
미래자동차 기술과 제작결함



차량 전동화와 자율주행기술 발전에 따른 자동차 안전 고찰

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A Study on Vehicle Safety Focused on Vehicle Electrification and Autonomous Driving Technology

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Key Words : Vehicle electrification(차량전동화), Electrified vehicle powertrain(전동화차량 파워트레인), X-by-wire, Functional safety(기능 안전), ISO 26262, SOTIF

ABSTRACT

The ignition off and the inability to restart while driving an internal combustion engine vehicle can be fatal to safe driving and are considered serious manufacturing defects of the vehicle. However, considering the powertrain structure of an electrified vehicle, the safety mode of an internal combustion engine vehicle cannot be applied as it is. The functional safety requirements such as ISO 26262 and SOTIF are essential to electrified chassis modules, autonomous driving, and ADAS function modules. The application of these standards is cited and recommended by OEMs and parts makers, and the government. Thus the government and research institutes should review whether vehicle defects are sufficiently defined in standards related to functional safety, whether the severity of defects is evaluated, and whether safety plans are appropriate.

And considering the recall rate of future cars (eco-friendly cars) is also increasing, with a sharp increase in recalls of electric vehicles, it is urgent to prepare safety standards for future cars. Unlike recalls due to structural and mechanical defects of internal combustion engines in the past, the recall rate for advanced safety devices and S/W accounts for a large proportion of future cars. Thus it is necessary to re-establish safety standards that meet the characteristics of future vehicle technologies.

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Deep Auto-Encoder 를 이용한 인간중심 Driving Performance 정량화 기법

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Human-Centered Risk Assessment through Deep Auto-Encoder

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Key Words : ADAS(첨단운전자지원시스템), Automated vehicle(자동주행), Human-vehicle interactions(운전자-차량 상호작용), Risk assessment(위험평가), Auto-encoder(오토인코더)

ABSTRACT

From the catastrophe of the Boeing 737 Max, it is widely known that a human vehicle cooperation of advanced driver-assist system (ADAS) has significant safety implication in partially automated vehicles where drivers may not be paying attention because of overreliance and lack of knowledge about the limitations of the system. Existing testing and regulation on this topic are minimal, and do not address the level of driver's overreliance with performance degradation. The Boeing 737 Max also provides another lesson about which human factors play a critical role in the safe operation of vehicles, just as they do in the safe operation of aircraft. Pilots must receive extensive training on the systems they operate, and the same goes for drivers and their ADAS systems. Drivers must also be aware of the limitations of their ADAS systems and know when to take over control of the vehicle. This study describes the human-centered risk assessment using Auto-Encoder through quantification of driving pattern and risk in the urban driving situation. It has been shown from the vehicle tests that the Auto-Encoder with Risk Assessment is beneficial for the measurement and evaluation of driver's driving performance degradation and assessment of its understanding.

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현행 자동차 결함조사 및 리콜제도 검토

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Review of the Current Automobile Defect Investigation and Recall System

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Key Words : Self-certification system(자기인증제), Defect investigation(결함조사), Recall system(리콜제도), Regulatory overhaul(법령 정비)

ABSTRACT

2023 marks the 20th anniversary of Korea's implementation of the self-certification system. In the meantime, complaints from automobile stakeholders such as automobile manufacturers and consumers about the above system have accumulated, and the automobile industry environment has changed rapidly, including the emergence of electric and hybrid vehicles and the entry into the era of self-driving cars. Accordingly, the researchers tried to check Korea's current automobile defect investigation and recall system, focusing on the perspectives of automobile stakeholders such as automobile manufacturers and consumers and the development of automobile technology, and to propose a system improvement plan to meet rapid environmental changes. To this end, Korea's current automobile defect investigation and recall system was examined focusing on major keywords of the Automobile Management Act, and then opinions from stakeholders were heard and various related literature surveys were conducted at the same time. After reviewing the opinions of automakers and consumers on the problems of the current system and the development of automobile-related technologies, it was concluded that related laws such as the Automobile Management Act need to be overhauled to improve the current automobile defect investigation and recall system.

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Expert Training Program and Response Strategy of KASA for Future Mobility Technology

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Key Words : Future mobility(미래 이동수단), International standard(국제표준), Expert training program(전문가인력 양성), Response strategy(대응전략), Korean auto-vehicle safety association(한국자동차안전학회)

ABSTRACT

Future mobility technologies become popular in academia and industry. They should promise comfort to human in the field of HMI (Human Machine Interface), new opportunities for industries such as self-driving cabs, MaaS (Mobility as a Service), better use of resources through UAM (Urban Air Mobility), and above all more safety on the road and in the air. To introduce these future mobility technologies successfully to our future society, authors would like to propose the new expert training program and response strategy of Korean Auto-vehicle Safety Association (KASA) for future mobility technology. For the small but in-depth academic society, KASA, we review the recently change of an organization of MOLIT(Ministry of Land, Infrastructure and Transport), and also six different academic society's activities, such as KSME, KSAE, KATRI, KATECH, NGV, and SAE. Especially, we thoroughly studied SAE International standard processes. It has been believed that SAE International is the world's leading authority in mobility standards development. Their design of safety, productivity, dependability, efficiency, and certification is better standards. Also, authors reviewed the seven steps of ISO (International Standard Organization) which are preliminary work step, new work item proposal, working draft, committee draft, draft international standard, first draft international standard, and publicly available specification. Finally, we would like to suggest several recommendations to KASA for better future society with various future mobility technologies.

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