ABSTRACT

Driving is the common activity in most of the people’s life; therefore, improving driving skill is very important for safety. As a part of intelligent transportation system, many driving assistant systems, such as automatic braking system, lane departure warning system and automatic adaptive cruise control system, have been added to the vehicles to provide safety and comfort to the drivers. However, a driver does not have an opportunity to know his/her driving performance. There are many researches which captured driving behaviors of the drivers using different types of sophisticated sensory equipment, such as pressure sensor, angular transducer, LASER and LIDER. Processing the physiological signal requires more expensive and comprehensive EEG acquisition equipment such as EEG cap, electrodes, and signal amplifier. This study evaluated driving performance by establishing a relationship between driver’s facial movement and driver’s driving state on the road using video data. The use of computer vision system to detect the state of a driver is a growing field in the transportation researches. OpenCV has been used in this study because it is very inexpensive to extract information from video data and it is widely used by transportation researchers to get valuable traffic information. This study found that the movement of head of a driver impacts the lateral displacement of his/her car. Moreover, a driver can also find out the reason behind his/her abrupt head movement while driving a car from this research.

RESEARCH QUESTIONS

1. How Video data can be used to collect the behavioral information of a driver and the road environment outside the vehicle?
2. What is the relationship between the state of a driver inside the vehicle and his/her driving performance on the road based on the selected parameters?

METHODOLOGY

- Camera Calibration
- Data Collection
- Environmental Setup
- Data Fusion
- Lateral Movement
- Head Angle
- Eye Blinking
- Data Analysis
- Head Movement vs Lateral Movement

ENVIRONMENT SETUP

- Front View Camera
- Driver Face View Camera

RESULTS

The change in the state of driver has been reflected to his/her driver performance by the displacement of lateral movement.

CONCLUSION

- This study explained how video data can be generated and processed to extract necessary information form the video. This study successfully extracted information from both front and outside video data.
- In this study, it was tried to find the relationship with movement of head of a driver with the lateral displacement of the car. The result shows a positive relationship between them. Using this result, the driver can realize how his/her head movement causes vulnerable driving state on the road. It will encourage driver to find out the reason behind his abrupt head movement.
- The lane detection method will help to extract the measurement parameters of the outside objects. By integrating the location parameter of the cameras on dash board, driver’s gazing point on any object can be extracted from the outside video which will help to identify what are the most influencing factors along the roads distract a driver. The video data can be automatically stored on the cloud and can be used as historical data later along with the real-time data to develop an advance driver assistance system.

BIBLIOGRAPHY