Documents

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Preface

This book explores a dynamic landscape where cutting-edge technologies are revolutionizing various domains. This captivating book delves into the advancements in security, communication, and environmental management, highlighting their profound impact on society. The developments bridge the gap between human needs and technological innovation. Readers will uncover the fascinating world of IoT-driven devices that seamlessly integrate into our lives, ensuring enhanced safety and communication efficiency. This book is a must-read for technology enthusiasts, researchers, and anyone curious about the transformative power of technology in shaping our present and future.

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Contents

Development of a Driver Detection System for Somnolence and Alertness Based on Image Processing Techniques

Mohd Fauzi Abu Hassan, Ahmad Arifridhwan Yakcob, Anis Sofi Ahamad Saleh, Ahmad Shahrizan Abdul Ghani & Mohd Helmy Abd Wahab

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Abstract

Microsleep or drowsiness which is caused by accumulated fatigue accounts for numerous numbers of car accidents. There are several reasons for microsleep to happen, that is lack of sleep, long driving period, and others. The behavioral-based measure gives a precise outcome in identifying microsleep compared to other methods. Thus, this project proposed a system that detects drowsiness by analyzing the state of the eyes of the drivers and the frequency of the eyes blink by using an image processing technique and controlled by using a Raspberry Pi module. The blink rate of a normal person's eye is 10 per minute, whereas the blink rate of a drowsy person's eye is less than 10 per minute. Dlib's facial landmark is used and the coordinates of the right and left eye of the driver were taken and then the eye aspect ratio (EAR) algorithm is used. The EAR algorithm is very important as it calculates the closure of the eyes. Thus, a drowsiness detection system can work. Then, the blink frequency is calculated through the video and the average of drowsiness and duration of eye closure is collected by using image frames. Experiments were carried out in the laboratory using a driver simulation setup. To validate the data, the test driver performs the subjective measure, which is the Karolinska sleepiness scale (KSS) before and after they use the simulation tools. Data are taken for 30 min from each subject in two categories, alert state, and drowsy state so that the driver experiences fatigue while driving. The data obtained was then analyzed from both will then be analyzed from both categories.

Keywords

Drowsiness detection | Eye closure | EAR

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