
Distracted Driving and Driver Monitoring System

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Abstract

Distracted driving emerges as a major issue in maintaining road safety, defined by activities that shift a driver's focus away from driving. This hazardous conduct includes a wide array of distractions such as texting or making calls on mobile phones, eating, conversing with passengers, adjusting in-car systems, and even being absorbed in one's thoughts. The impact of such distracted driving is significant, leading to a noticeable increase in the likelihood of road mishaps, injuries, and deaths.

Technology like vision-based Driver Monitoring Systems/Interior monitoring systems contributes high stakes in ensuring safety and avoiding alerting drivers.

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1. Introduction

Distracted driving can be categorized into three main types: visual, manual, and cognitive distractions. Visual distractions take the driver's eyes off the road, manual distractions involve taking hands off the steering wheel, and cognitive distractions remove the driver's focus from driving. The use of smartphones, arguably the most common form of distracted driving today, often combines all three types, making it particularly dangerous. Distraction of public transport, school bus, truck drivers cause heavy casualties. Truck drivers are often distracted due to long hauls

Statistics [1]

- According to NHTSA, 32,657 people died in distraction-affected crashes over the ten-year period from 2012 to 2021. A distraction-affected crash is any traffic crash in which a driver was identified as distracted at the time of the crash.
- In 2021 there were 3,522 people killed and an estimated additional 362,415 people injured in motor vehicle traffic crashes involving distracted drivers. This is an increase of 380 fatalities compared to 2020.

- Distracted-driving crashes accounted for 8% of all fatal crashes, 14% of injury crashes and 13% of all police-reported motor vehicle traffic crashes in 2021.
- Five percent of all drivers involved in fatal traffic crashes in 2021 were reported as distracted at the time of the crashes. Seven percent of drivers 15 to 20 years old involved in fatal crashes were reported as distracted. This age group has the largest proportion of drivers who were distracted at the time of the fatal crashes.
- Drivers in the:
 - 15-20 age group made up 8 percent of drivers in fatal crashes but were 11 percent of all distracted drivers and 16 percent of drivers distracted by cell phones in fatal crashes.
 - 21-24 age group made up 9 percent of drivers in fatal crashes but were 11 percent of all distracted drivers and 15 percent of drivers distracted by cell phones in fatal crashes.
 - 25-34 age group made up 22 percent of drivers in fatal crashes but were 25 percent of all distracted drivers and 30 percent of drivers distracted by cell phones in fatal crashes.

The Consequences Are Real and Heartbreaking

Statistics paint a grim picture of the consequences of distracted driving. According to the National Highway Traffic Safety Administration (NHTSA), 3522 people killed due to distracted driving as of 2021 [1] and thousands of people die each year in traffic crashes involving a distracted driver. These are not just numbers; they represent fathers, mothers, children, and friends. Behind every statistic is a heart-wrenching story of loss and grief haunting us and the need to call for action on distracted driving.

Economic and Social Impact

Beyond the immeasurable human cost, distracted driving also imposes a significant economic burden. This includes medical expenses, lost productivity, and property damage. Furthermore, survivors of distracted driving accidents often endure long-term disabilities, adding to healthcare costs and personal suffering.

How to avoid distracted driving and usage of Technology to the Rescue

Technology, while a primary culprit in distracted driving, also holds promise for solutions. Apps that limit phone use while driving, as well as advanced driver assistance systems (ADAS) that alert drivers to potential hazards or take control in critical situations are on the rise.

Technology like vision-based Driver Monitoring Systems contributes high stakes in ensuring safety and avoiding distraction by monitoring and alerting drivers and different sub-systems to safe maneuver or safe stop of vehicle in case of no response from the driver.

Driver Monitoring systems (DMS) also have different has additional advantages along with identifying distracted driving.

- a. Distracted Driving behavior
- b. Impaired driving (Alcohol detection)
- c. Occupant detection
- d. Identify driver and occupant seating position deploy airbags.
- e. Left child behind

- i. Keep vehicle on
 - ii. Turn ON AC/make sure windows down
 - iii. Siron CAR
 - iv. Notify the driver immediately by mail, message/call.
 - v. If no response, inform the first responder immediately.
- f.
- g. Detect the Driver's feelings and sense the and play music background music to cool down and ensure it's safe to drive when if detect abnormal.
 - h. DMS Can Detect the Driver looking or tracking the front vehicle and based on that audible or visible alarm can be disabled to avoid inconvenience.
 - i. Gesture tracking.
 - j. DMS is not limited to passenger car. But rather it would be more appealing for Trucks due to the very long haul. Off-road vehicle operators (Cranes/earth movers)
 - k. Monitor in cabin live as needed.

DMS Role in Automated Driving and Distracted driving

In Semi-Automated driving like hands-free driving scenarios checking the driver is more required than ever considering the availability of driver presence when required. DMS system will ensure the presence of the driver and still focus on road when needed to take control of vehicle. In case of no response from driver or drowsiness scenario, available system in vehicle maneuver for safe stop.

Conclusion

4. Conclusion

Distracted driving is a pervasive issue with devastating consequences. As society becomes increasingly reliant on technology, the challenge of keeping our roads safe from distracted drivers becomes ever more significant. With the innovation of Driver monitoring systems and continuous monitoring of driver behavior system will alert driver in case distraction and maneuver to safe stop when capable system available in vehicle.

References

- [1] *Distracted Driving Concept Testing* (trafficsafetymarketing.gov)
- [2] *Article on Distracted Driving*, <https://www.nhtsa.gov/risky-driving/distracted-driving>