

REVIEW ON USE OF INTERNET OF THINGS IN AUTOMOBILE

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Abstract—: In this paper we have discussed, accidents occurred due to lack of visibility because of severe weather conditions (Dense Fog). Prevention of these accidents by using Internet of Things with the help of technologies like i.) Smart Vehicle Monitoring System, ii.) Image Processing iii.) Wireless Fog Warning System.

I. INTRODUCTION

Accidents are unfortunate incident that happens unexpectedly and unintentionally, typically results in damage or injury. Road accidents are usually caused by vehicles like cars, bikes, goods carrier, etc. Causes for road accident are over speeding, low visibility due to dense fog, road planning and construction, under age driving, drunk and drive, lack of public awareness, inefficient authorities, and need for enforcement of existing laws to undertake the menace of discourtesy to rules and laws [1].

Every year 31,385 accidents happens due to low visibility due to foggy weather and from these accidents 11,812 people suffer injuries and more than 500 people die annually. Statistics shows in 2016 around 25,500 people were killed in road accidents across Europe. On average, about 8% of road fatalities occurred on motorways, 37% happened in urban areas, and most (55%) occurred on rural roads. In India, nearly 150,785 persons were killed in 2016 as against 146,133 in 2015, according to the local Ministry of Road Transport and Highways. Several reasons were reported for these accidents, of which weather conditions are major ones. In this regard, statistics showed that on average, there are over 5,748,000 vehicle crashes each year in the USA, among which approximately 22% are weather-related [2].

To eliminate these considerable impacts of fog, emerging technologies like telematics, intelligent transport system (ITSs) which are in-vehicle system that offer safety and infotainment services as well as local traffic updates. Also, device like automatic cruise control (ACC) and autonomous emergency brake (AEM) systems which have integrated environment-recognition sensors commonly ineffective particularly under severe weather condition (dense fog situation) [2].

In this paper we are proposing, Use of Internet of Things in the car systems can increase the ability of vehicle to compute and make decision about speed, retardation and collision prevention.

With the help of Internet of things, V2V (vehicle to vehicle) communication network can be established which can be used to share and receive the information. Use of GPS tracking system, cloud computing and real time image processing which increase the visibility of person in foggy region can be made in vehicle.

II. METHODOLOGY

A. Internet of things in Automobile:

In Automobile industry, use of 'Internet of Things' has drastically changed the way vehicles were used earlier. With the help of IoT safety and control of vehicle. Through IoT we can excess following services:

a) Smart vehicle monitoring system:

This system uses IoT as a mediator to analyze and compute for the services like communication technologies that includes services like Radio-Frequency Identification Device (RFID), Global Positioning System (GPS), lobar System for Mobile Communication (GSM), WIFI, etc. IoT is also used for sensing performance of the vehicle. Sensors like Acceleration sensor, Gyroscope sensor, Impact sensor, etc. are connected to vehicle to gather the performance data of vehicle compute respective control or safety measurements [3]. These services use cloud computing as a base to analyze, monitor and compute results and safety measures for vehicle [3,4].

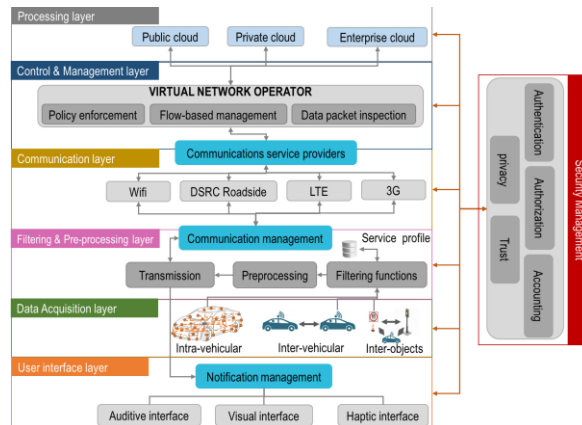


Figure 1. Cloud computing for vehicle [4]

b) Image-processing:

- Increase in technology has led excessive of machine vision technology, machine intelligence, and automation for the in-post processing or processing of the picture captured in different atmosphere. Thus, images highly spoiled due to influence of weather conditions like dense fog, rain, storm, dusty environment [5].

- Image-processing improves the quality of the given image/video under these conditions. Image processing follows processes like:

- i. Dark channel prior [5]
- ii. Bilateral filter [5]
- iii. Homomorphic filtering [5]
- iv. Canny Edge Detection [5]
- v. NPEA method [5]

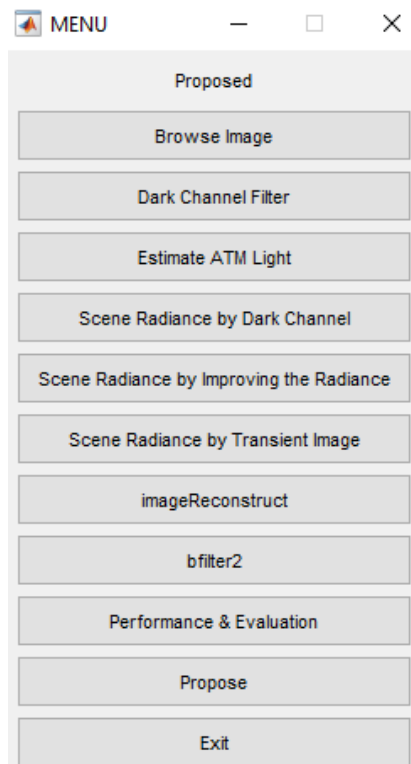


Figure 2. Flow chart for image processing [5].

c) Wireless Fog Warning System (WFWS):

In the extreme weather conditions where visibility is reduced, chances of collision exceed. To reduce these chances WFWS is implemented in vehicle. This system analyzes the speed and distance between the incoming object or vehicle and use that data to calculate collision time. With the help of collision time, system calculate time and speed required to decelerate a vehicle to avoid collision. after calculation, system sends message to decelerate the vehicle and avoid collision [2].

III. CONCLUSION

In this paper we have highlighted the technologies to support and improve the driving experience and safety of the driver with the help of Internet of Things. these technologies also improve stabilities and provides secure driving under extreme weather conditions.

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