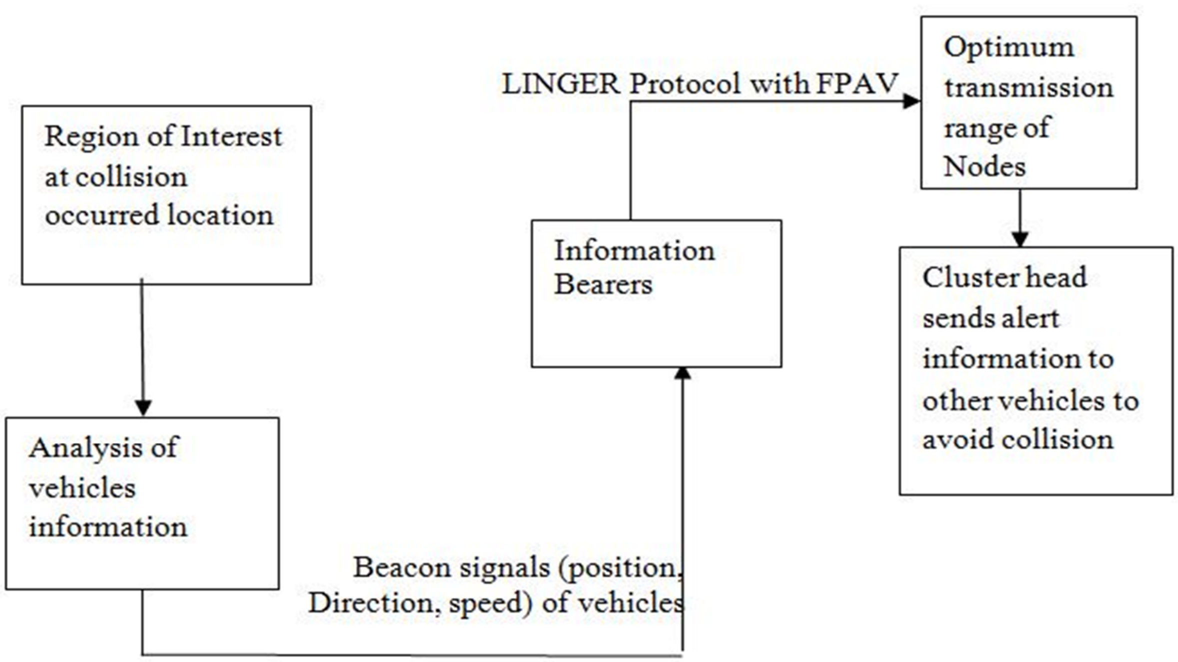

Figure 3.1: Communication protocol to send alert information

On the other hand, the higher the power used to send beacons, the higher is the network load generated by the beacon exchange activity. We recall that in the envisioned application scenario, the above described beaconing activity is assigned with a limited portion of the available network bandwidth, the remaining bandwidth being available for event-driven safety messages.

Thus, the ‘node optimal strategy’ of sending the beacon at maximum power in general conflicts with the network-wide task of keeping the network load offered by beaconing below a certain threshold. As a consequence of this, we need a strategy for setting the node transmit power levels such that the beaconing network load does not exceed the threshold, and the beaconing transmit power levels are maximized.

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IV. RESULTS AND DISCUSSION

Figure 4.1 shows the simulation results that LINGER choose a single node to transmit the information for all nodes in a Region of Interest so that, even in dynamic traffic scenarios, information can be sent from source to destination.

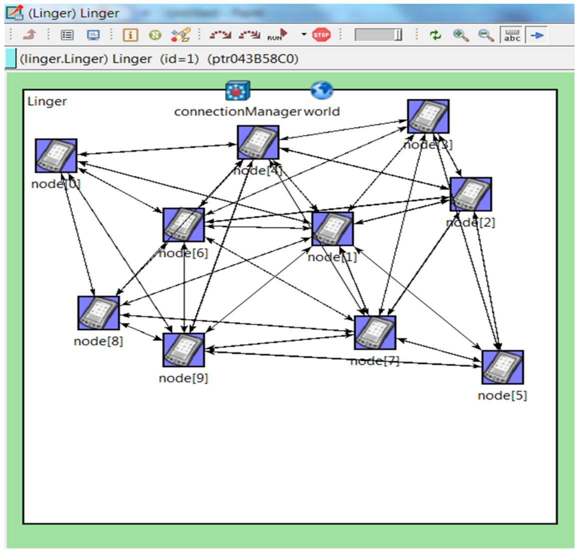

Figure 4.1: Node Transmit from LINGER

But the issue in LINGER is it chooses a cluster head and forwards the information from a Region of Interest. So there is a chance of collision and also it consumes more bandwidth.
By combining FPAV with LINGER, it finds the optimum power transmission range of nodes and choose a single node to transmit information to all the nodes in a region of interest which is shown in below figure 4.2

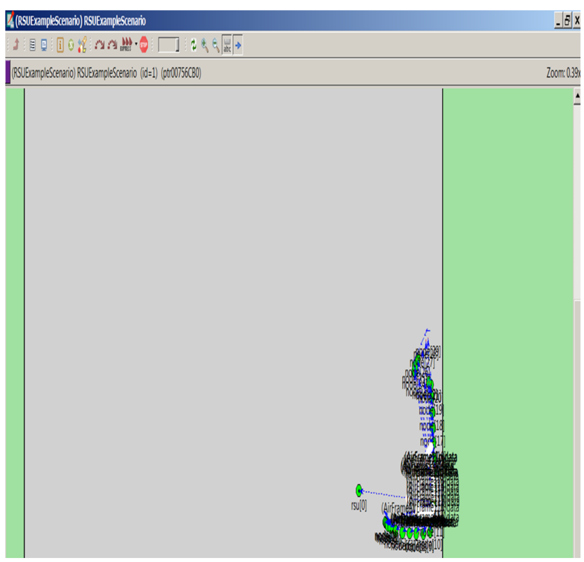

Figure 4.2: Finding Optimum Transmission Range using FPAV

FPAV allow the users to send beacon messages to inform the nodes current position, direction, velocity, etc. the power used to transmit beacons can be adjusted, so that the overall network bandwidth used for beaconing can be kept under control.

The performance statistics when combining FPAV algorithm with LINGER is shown in Figure 4.3. Information can be sent from source to destination in a highly dynamic changing environment. The beacon has information such as speed, position, direction of node. So FPAV is more efficient solution for information transmission.

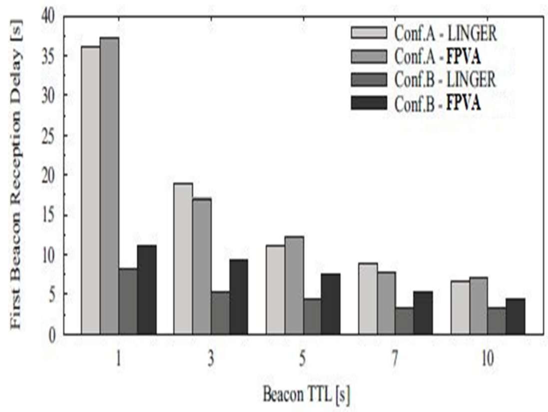

Figure 4.3: Performance statistics

V. CONCLUSION

Vehicular network wishes to dispatch specific information to the localized areas, LINGER protocol is act as a data broadcaster within a region of interest, LINGER creates a node and successfully deliver the message to the nodes by using MiXiM. Flow modeling and road segment was implemented in SUMO environment. To enhance the use of LINGER, FPAV algorithm was combined to deliver the message to the vehicle without delay and collision within the Region of Interest.

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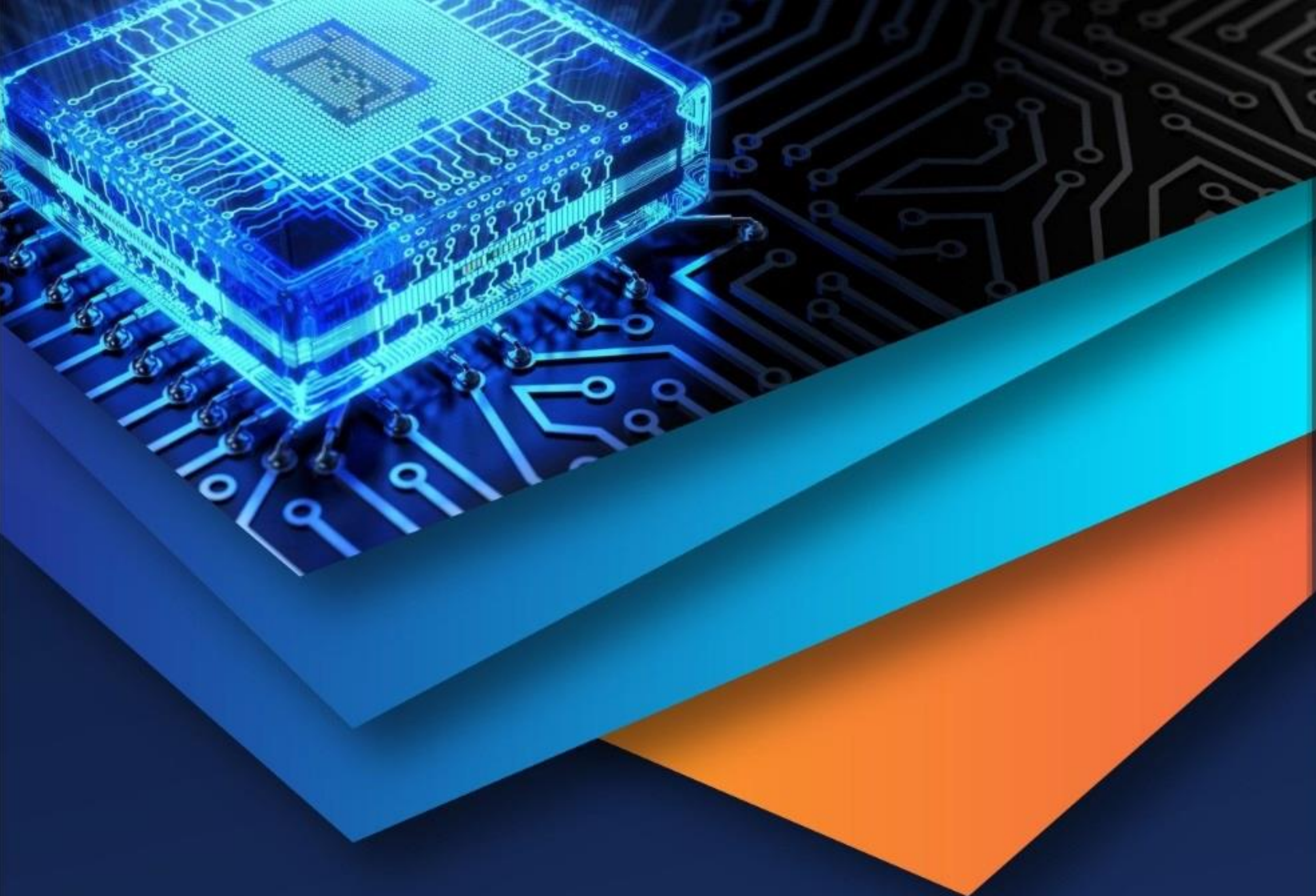

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