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### Motivation:

According to the result of National Motor Vehicle Crash Causation Survey by the U.S. Department of Transportation spanning from 2005 to 2007, 94 percent of the total 2,189,000 crashes within the 2 years was driver-related, and among those crashes recognition error was ranked as the number one critical reason [1]. The survey defined recognition error as error due to driver' inattention, internal and external distractions and inadequate surveillance. In another word, the number one cause of motor accident is distracted drivers.

Being distracted while driving is a major issue, and many states have enacted laws to prohibit distracting behavior while driving. However, many people, especially teenagers, still fall short on following the laws and not engage in distracting behaviors even when they intent to not engage. The motivation of this project is to create a self-tracking tool to monitor and record the driver's distracting and dangerous driving habits, analyze those collected data to warn drivers' their behaviors, prevent possible accidents, and serve as a reinforcement to drive safely on the road. Another motivation of this project is that people other than driver can benefit from the data as well, such as parents monitoring their teenagers driving skills, or employers monitoring their employees' driving habits.

### Analyze the Problem & Possible Solution:

There are technologies that track drivers' driving habits on the market. Insurances companies Progressive has SnapShot, a plug-in device that records how the driver accelerates and applies to the brake. Similar devices and applications also allows parents to monitor and view their children's driving data. However, most devices can only collect data from the car itself, limiting the analysis to be based on speed, acceleration and braking, and unable to detect the activities drivers were engaged in when those dangerous behavior is occurring, thus not addressing the root of the problem.

Being able to "see" what drivers are doing while driving would be a game changer in solving the problem. Using sensor or camera to detect user activity would give us somewhat accurate feedback and allow us to analyze their driving habits, warn them about the danger related to distracting activities they are engaged in in real time, and provide a direct way for others to monitor the driver. However, there are some potential issues with the idea of "seeing" the driver, and further research in those areas are needed. One of the problem we need to address is the processing power of the device, its size and replacement on the car, and how much power it will need to operate. Another problem is users' privacy, are users willing to be recorded to avoid possible accidents.

Table 2. Driver-Related Critical Reasons

Critical Reason	Estimated (Based on 94% of the NMVCCS crashes)	
	Number	Percentage* ± 95% conf. limits
Recognition Error	845,000	41% ±2.2%
Decision Error	684,000	33% ±3.7%
Performance Error	210,000	11% ±2.7%
Non-Performance Error (sleep, etc.)	145,000	7% ±1.0%
Other	162,000	8% ±1.9%
Total	2,046,000	100%

\*Percentages are based on unrounded estimated frequencies  
(Data Source: NMVCCS 2005-2007)



In summary, driving has become one of the primary ways of transportation, and engaging in distracted behavior has been shown to be the main cause of driver related accident. Although there are potential issues to be addressed for solving the problem, it is important to provide a tool for drivers and others to track and detect drivers' dangerous behaviors on the road, in hope of changing such behaviors and preventing accidents that take away our lives and lives of our loved ones.

## Citation

[1]: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>

Figure 1: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>

Figure 2: <http://bloviatingzeppelin.net/wp-content/uploads/2013/07/Progressive-Snapshot-Big-Brother.jpg>