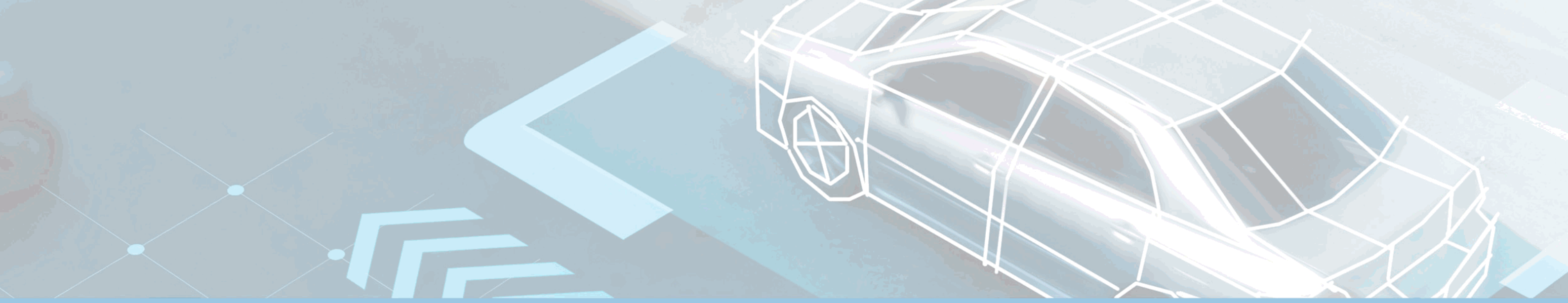

K-CRASH

사고기록장치 기록정보의 신뢰성 연구

박종진*

Study on Reliability of Event Data Recorder

Jongjin Park*

Key Words : Event data recorder(사고기록장치), Crash data retrieval(충돌 데이터 추출기), Traffic accident investigation (교통사고 조사), Traffic accident reconstruction(교통사고 재현)

ABSTRACT

As of January 1, 2025, South Korea expanded the data elements of EDR to 67, including advanced emergency brake system, master cylinder pressure, and more. Additionally, Article 29(3)(Installation of Accident Recording Devices and Provision of Information, etc.) of the Motor Vehicle Management Act stipulates that from December 4, 2025, any motor vehicle manufacturer, seller, and other relevant parties will be permitted to distribute and sell equipment capable of extracting data stored in EDRs. This will make it easier for anyone to view and analyze EDR data.

However, in Korea, research on the reliability of EDR data is not yet active, and there are no training programs in place to analyse whether the recorded information is directly related to the accident. These limitations may lead to misinterpretation of accident causes and could result in substantial disputes in court.

This study introduces the results of crash tests conducted by the National Forensic Service to verify the reliability of EDR data and the importance of utilizing EDR data. It also introduces the K-CRASH project, which is being jointly promoted by the automotive industry, academia, and research institutes in Korea.

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경미사고 탑승자 상해위험 분석 및 활용

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Analysis and Application of Injury Risk for Occupants in Minor Accidents

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Key Words : Minor accident(경미사고), Vehicle-to-vehicle crash test(차대차 사고재현시험), Medical evaluation(의학적 검사), Injury risk analysis report(상해위험분석서)

ABSTRACT

In 2023, the average medical cost for minor injury claimants increased by 140% compared to 2014, which is 4.4 times higher than the 32% increase for serious injury cases during the same period. According to a joint study conducted by the Korea Insurance Development Institute (KIDI) and the Korea Insurance Research Institute (KIRI), the estimated scale of excessive medical treatment for minor injuries in 2019 ranged from approximately KRW 350 billion to KRW 650 billion.

While it is possible to medically diagnose an individual's physical health condition, explaining the causal relationship between diagnosed injuries and the severity of an accident falls within the scope of engineering analysis. KIDI aims to contribute to insurance premium reduction by analyzing injury risks based on the causal relationship between claimed injuries and minor collisions and utilizing the results in insurance practices.

KIDI conducted low-speed vehicle-to-vehicle crash tests involving 53 human volunteers. Through pre- and post-test medical evaluations such as MRI scans and electromyography/nerve conduction tests, it was confirmed that none of the participants sustained injuries. By comparing and analyzing real accident cases with the crash tests - including accident types and vehicle damage severity - the injury risk for vehicle occupants was assessed.

KIDI’s injury risk analysis reports have been provided to insurance companies in response to claims involving excessive treatment or settlement demands in minor accidents. These reports are being used to support the withdrawal of excessive settlement demands, other legal proceedings and etc.

The expanded use of engineering-based analysis is expected to help adjust insurance payments for occupants involved in minor accidents to appropriate levels and ultimately reduce insurance premiums for honest policyholders.

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자율주행자동차 사고조사 처리절차 및 법률 개정방안 연구

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A Study on the Processing Procedures of Accident investigation and Law Revision Plan for Autonomous Vehicle

JeongHwan Cheon*, YoonSeong Oh**, WonGi Kim***

Key Words : Autonomous vehicle(자율주행자동차), Driving subject(운전주체), Traffic accident(교통사고), Accident investigation(사고조사), Legal revision(법률개정)

ABSTRACT

Recently, autonomous vehicles have been introduced and are in operation due to technological advancements in both Korea and abroad. However, the introduction of fully autonomous vehicles (L5) is significantly delayed due to various technological limitations and institutional restrictions. Accordingly, a traffic environment is being created in which partially autonomous vehicles (L3, L4) are operated together with regular vehicles for the time being. Since the driving subject of partially autonomous vehicles varies depending on the driving situation, either the driver or the autonomous driving system. it is expected that traffic accidents caused by regular vehicles, which are entirely driven by the driver, will appear in a completely different manner.

The Ministry of Land, Infrastructure and Transport launched the Autonomous Vehicle Accident Investigation Committee in October 2020 based on the revised Automobile Damage Compensation Security Act and is responding by establishing accident investigation and management plans for autonomous vehicles. However, while the Autonomous Vehicle Accident Investigation Committee of the Ministry of Land, Infrastructure and Transport conducts accident investigations from a civil perspective, the National Police Agency, which conducts accident investigations from a criminal perspective, is currently not fully prepared for legal revisions or investigation systems for accident investigations of autonomous vehicles.

This study aims to propose a revision of related laws and regulations to establish a legal basis for accurate accident investigations and smooth handling of autonomous vehicle traffic accidents by establishing investigation items and procedures for autonomous vehicle traffic accidents.

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자율주행자동차 안전 시나리오 개발을 위한 데이터베이스 구축 및 활용

백세룡* · 김형규** · 정승윤*** · 김천호****

Development and Utilization of a Database for Autonomous Vehicle Safety Scenario Generation

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Key Words : Autonomous vehicle(자율주행자동차), Real-world driving data(실도로 주행 데이터), Potential collision scenario(잠재 충돌 시나리오), Near-miss event(비충돌 위험상황)

ABSTRACT

As autonomous driving technology moves toward full-scale commercialization, the prevention of accidents in unexpected situations has become a critical challenge. While most current research focuses on predicting the likelihood of autonomous vehicle accidents based on recorded traffic crash data, potential collision events, in which a driver or system performs emergency evasive maneuvers to avoid an imminent crash, occur far more frequently on real roads. However, systematic analysis and scenario development for such high-risk near-miss events remain limited. In this study, we collected video footage of critical near-miss situations where evasive actions were taken to avoid collisions, based on real-world driving data acquired from autonomous vehicles. The collected data were organized into a web-based database platform designed to enable easy access and analysis by researchers. After refining and analyzing the dataset, we developed safety scenarios based on emergency avoidance situations that autonomous vehicles may realistically encounter. This study provides foundational resources for scenario-based safety evaluation, test scenario diversification, and the establishment of accident prevention strategies in the domain of autonomous driving.

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영상기반 속도분석 한계 극복을 위한 사용자 주도형 속도 최적화 기법에 대한 연구

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Study on a User-Driven Speed Optimization Method to Overcome the Limitations of Video-Based Speed Analysis

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Key Words : Video-based Speed Analysis(영상기반 속도분석), PC-Crash(피시크래시), Python-based Module(파이썬 모듈), User-driven Speed Optimization(사용자 주도형 속도 최적화), Simulation Automation(시뮬레이션 자동화)

ABSTRACT

With the increasing complexity of modern transportation systems and the heightened significance of traffic accident analysis, the demand for accuracy in accident analysis is growing, with speed as a key factor in these investigations. Existing video-based speed analysis calculates the average speed over a given section, which is adequate for constant-speed movement but limited when acceleration or deceleration occurs, as the starting and ending speeds may differ from the average speed. In this study, we propose a user-driven speed optimization method that enables real-time adjustment of the speed graph slope, achieved by developing a Python-based module compatible with PC-Crash, a traffic accident analysis software. To validate the proposed automation method, video footage from actual driving tests was collected. Speed analysis was performed based on this footage and then compared with speeds measured by high-precision GPS. The results confirmed that more accurate speed analysis is achievable when the average speed from video analysis is adjusted using the method proposed in this study.

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자율주행자동차 교통사고 특성 분석 및 사고예방 방안 연구

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Analysis of Traffic Accident Characteristics in Autonomous Vehicles and Strategies for Accident Prevention

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Key Words : Autonomous vehicles(자율주행자동차), Traffic accidents(교통사고), Human factor(인적요인), Vehicle factor(자동차 요인), Environmental factors(환경요인)

ABSTRACT

Traffic accidents can be categorized into human factors, vehicle factors, and environmental factors, with most conventional accidents primarily attributed to human error. However, in autonomous vehicles, where automated systems instead of humans perform the driving task, the main causes of accidents are likely to stem from vehicle-related factors, particularly limitations or failures of the autonomous driving system. This study analyzes traffic accident cases involving autonomous vehicles to identify key characteristics and underlying causes. Through this analysis, potential vulnerabilities in autonomous driving systems are examined. Based on the findings, the study proposes preventive measures aimed at reducing such accidents. The results of this research are expected to contribute to the development of safer autonomous driving systems and provide a valuable foundation for enhancing the reliability and safety of future autonomous vehicles.

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