We would like to propose the following points on how we would like to help towards raod safety.

Our cameras as proposed below would be connected to raspberry pi installed in the car which in turn would be conneced to an andriod mobile of the user. Our algorithms and computing would be done offline on the raspberry module(To speed up the response time) and alerts(in-car)

would be in the form of sound signals or a small screen mounted on the dasahboard itself.

For other alerts, we would use the connected android mobile to send messages to preferred contacts.The connected mobile would also help to update our algorithms or make updates on the rapberry installed.

**1 .Dashboard mounted camera facing the driver:**

We would record the drivers face at regular intervals of time and using opencv and other algorithms do an expression analysis on the driver on wether he looks weary or not.

Another point being we would scan the eyes of driver for redness which would help us identify if he is drunk or is too tired to drive.This would also help us to calculate the percentage of time driver pays attention to the road.

We would propose a scoring system based on these results with parameters being:

(i).Face expression whether drunk or not.

(ii).Redness in the eyes.

(iii)Percentage of time driver was paying attention on the road.

(iv).The speed of car.(This would be in combination with above point...If spped is more, driver would need to pay more attention on the road)

When the threshold scoring value is crossed we would alert the driver with sound signals and preferably a message to emergency contacts submiited initially by the driver.(**Special focus would be made on removing false positives and incorporating tottaly obvious cases**)

For even better results we have API(s) from different organisations which have done work in computer vision. For Example Kairos has a face expression analysis API and using open cv inbuilt modules or by using deep learing methods we can scan and analyse the eyes of the driver.

**2.Android application connected to our raspberry pi in the car:**

The drivers mobile would have to be connected with the raspberry in the car and a specialized application would be made which would serve the following points:

(i)An automated voicemail would be sent to the caller(in case a someone calls the driver during the drive) saying that the person is driving and cant pickup your call.If the person calls again, then we would move on to the next point

(ii)The driver cant pickup a call unless the mobile is connected to bluetooth system in the car or the car is not moving.

**3.Road facing cameras(2) or a camera combined with a ultrasonic sensor(Kind of a parking sensor) to measure distance of objects in front of thr car:**

Here, we would use the cameras to identify objects in front of the car.Special focus on identifying people and other cars most accurately and calculating the distance from the car.

Here, we would have to collect data from the car companies on the stopping distance of different cars according to their current speed.

If the margin of distance and stopping time for tha speed is reducing we would first flash alerts on the dashboard mounted screen(so as to not scare the driver) but after its completely necessary sound alerts would be given for the driver to apply the breaks.

For even more accuracy we can look into the auto breaking algorithms used by companies like Mercedes and Ford in their cars( Various Research papers have also been published on the subject ) for our alerts to be more accurate and real time.

**4.Black box for cars(Recordings,speed and location data)**

The raspberry would store the above mentioned data and in case of an accident, we could use this to analyse what went wrong .Not only in case of an accident, but this would also help in our data collection for further uses and also would help the police in analysis of a crime (if it was a case).

The only drawback for this method would be that storage on a raspberry is limited and we would have to upload the data to cloud in regular intervals which would require data services from the connected mobile mentioned above.