Literature Survey

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Project Name	signs with smart connectivity for better road safety
Maximum Marks	4 Marks

Abstract:

Driver inattention and distraction are recognitions as two of the most critical factors for road safety worldwide. While roadside advertising is often identified as a potential source of distraction, it has received less attention compared to other types of distractions such as texting or calling while driving. Therefore, this study focused on the impact roadside advertising signs on behaviorism and road safety. To examine this, a theory-driven systematic literature review was undertaken. In total, 90 unique documents were identified and reviewed using the Task-Capability Interface (TCI) Model to explain potential safety impact of roadside advertising. The findings confirmed that the TCI model is a useful tool for describing the relationship between roadside advertising and driver behavior. From this perspective, roadside advertising signs can be considered environmental clutter, which adds additional demands to the driving task. In particula r, roadside advertising signs-impaired eye movement patterns of drivers. Additionally, it was demonstrated that the impact of roadside advertising on driving behavior is greatly moderated by individual differences among drivers. Of great importance was that young drivers invest more attenuation resources in interacting with roadside advertising, which suggests a lower capacity to discriminate between relevant and irrele- want driving information. Based on the available evidence, however, it is not possible to definitively conclude that there is a direct relationship Between the driving behaviour changes attributed to roadside advertising and road crashes.Nonetheless, while most studies remain inconclusive, there is an emerging trend in the literature suggesting that roadside advertising can increase crash risk, particularly for those signs that have the capacity to frequently change (often referred to as digital billboards). Lastly, it is important to mention that most of the empirical studies undertaken to date feature strong methodological limitations. Consequently, there is an urgent need for more research in this area, given that roadside technology-and the transport system are changing rapidly.

Literature Survey

Development and Testing of Road Signs Alert System Using a Smart Mobile Phone

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A review of the literature on road safety revealed several approaches that are being used to avoid accidents. According to the review, the related approaches are divided into three themes: road sign colour and shape recognition, vehicle-to-roadside infrastructure communication, and vehicle-to-vehicle communication.

Road Signs Colour and Shape Recognition

Several studies on road safety have been conducted using a device onboard a vehicle to detect and recognize signs. developed a traffic sign recognition system that uses a vision camera mounted on a vehicle. Based on the colours and shapes of the road signs, the system detected and recognized them and found a recognition of road signs with an average accuracy of about 95.53% and 92.8%, respectively .However, recognizing road signs based on colours and images presents numerous challenges. Include lighting conditions that vary naturally with the time of day and weather conditions; images that have been buffed by a moving vehicle's vibration; fading of paint on the sign; and occlusion of the sign by obstacles such as a tree, street lamp, or buildings. Another study by Ling and Seng used a mobile phone, the study used a smartphone back camera to recognize traffic signs and alert drivers for an incoming sign. Phone was placed on a windscreen for the camera to face the road. distinct advantage of the system was that it did not require additional hardware. However, the main problem experienced was the low detection rate, light variation, and weather conditions.

Vehicle-to-Roadside Infrastructure Communication

Other approaches have used mobile devices on a vehicle and communication infrastructure on the road. developed a road sign notification system based on the global positioning system (GPS) and wireless radio frequency identification (RFID) technology . A database of road signs and their locations was created. RFID transmitters were placed at the locations of road signs, and a receiver was placed in the vehicle. Using the system, drivers were alerted about the next road signs at some predetermined specific distance before the road signs were encountered. However, the use of RFID transmitters in two-way traffic could be limited, in the sense that their signals might be detected by vehicles traveling in the opposite direction. This situation can be misleading the drivers. Also, the devices are expensive and require a constant power supply and regular maintenance. Few studies have used wireless local area network (WLAN) mobile device technology to provide information about road signs. However, when the transmitters were close to each other, the separation of relevant traffic sign information from the vehicle was problematic.

Developed a communication system consisting of two devices; a road side unit (RSU) deployed on the road sign and an on-board unit (OBU) deployed in a vehicle. Information about the road signs ahead was wirelessly communicated to drivers using two units.

However, information transfer between modules was hindered by the speed of the vehicles in terms of delay and packet loss. Furthermore, the attenuation of wireless signals decreases as the transmitter-receiver increases distance. Proposed the use of Wi-Fi connectivity for wireless digital traffic signs. It has capable of transmitting the traffic sign information wirelessly in the vehicle displays. Drivers were informed at an average distance between 70 and 98 meters. However, the device required a constant power supply. In addition, when a driver travelled at a speed greater than 60 km/h, the average distance was not enough to provide timely alerts, were prioritization and queuing due to the number of data processed from many nodes.

Vehicle-to-Vehicle Communication (V2V)

V2V communication is used to interchange reliable information between automobiles on a network. In this approach, the broadcast information can include a warning while traveling on a similar road. V2V wireless technology works as an automated system to control and properly inform drivers by exchanging accurate information. However, the most challenging issues with this approach were the connectivity between V2V and vehicle infrastructure (V2I), mobility that allows vehicle area network (VAN) to change its topology quickly, and violation of driver privacy and security. Another challenge is the variation in the broadcast information offered by different types of vehicle manufacturers.

References

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