사고 조사 및 재현

휴먼 에러에 의한 급발진 사고

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Unintended Acceleration Accident by Human Error

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Key Words : Unintended acceleration(급발진), Event data recorder(사고기록장치), Advanced driver assistance system (첨단안전장치), Accident investigation(사고조사), Accident reconstruction(사고재구성)

ABSTRACT

Unintended Acceleration(UA) accidents have emerged as a significant social issue, resulting in numerous casualties annually. The proliferation of electric vehicles(EVs) has further highlighted this concern, as UA Accidents involving EVs are frequently reported. UA accidents poses a considerable societal threat, not only endangering the lives of drivers and passengers but also posing risks to other road users. However, extensive analysis of accident records, including data from Video Data Recorders(VDR) and Event Data Recorders(EDR), indicates that UA accidents predominantly arise from driver error rather than inherent defects in vehicle systems. This study introduces the accident cases of vehicles with ADAS(Advanced Driver Assistance Systems) and electric power-train, and suggests the implications of each accident and the necessity of designing and deploying human-centered vehicle to prevent UA accidents caused by human errors.

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급발진 의심 사고의 파워트레인 거동 분석

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Analysis of Powertrain Behavior in Unintended Acceleration Accidents

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Key Words : Unintended acceleration accident(급발진 의심 사고), Powertrain(파워트레인), Vehicle behavior(차량 거동), EDR(사고기록장치), Vehicle dynamics(차량동역학), Kick-down(킥다운)

ABSTRACT

Due to the recent increase in unintended acceleration accidents, many vehicle users are questioning the function and necessity of an EDR(Event Data Recorder). Most suspicious unintended acceleration accidents typically show a rapid increase in vehicle speed for a short time. Thus, it is important to look at how the engine speed has changed and whether the gear shift has occurred as the vehicle speed increases. In this study, we first briefly explain the automatic transmission structure and the shifting principles. The vehicle needs to shift gears to accelerate, and these shifts are made normally based on the shift points defined in the shifting map. By comparing the speed of the engine and vehicle recorded in EDR, it can find out how the gear shift occurred. Through this, we analyze whether the kick-down switch has been activated in a suspected unintended acceleration accident, in which the driver claims he did not press the accelerator pedal. Finally, we verify our assumptions by analyzing several cases of unintended acceleration accidents.

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Developing Autonomous Vehicle Scenarios Based on Traffic Accident DB Risk Factors

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Key Words : In-depth accident reconstruction(심층사고분석), Crash database(교통사고 데이터베이스), Autonomous driving scenarios(자율주행 시나리오)

ABSTRACT

Autonomous vehicles are expected to be on the road within a few years. In the United States, self-driving taxis have already begun operating in cities, but there are still concerns about safety issues. Mistakes in judgement due to incorrect object classification in mixed traffic with conventional vehicles, or inability to predict and control autonomous vehicles after correct perception can lead to major accidents. In particular, unpredictable pedestrian safety poses a major threat to society. To improve the safety of self-driving cars, Waymo is already training autonomous vehicles using various edge scenarios based on the driving environment. In this study, we derive high-risk factors based on existing road accidents and propose the need to develop scenarios based on them.

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Analysis of Legislative Trends in Autonomous Vehicle Accident Investigations at Home and Abroad

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Key Words : Autonomous driving(자율주행), Accident Investigation(사고조사), Legislative Trends(입법동향)

ABSTRACT

In South Korea, since initiating policy reviews related to autonomous driving in 2015, various legislative and policy achievements have been accumulated. A prominent example is the "Autonomous Vehicle Regulation Innovation Roadmap 2.0," established in December 2021, which serves as a foundation for regulatory innovation and legal frameworks related to autonomous driving. Briefly reviewing legislative achievements thus far:

The “Road Traffic Act” was amended and implemented in February 2016, containing legal definitions of autonomous vehicles and a system for temporary operation permits.

The "Act on Promotion and Support for Commercialization of Autonomous Vehicles" has been in effect since May 2020, promoting the development and commercialization of autonomous vehicles.

In April 2020, the "Automobile Insurance Act" was amended to facilitate the identification of causes of accidents related to autonomous vehicles and streamline compensation for victims.

In October 2021, the "Road Traffic Act" was revised to include the use of autonomous driving systems within the legal definition of driving. This update imposes additional obligations on drivers of Level 3 or lower autonomous vehicles to respond promptly to system driving demands.

Looking at international legislative examples, particularly in the United States, legislation and policy trends related to autonomous driving offer various perspectives not only on the development of autonomous vehicles but also from a policy standpoint, distinguishing between federal and state (California) regulations.

Autonomous vehicles collect and process vast amounts of information through various sensors. This information includes personal data that must be protected, alongside other details crucial for determining accident causes and liability. Therefore, efforts to supplement legislative mechanisms are needed to ensure the rational protection and effective utili

* 조이앤파트너스 법률사무소/변호사
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에어백제어모듈의 메모리칩 포렌식 분석

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Forensic Analysis of Memory Chip of Airbag Control Module

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Key Words : ACM(에어백제어모듈), EDR(사고기록장치), CDR(충돌데이터진단기), Law Data(원시데이터), Reverse Engineering(역공학), MCU(마이크로컨트롤러), UDS(통합진단서비스)

ABSTRACT

The airbag control module(ACM) has a built-in memory chip that can store accident information. Accident information (EDR data) stored in ACM's memory chip can be imaged using CDR or EDR analysis equipment. However, if the ACM is damaged due to a crash or fire, diagnosis of EDR data can be difficult. This study explored a forensic method that can acquire and analyze accident data directly from the ACM's memory chip when EDR diagnosis is difficult in ACM. Raw data stored in the memory chip was extracted using the UDS diagnostic tool or JTAG interface. To understand the extracted raw data, the imaged data was reversed in ACM. Through reverse engineering, raw data extracted from ACM's memory chips can be analyzed.

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