Introduction

According to National Transportation Safety Board (NTSB) 58% of roadway crashes are safety related.

Factors such as fatigue and drowsiness causes significance decline in driver’s abilities of perception, recognition and vehicle control.

Exposes driver’s to a higher level of risk while driving with these conditions.

Being awake for 18 hours is equivalent to a Blood Alcohol Concentration (BAC) of 0.08%.

Motivation

Studies suggests the relationship between the change in physiological signals with the physical state of the driver, the changes with the environment and surroundings of the driver.

The common physiological signals directly related to human behavior are:

- Electroencephalogram (EEG)
- Electrocardiogram (ECG)
- Galvanic Skin Response (GSR)

EEG is recording of electrical activity of the brain by capturing signals along the scalp.

ECG is a process of interpreting electrical activity of the heart by placing electrodes on the outer surface of the skin.

GSR or skin conductance is a technique of measuring electrical conductance of the skin.

Conclusions

Driving under the influence of drowsiness may cause:

- Longer reaction time
- Lack of alertness
- Decision making ability

It has been reported that the parameters of alpha, beta and theta waves are associated with human drowsiness.

Heart Rate Variability (HRV) is studied by calculating R wave to R wave interval in an ECG.

Spectrum of HRV provides a Low Frequency (LF) and High Frequency (HF) components.

The ratio of LF power over HF power is commonly used as an indicator for drowsiness.

GSR studies the nervous behavior of a person by measuring electrical conductance.

Future Work

Approval from IRB for data collection.

Data collection from individual subjects to come up with a thorough model.