Development of Driver Safety Assessment Method using Digital Tachograph

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1. Introduction

Improvement of safety in the traffic operation is a major goal of national transportation policy in Korea. Compared to general vehicles accident rates and severity of commercial vehicles are high, various traffic safety policies were implemented to commercial vehicles for reducing traffic accidents and systematic safety management. Accordingly, mounting digital tachograph (DTG) to commercial vehicles is mandatory by the Traffic Safety Act Article 55. Also Logistics service providers should keep DTG records of its vehicles for six months and submit regularly to the Korea Transportation Safety Authority (TS).

2. The Content and Scope of Research

IntelliDrive project by the U.S. Department of Transportation (DOT) to provide an infrastructure where vehicles can identify threats and hazards on the roadway and communication this information over wireless networks to alert and warn drivers. A major component of IntelliDrive is the Dedicated Short Range Communications (DSRC). The EU-co-funded CVIS (Cooperative Vehicle-Infrastructure Systems) project had aim to bring major benefits for drivers as well as road authorities and managers, by allowing vehicles to communicate and cooperate directly with each other and with roadside infrastructure. Sim^{TD} (Safe and Intelligent Mobility Test Field Germany) is one of national field operational tests with cooperative systems technology that provide test data to DRIVE C2X. The data is used for system evaluation from a European point of view. Sim^{TD} is the biggest Field Operational Test for vehicular communication in Europe and executes tests on a large public road network around the city of Frankfurt, Germany.

We developed a prototype of integrated smart device (k-DTG) based on DTG that is mandatory mounted to freight cars, black box that is widely spread for analysis of traffic accidents and CDMA is shown in Figure 1.

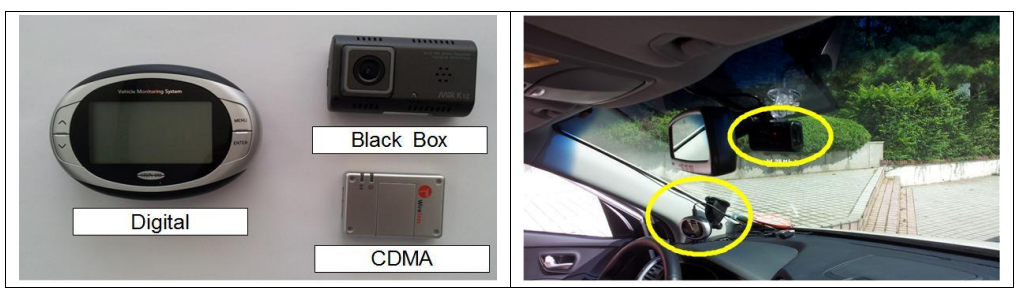

Figure 1. Prototype of the Smart Integrated DTG(k-DTG)

In particular, by applying the time and GPS position synchronization technology, we can analyze real-time driving record data linked with black box video. Also we improved the accuracy of data analysis by developing an analysis support software is shown in Figure 2.

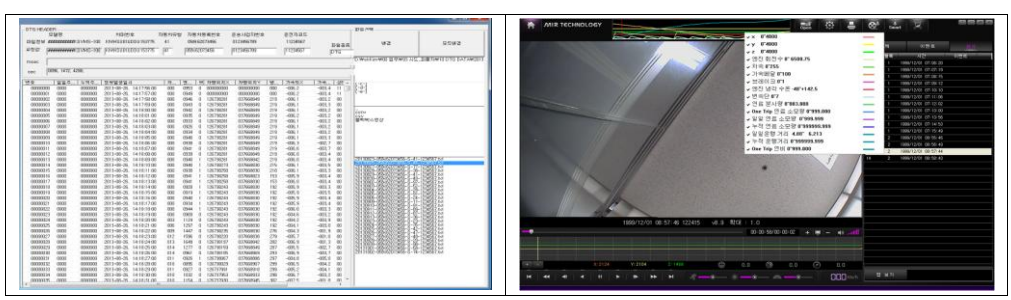

Figure 2. DTG Data Analysis Support Software for Driver

3. Result

We performed the verification of prototype with short-term and long-term tests for driving record, fuel consumption, and automatic data transfer function using CDMA. In particular, by confirming that the correct information is transmitted to the server through the comparison of the data stored in the prototype and service records to be sent to the server, it was confirmed that k-DTG can be utilized for CVO. And k-DTG can collect driving information of vehicles per second, allowing more sophisticated than conventional driver's driving pattern analysis is shown in Figure 3.

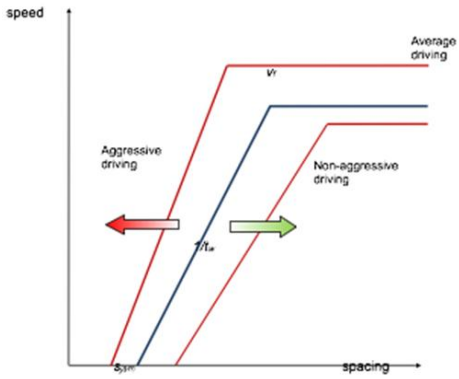

Figure 3. Driver's Tendency Analysis using DTG data

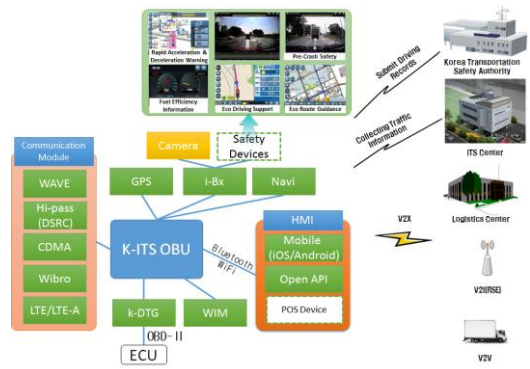

Figure 4. The Structure of Mobile TMS for CVO(k-CVO)

4. Conclusion

We have plans to implement the safety and Eco-driving assistance service based on k-DTG. In addition, we will design a mobile TMS (Transportation Management System) for general purpose and "Web-based" logistic manage software that is no more need sever. And we will develop a mobile TMS application (That is called "k-CVO") based on android OS that can be used in a small logistics is shown in Figure 4. K-CVO will also include driver safety assessment function by developing driving tendency analyzing algorithm based on real-time DTG data. Various functions of k-CVO such as collecting real-time operating information, collecting video information, and wireless communication can be expanded to a variety of fields. For example k-CVO can be used to active-safety driving support service in all kinds of vehicles, by applying an image processing technique of k-DTG.

5. Acknowledgements

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6. References

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