Driver's Behavioral Analysis Using Android Phone and Raspberry Pi

Objective

To develop an android application to analyze the behavior of a driver behind the wheel and interact with the driver to maintain the safety of drivers.

Methodology

Application Design & Data Collection

- Various data such as acceleration, deceleration, hard brakes, etc. are collected using accelerometer sensor in the phone.
- Turning angles is collected using gyroscope sensor in the phone.
- Traffic flow and speed limits are calculated using google maps api.
- Different weather condition such as icy road surface, rain and so on are calculated using weather api.

Data Analysis

- Data from the accelerometer and gyroscope are used to determine the erratic behavior of the driver. Accelerometer data provides the position and speed information of the vehicle, while gyroscope data provides reliable information regarding the lane departure and turning events.
- Speed of the vehicle is used to determine if the vehicle is under or over the speed limit. The traffic data can be used to evaluate if the driver should decrease his speed. Such data can also be used to notify the driver about the erratic drivers nearby.
- Rain and weather data collected from the weather api are also beneficial to suggest to the driver to maintain the safety condition in an unsafe road.

Components

- Power Source - Battery/car ports
- Mobile Phone - accelerometer, gyroscope, GPS

Conclusion

By using the above parameters and correlating these factors to determine a threshold to evaluate the behavior of the driver and the driving pattern, we intend to develop an android application to notify the driver about his/her safety level as well as probability of occurrence of accidents.