

## Application Areas Of VANET : A Survey

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**Abstract**—This paper introduces various applications regarding the VANET (Vehicular Ad-hoc Network). The goal is to study the various applications both available & possible of VANET. It's main feature is to provide car safety and passenger comfort, field trip planning & Traffic prediction with real-time traffic information. For this VANET requires Vehicle-to-vehicle communication & that too is totally wireless & with moving vehicles. The existence of such networks opens the way for a wide range of applications. In this chapter we will look at some of these applications of VANET.

**Keywords**- VANET, Safety Applications, Comfort Applications, Management Applications, on-coming traffic warning

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### I. INTRODUCTION

**VANET** :- Vehicular Ad Hoc Network. A type of MANET that allows vehicles to communicate with road-side equipment

The use of radio communications for vehicle-to-roadside and vehicle-to-vehicle communications for the purposes of :

- Increasing traffic safety (“save lives”);
- Increasing traffic efficiency (“combat with traffic jams”);
- Increasing environmental friendliness (“reduce CO2 emission”).

To get the idea of VANET it is better to view application domain of it. The VANET at currently has three types of applications. There are basically three types applications of VANET

1. Safety Applications
2. Comfort Applications
3. Management Applications

Let's have some introduction about these apps shall we.

### 1. Safety Applications

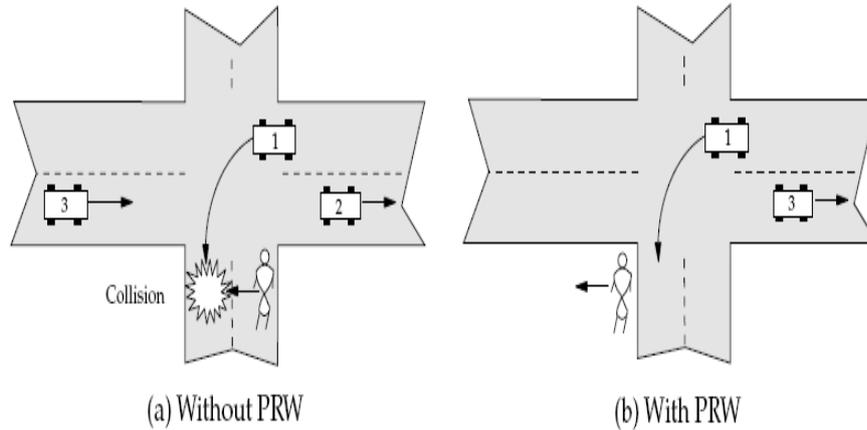


Figure 1: Roadway warning [2]

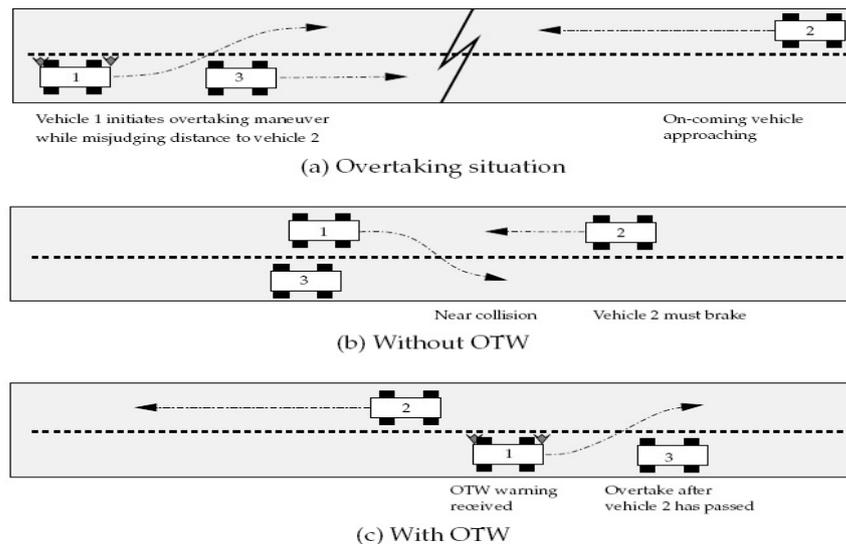


Figure 2: On-coming traffic warning [2]

The applications regarding safety are strictly tied to the main purpose of vehicles: moving from a point till to destination. Car collisions are currently one of the most frequent dead causes and it is expected that till 2020 they will become the third cause. This leads to a great business opportunity for infotainment, traffic advisory service, and car assistance.

Safety applications are always paramount to significantly reduce the number of accidents, the main focus of which is to avoid accidents from happening in the first place. For example, Traffic View [15] and Street-smart [18] inform drivers through vehicular communications of the traffic conditions in their close proximity and farther down the road. Vehicle platooning is another way to improve road safety. By eliminating the hassle of changing lane and/or adjusting

speed, platooning allows vehicles to travel closely yet safely together [20]. Fuel economy can also benefit from reduced aerodynamic as a vehicle headway is tightened (e.g., the spacing can be less than 2 m [21]). Together with adaptive cruise control assisted by V2V communications, the problem of vehicle crashes due to human error can be alleviated. Some Safety application services are as below...

- Traffic signal violation warning
- Stop sign violation warning
- General in-vehicle signage
- Left turn assistant
- Intersection collision warning
- Pedestrian crossing information
- Emergency vehicle approaching warning
- Emergency vehicle at scene warning
- Vehicle safety inspection
- Electronic license plate
- Electronic driver's license
- In-vehicle Amber alert (crime haunt)
- Stolen vehicles tracking
- Post-crash/breakdown warning
- SOS services
- Pre-crash sensing
- Work zone warning
- Vehicle-based road condition warning
- Cooperative (forward) collision warning
- Emergency electronic brake lights
- Wrong way driver warning
- Rail collision warning [1]

## **II. Comfort Application**

The aim of infotainment applications is to offer convenience and comfort to drivers and/or passengers. For example, Fleet net [3] provides a platform for peer-to-peer file transfer and gaming on the road. A real-time parking navigation system is proposed in [3] to inform drivers of any available parking space. Digital billboards for vehicular networks are proposed in [3] for advertisement. Internet access can be provided through V2I communications; therefore, business activities can be performed as usual in a vehicular environment, realizing the notion of mobile office [3]. On-the-road media streaming between vehicles also can be available [3], [3], making long travel more pleasant. An envisioned goal is to embed human-vehicle-interfaces, such as color reconfigurable head-up and head-down displays, and large touch screen active matrix Liquid Crystal Displays (LCDs), for high-quality video-streaming services. Passengers can enjoy their traveling time by means of real-time applications e.g., video streaming and online gaming, using individual terminals next to their seats [3]. Figure depict the use of LCD devices for entertainment applications.



Figure 3: Visibility on Device

- Visibility enhancer
- Cooperative glare reduction
- Parking spot locator
- Enhanced route guidance and navigation
- Map download/update / GPS correction
- Cooperative positioning improvement
- Instant messaging (between vehicles)
- Point of interest notification
- Internet service provisioning
- Mobile media services
  - Mobile access to vehicle data[1]

### **III. Management Applications**

Traffic monitoring and management are essential to maximize road capacity and avoid traffic congestion. Crossing intersections in city streets can be tricky and dangerous at times. Traffic light scheduling can facilitate drivers to cross intersections. Allowing a smooth flow of traffic can greatly increase vehicle throughput and reduce travel time [3]. A token-based intersection traffic management scheme is presented in [3], in which each vehicle waits for a token before entering an intersection. On the other hand, with knowledge of traffic conditions, drivers can optimize their driving routes, whereby the problem of (highway) traffic congestion can be lessened [3]

- Highway merge assistant
- Cooperative adaptive cruise control
- Adaptive drive train management
- Intelligent traffic flow control
- Area access control
- Electronic toll payment
- Rental car processing

[1]

For Example a Traffic Management System must have following information to manage traffic.

- Identification: - what is causing the traffic problem and its seriousness;
  - Location: - the area, road or specific location affected
  - Direction: - the traffic directions affected;
  - Extent: - how far the problem stretches back in each direction;
  - Duration: - how long the problem is expected to affect traffic flow;
  - Diversion advice: - alternative routes to avoid the congestion.
- [3].



Figure 4: Traffic Network of Vehicles

## Conclusion

In this paper we have presented the main application areas in vehicular networks for next generation smart vehicles. In future there can be more VANET application exploited to provide communication, control and safety capability to vehicles, as well as comfort and entertainment to the people who will access VANET. But there so many areas of application possible in VANET which will be most useful in future.

## REFERENCES

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