LITERATURE REVIEW ON ANTI SLEEP SENSING AND AUTO PARKING SYSTEM

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ABSTRACT:

The demand for intelligent driving systems has been steadily increasing as the automotive industry progresses towards autonomous vehicles. One crucial aspect of autonomous driving is ensuring driver and passenger safety through the prevention of drowsy driving. In this survey paper, we present an overview of recent advancements in the field of anti-sleep sensing and auto-parking systems that utilize machine learning techniques. We review various approaches that leverage machine learning algorithms for detecting driver drowsiness in real-time, including physiological, behavioral, and environmental sensing methods. We also explore how machine learning algorithms can be applied to enable autonomous parking systems that efficiently maneuver vehicles in complex parking scenarios. Furthermore, we discuss the challenges and limitations associated with anti-sleep sensing and auto-parking systems, such as accuracy, robustness, and real-time performance. Finally, we highlight potential future directions and research opportunities in this field, including the integration of multiple sensors and the use of advanced machine learning techniques, such as deep learning and reinforcement learning, to enhance the performance of these systems. This survey paper aims to provide a comprehensive overview of the state-of-the-art in anti-sleep sensing and auto-parking systems that utilize machine learning, and serves as a valuable resource for researchers and practitioners working in the field of autonomous driving.

Keywords : Intelligent,Drowsy,Machine Learning,Anti-Sleeping,Auto-Parking,Accuracy

INTRODUCTION:

The purpose of this review paper is to examine the latest developments in anti-sleep sensing and auto-parking technologies in the automotive industry. These two technologies are designed to improve the safety and convenience of driving by detecting driver fatigue and automating the parking process.

In recent years, anti-sleep sensing systems have become increasingly sophisticated, incorporating a range of sensors and algorithms to detect signs of drowsiness in drivers. These systems use various methods, such as eye tracking, steering behavior, and heart rate monitoring, to identify when a driver is at risk of falling asleep at the wheel. Once detected, the system can alert the driver to take a break or even intervene to stop the vehicle.

Auto-parking technology has also evolved significantly, allowing vehicles to park themselves with minimal human intervention. This technology uses a combination of sensors, cameras, and algorithms to detect and navigate parking spaces, making it easier for drivers to find a spot and park their vehicles safely and efficiently.

Both technologies have the potential to reduce the number of accidents and increase the efficiency of driving. Anti-sleep sensing systems can help prevent accidents caused by driver fatigue, which is a major cause of accidents, especially on long drives. Auto-parking can help reduce the stress and difficulty of finding a parking spot, especially in crowded urban areas.

In this era of rapid technological advancement, these innovations are just a glimpse of what the future holds for the automotive industry. As technology continues to evolve, we can expect to see even more advanced safety features and driver assistance systems in the coming years.

This review paper will examine the latest research and developments in these technologies, including their effectiveness, limitations, and potential applications. Additionally, the paper will consider the ethical and social implications of these technologies, such as the impact on driver behavior and the potential for job displacement in the transportation industry.

Overall, this review paper will provide a comprehensive overview of anti-sleep sensing and auto-parking technologies, highlighting their potential to revolutionize the way we drive and improve road safety.

LITERATURE WORKS:

2.1)Anti-Sleep Sensing Systems

Several studies have been conducted to develop anti-sleep sensing systems using machine learning algorithms to detect driver fatigue. A group of researchers proposed a real-time fatigue detection system using a camera and deep learning algorithms to monitor the driver's facial features and physiological signals[13]. Another system called a real-time driver drowsiness detection system using electroencephalography (EEG) signals and machine learning algorithms[12].

2.2)Auto-Parking Systems

Auto-parking systems have also been developed using various sensors and machine learning algorithms. A auto-parking system was also developed using an ultrasonic sensor and machine learning algorithms to detect and locate available parking spaces[17].There is an auto-parking system that uses a LiDAR sensor and a control algorithm to park the vehicle in a narrow space[5] and there also a system on auto parking systems using ultrasonic sensors. That is implemented using ultrasonic sensors to detect the parking place and the roadside parking algorithm was used to park the vehicle[11].

Machine learning has been widely used in various applications in the automotive industry, including driver assistance, vehicle control, and autonomous driving. A group of researchers developed a machine learning-based driving style classification system that can classify drivers based on their driving behavior[16]. Another study also led to the development of a machine learning-based vehicle trajectory prediction system that can predict the future trajectory of the vehicle based on past driving data[15].

K. Kwangjin Yang and S. Sukkarie[21] an analytical path-smoothing algorithm for continuous-curvature paths in robotics. The proposed method uses an iterative process that adjusts the path's curvature based on a smoothing factor and eliminates the sharp turns that can lead to instability. The algorithm is computationally efficient and is demonstrated to improve the path's tracking performance in simulations and experiments

F. Xie, J. T. Lou, and K. Zhao[22], proposes a vehicle trajectory prediction method based on behavior recognition and curvature constraint. The method uses a Hidden Markov Model (HMM) to recognize driver behavior and estimate the vehicle's future motion. A curvature constraint is then applied to ensure the predicted trajectory is feasible and safe. The proposed method is validated using real-world data and is shown to achieve high prediction accuracy and robustness to uncertainties.

2.4)Integrated Systems

Some studies have also proposed integrated systems that combine anti-sleep sensing, auto-parking, and machine learning features. For example, a model developed as a smart vehicle system that uses facial recognition and machine learning algorithms to detect driver fatigue and a parking assist system to automatically park the vehicle[14].

2.5)Collision Detection Systems

A Collision Detection System model was deployed to detect whether our vehicle will collide with the object in front of us and he developed an avoidance system to avoid collision in such situations. At first they calculated the distance between our vehicle and the front object and then calculated the distance of safety. If the actual distance is less than the safe distance, the driver will be alarmed by using a buzzer. If the driver is not able to respond to the alarm then their system will automatically reduce the vehicle's speed. Though the actual distance is lesser than the minimum safe distance, their system stops the vehicle at that time[1].

Sri Krishna ChaitanyaVarma, Poornesh, TarunVarma, Harsha[23],an automatic vehicle accident detection and messaging system that uses GPS and GSM modems. The system detects vehicle accidents using an accelerometer and sends the location details to emergency services and pre-defined contacts via SMS. The system also includes a microcontroller, GPS module, and GSM modem to facilitate the communication process. The proposed system aims to reduce response time and improve the overall efficiency of emergency services during accidents.

2.6)Alerting Systems

A have also studied the alerting system and proposed a methodology to sense sleeping and an alert system for drivers to alert them when they fall asleep. In their methodology, they used an IR led sensor to detect whether the person's eye is opened or closed. If the driver closes the eye for more than 10 seconds, the alarm will be raised to wake up the driver at most for the time period of 10 seconds[2].

M. B. Ahmad, A. A. Abdullahi, A S Muhammad, Y. B. Saleh, U. B. Usman[24], discusses the various types of sensors used in security alarm systems. The authors outline the different categories of sensors, including motion sensors, door and window sensors, vibration sensors, and acoustic sensors. They describe the functionalities, advantages, and limitations of each type of sensor. The article provides a comprehensive overview of sensor technology, which is essential for developing effective security alarm systems. It concludes that the use of multiple sensors can enhance the accuracy and reliability of security systems.

2.7)Drowsiness Detector

Israt Jahan et al.[3] have developed a model to detect drowsiness in real-time using CNN with the deep learning techniques. They used a transfer learning strategy rather than developing a new model. They reused the Imagenet with its versions like VGG-16 and VGG-19

Jay D. Fuletra and Bulari Bosamia[13], provides an overview of various driver drowsiness detection techniques, including those that use physiological signals, video analysis, and machine learning algorithms. They discusses the advantages and limitations of each technique and highlights areas for future research.

Ming-ai Li, Cheng Zhang, and Jin-Fu Yang[14], proposes a method for detecting drowsy driving state using electroencephalography (EEG) signals. This paper describes the experimental setup and results, demonstrating the effectiveness of the proposed method for detecting drowsiness in real-time.

D. Jayanthi and M. Bommy[16], proposes a vision-based method for detecting driver fatigue in real-time. The paper discusses the system design and implementation, demonstrating the effectiveness of the proposed method for improving vehicle safety.

Artem A. Lenskiy and Jong-Soo Lee[17], proposes a method for detecting driver fatigue by analyzing eye blinking patterns. This paper describes the algorithm for color and texture segmentation, which is used to extract features from the driver's face and eyes. The proposed method is tested on a dataset of video recordings, demonstrating the effectiveness of the algorithm for detecting drowsiness in real-time.

Overall, the related work highlights the potential of anti-sleep sensing and auto-parking systems using machine learning to improve driving safety and parking efficiency. However, there is still a need for

further research and development to optimize these systems and ensure their reliability and effectiveness in real-world driving conditions.

ANALYSIS:

APPLICATION	Sensors/Technology Used	Machine Learning Algorithms
Anti-Sleep Sensing	Camera, physiological signals, EEG	Deep learning algorithms
Auto-Parking	Ultrasonic sensor, LiDAR, Ultrasonic sensors	Machine learning algorithms, control algorithm, roadside parking algorithm
Vehicle Trajectory Prediction	Past driving data	Machine learning algorithms
Integrated Systems	Facial recognition, machine learning algorithms	Parking assist system
Collision Detection	Distance sensors	Automatic speed reduction
Alerting Systems	IR led sensor	Alarm system
Drowsiness Detector	Transfer learning, CNN	Deep learning techniques

CONCLUSION:

In conclusion, the development of anti-sleep sensing and auto-parking technology has significantly improved the safety and convenience of driving. These features use advanced sensors and algorithms to detect driver drowsiness and enable the vehicle to park itself with minimal human intervention. These technologies have the potential to reduce accidents caused by driver fatigue and human error, and make driving more accessible to those with disabilities or limited driving experience.

The review paper highlights the different approaches and techniques used in the development of anti-sleep sensing and auto-parking systems, including camera-based, sensor-based, and machine learning-based methods. The paper also discusses the limitations and challenges associated with these technologies, such as accuracy, cost, and integration with other vehicle systems.

In the above analysis, for Anti-Sleep Sensing carema and deep learning are best. for Auto-Parking LiDAR and roadside parking algorithm are best. For Vehicle Trajectory Prediction and Machine learning algorithms are best. For Integrated Systems , machine learning algorithms and Parking assist system are best. For Collision Detection Distance sensors and Automatic speed reduction are best. For Alerting Systems IR led sensor and Alarm system are best. For Drowsiness Detector CNN and Deep learning techniques are best.

Overall, the review paper emphasizes the potential benefits of anti-sleep sensing and auto-parking systems for the automotive industry and society as a whole. As technology continues to advance, we can expect to see even more sophisticated and reliable systems that further enhance the safety and convenience of driving.

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