# **Driver attention detection and alerting system for improved Road Safety**

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**Motivation**:   
  
According to the World Health Organization, road traffic injuries caused an estimated **1.25 million deaths** worldwide in the year 2010. That is, **one person is killed every 25 seconds**.  
  
According to the Director of Traffic Safety at the American Automobile Association, somewhere between **25-50 percent** of all motor vehicle crashes in the U.S. are directly related to **driver distraction** as the root cause of automobile accidents.

These distractions include **texting, rubbernecking, or slowing down to observe another accident**, accounting for **16 percent** of all distraction-related crashes. **Cell phone use** is a major concern with **as many as 85 percent** of the estimated 100 million cell-phone users talking on their phone regularly while driving. One study found that driving and talking on a cell phone at the same time quadruples the risk of crashing. Other common driver distractions include:

* Driver fatigue (12 percent)
* Looking at scenery (10 percent)
* Other passengers or children (9 percent)
* Adjusting the radio or CD player (7 percent)
* Reading the newspaper, books, maps, or other documents (less than 2 percent)

To reduce driver distraction related accidents we propose a system to continuously monitor the attention of driver (head orientation and eye focus) combined with an alerting system to notify distracted drivers immediately making them refocus immediately.

**Project Description:**

We will be using a Raspberry Pi coupled with a Raspberry Pi camera module to continuously monitor the drivers face orientation and eye gaze. For this we will be using Python OpenCV Haar Cascade to detect face and eyes. When the system cannot detect the face it means the driver has turned his head away (i.e. stopped looking at the road). When the system detects the face but not the eyes, it will indicate that the driver has either fallen asleep or is looking down at his phone. Both of these scenarios will cause an alert via a small vibrating motor attached either to the driver’s seat or steering wheel. If the driver does not respond to this then a speaker configured with the Raspberry Pi will sound a loud alarm.

**Equipment:**

1. Raspberry Pi
2. Camera Module
3. Vibrating Motor
4. Speaker