



**SDSU**  
presents  
a thesis defense for  
Master of Science  
degree in  
Computer Science

Wednesday,  
February 11, 2015

12:00pm  
GMCS 418

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*Detection of a Driver's Eye Blinks and Brain Wave in  
Different Scenarios by EEG to Measure Drowsiness*

## Abstract

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Drowsiness or sleepiness while operating a vehicle is a very critical issue. Drowsy drivers cause each year nearly three thousand car accidents. The current concept of car technology involves safety-monitoring system based on human facial expression or wandering car movement, which has a low success rate. EEG sensors can be used to detect the eye blink strength, frequency and brainwave activity while measuring the alertness and sleepiness state of a human. Different levels between Beta waves and Delta waves can be monitored and profiled to establish alertness and reduced consciousness for a driver. Various brain responses can be extracted while driving a car such as attention or drowsiness. Also, frequency and duration of eyelid drops can be measured to elicit the awareness. These signals can be transferred to computer or handheld devices using Bluetooth. Then these responses can be sampled for a human and be used to develop an algorithm to trigger alert or stimulants while the driver is not in his complete awareness to drive. Other obvious uses are air-traffic controller, watchmen and many others who can be benefitted. Instead of multiple channels clinical-grade EEG, a single channel EEG sensor has been used to figure out whether the easily available and wearable devices are reliable to measure drowsiness and can be effectively used to provide feedback.

## Thesis Committee

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Carl Eckberg, Thesis Chair, Department of Computer Science  
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Yusuf Ozturk, Department of Electrical Engineering