Smartphone-Based Novice Teenage Driver Support System

Motor vehicle crashes are the leading cause of teen fatalities. One approach to reducing fatalities is the use of Graduated Driver Licensing (GDL) programs that limit teens’ exposure to risky situations. However, these programs suffer from weak compliance monitoring because they are based on an honor system and depend on driver self-reporting.

A Teen Driver Support System (TDSS) has been developed by the ITS Institute that will allow parents to accurately monitor their teen’s driving behavior in relation to known risk factors and GDL provisions. The TDSS, based on a teen’s smart phone, provides real-time, in-vehicle feedback to the teen about his or her driving behavior and helps parents monitor certain known risk factors. The system does not allow incoming or outgoing phone calls or texting while the teen is driving.

Feedback to the teen driver includes warnings about speeding, excessive maneuvers (e.g., hard braking, cornering), and stop sign violations. The TDSS prototype also monitors seat belt use and detects the presence of unauthorized passengers (e.g., based on GDL provisions)—two known factors that increase the risk of fatalities among teen drivers. The TDSS can also be programmed to monitor driving during the GDL curfew (e.g., midnight to 5 a.m. in Minnesota) or a curfew set by parents. The in-vehicle, real-time feedback provided to the teen driver differentiates the TDSS from many of the teen monitoring devices currently on the market.

Because the TDSS is programmed in a cell phone, it is capable of providing near real-time feedback to parents about a teen’s driving behavior. For example, if a teen receives feedback that he or she is speeding but fails to reduce the vehicle’s speed after being warned, the TDSS will automatically send a text message to the teen’s parents to inform them of the speeding behavior. Feedback to the teen informs her or him about the unsafe driving and gives the teen an opportunity to change the behavior before parents are notified. This near real-time feedback to parents allows them an opportunity to talk with their teen about the unsafe behavior soon after it occurs. This is in contrast to other teen systems that typically provide feedback once a week or once a month, long after the risky behavior has occurred. Parents also have access to a summary report via a secure Web site where they can monitor their teen’s behavior over time.

A usability review of the prototype TDSS will identify the extent to which parents and teens perceive the TDSS to meet expectations for monitoring and encouraging safe driving behavior, with and without GDL provisions, and make suggestions for design changes to improve the effectiveness and acceptance of the system. The study evaluation is being run in Washington County, Minnesota, with 30 teen-parent pairs who represent both suburban and rural drivers.

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