Preventing Accidents Caused by Unintended Acceleration and Subsequent Continuous Acceleration in Automatic Transmission Vehicles

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Abstract

The purpose of this study is to provide a fundamental solution from the viewpoint of Human Factors to the numerous accidents caused by unintended acceleration involving automatic transmission vehicles. Annually, an average of 7,000 accidents of this type occur in Japan in the last decade with remarkably high fatality rate of approximately 4.6 %. This high fatality rate is caused by vehicles colliding with an obstacle at full throttle acceleration with an apparent loss of braking effectiveness.

The main cause for this type of accident is believed to be human error since evidence of electro-mechanical defects is very rarely discovered in accident investigations [1]. The likely contributing factor behind this type of accident is possibly the similarity of throttle and brake pedal placement and the identical method of operation. This pedal layout leads to driver misapplication of the pedal when intending to stop the vehicle.

To prevent this type of accident, the authors removed the conventional throttle pedal from the driver's foot space and installed a proprietary hand controlled throttle (HAC-T hereafter) system, which prevents the human error responsible for this type of accident. The HAC-T system was invented based on the viewpoint of Human-Machine Interfaces and aims to achieve symbiotic human-vehicles driving system. The throttle body with control lever is installed on top of the center console in the prototype vehicle and is easily reached by drivers while maintaining visual contact with the road and surroundings. The HAC-T system consists of a hand controlled throttle system, an organ-type brake pedal with footstool, and a turning knob on the steering wheel.

In conclusion, by creating a fundamental solution to prevent this type of accident, the HAC-T system is greatly anticipated.

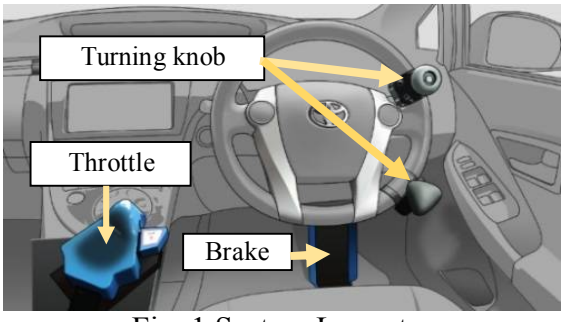

Fig. 1 System Layout

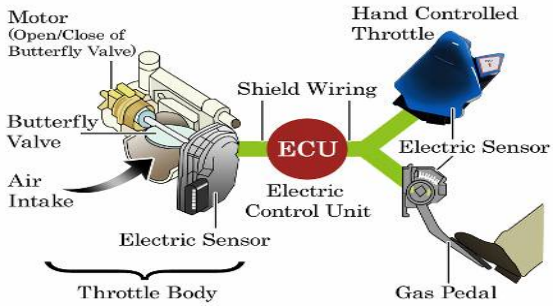

Fig.2 System Schematic Diagram

References

[1] R. Schmidt and D. Young, "Frontiers in psychology: Cars Gone Wild: The Major Contributor to Unintended Acceleration in Automobiles is Pedal error. Frontiers in Movement Science and Sport Psychology 1 (2010).