Portable Wireless Drowsiness Detector

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Abstract- Excess sleep results in drowsiness that's not the underlying disease.Drowsiness may cause additional symptoms, like forgetfulness or falling asleep at inappropriate times. The common examples are Sleep deprivation, alcohol or drug use, medication side -effect, an outsized meal or caffeine withdrawal. A number of the causes of the drowsiness are Lifestyle factors, psychological state, Medical Condition, Medications, Sleeping disorders. The prevailing method uses the photo-PLETHYSMOGRAPHY method. In our project we are going to detect the drowsiness, this we will detect the waveforms and transform the waveforms using ARDUINO software and determine the speed of drowsiness. Using GSM, just in case of drowsiness the notification or call is shipped to the respective registered number. The developed low-cost device could avoid complicated procedures and provides continuous monitoring of the drowsiness.

Index terms- drowsiness detection, EMG (electromyography), GSM module, Arduino software, Notifications, pulse notifications, EMG value.

I. INTRODUCTION

Feeling of abnormal sleepiness or tired during the day is usually referred to as drowsiness. Drowsiness may cause additional symptoms like forgetfulness or falling asleep at inappropriate times[1]. A number of the factors contributing to the drowsiness are psychological state, medical conditions, Medications, Sleeping disorder. In most of the cases, drowsiness will subside as your body adapts to a replacement schedule. The drowsiness is additionally caused by the factor of emotion, the method of stress, Boredom, taking sleeping bills and a few medical conditions. A number of the common sorts of the drowsiness are diabetes and therefore the other results in the metabolism or the psychological state like the hypothyroidism or hyponatremia[2]. Excessive drowsiness without a known cause are often a symbol of a sleeping disorder. In obstructive apnea disorder, a blockage in your upper airways results in snoring and breathing cessation throughout the night. Most of the accidents are caused thanks to the drowsiness. Over 69% of the deaths are caused thanks to accidents, during which drowsiness plays a serious role. consistent with the National Sleep Foundation's 2005 Sleep in America poll, 60% of adult drivers about 168 million people suffer from drowsiness within the past year, and quite one-third, (37% or 103 million people), have fallen snoozing at the wheel. 4% approximately eleven million drivers admit that they had an accident or near accident because they dozed off or were too tired to drive. Normally no care might be given to stop the aim of drowsiness. Only certain steps and procedures might be followed for preventing drowsiness[3]. Some steps are proper sleep, proper diet control, proper maintaining of health, Avoid consuming of heavy capsule. Usually drowsiness is detected using the ECG sensor[1],[2]. Mainly detecting using the ECG signal is extremely much applicable. The detection uses either the ECG signal or the guts rate method or the photoplethysmographymethod[9]. Here ECG signal is replaced with the EOG signal or the EMG signal. The signal or the body movements has acquiesced through the ECG signal or the sensor and it's sent to the MATLAB software or the microcontroller and therefore the output is displayed within the computer screen.

1.1 DROWSINESS TREATED

Treatment of drowsiness depends on its cause. Self-treatment and Medical care are some of the treatment for the drowsiness. When it comes to self treatment some drowsiness can be treated at home, especially if it's the result of lifestyle factors, such as working longer hours, or a mental state, such as stress. In these cases, it may help to get plenty of rest and distract you. It's also important to investigate what's causing the problem — like if it's stress or anxiety — and take steps to reduce the feeling. In medical care, during the appointment, the doctor will try to identify the cause of your drowsiness by discussing the symptom with us. The amount of sleep we get, how often we fall asleep during the day, how often we feel drowsy during the day[1],[2].

1.2 STATEMENT OF THE PROBLEM:

Currently drowsiness is detected either with ECG sensor or with the moving of the eye[18]. In some cases the drowsiness will not be detected before and causes to serious injuries and problems. In the case of driver's it causes accidents due to drowsiness this may affect the drivers a well as the passengers inside. This drowsiness is also very hard for the old people because they feel drowsy often. A proper detection should be used[15].

1.3 EXCISTING METHOD

Drowsiness Detection System supported Eye-closure employing a Low-Cost EMG and ESP8266-Dian Artanto, M. PrayadiSulistyanto, Ign. DeradjadPranowo, ErvanErryPramesta. during this paper, a prototype driver drowsiness detection system employing a low-cost EMG and ESP8266 wifi module has been proposed[12].

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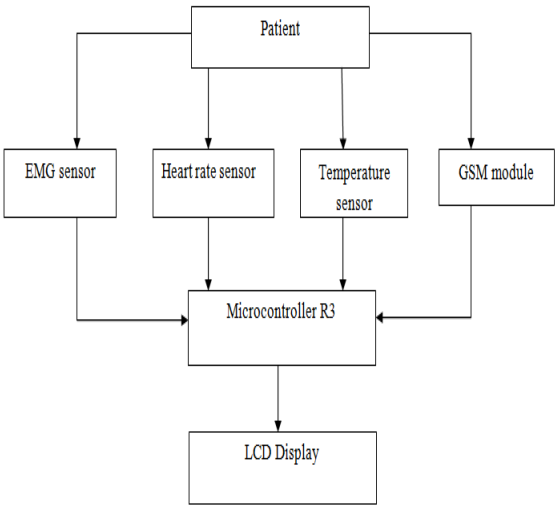
Vision-based drowsiness detector for Real Driving Conditions I. Garc´ıa, S. Bronte, L. M. Bergasa, J. Almazan, J. Yebes This paper presents a non-intrusive approach for monitoring driver drowsiness, supported computer vision techniques, installed on a true car, capable of handling real operation setting. Most of the previously addressed works could only affect indoor setting, like naturalistic simulators or night conditions, during which the illumination is in check.[13] The implemented system is user-independent and may evaluate the PERCLOS indicator in real-time in both, simulation and real operation scenarios. Results obtained within the system are similar or maybe better than other commercial ones being more flexible and open source. Sudden Unintended Acceleration Avoidance and Drowsiness Detector For Automobile Accidents Prevention- S. Priyanka, G.Hemalatha, C.Saranya during this paper, we presented some works that we've been doing in our lab towards the advancement of a system with avoidance like pedal error using different sensors and Drowsiness detection using camera and image processing tools. the most application of this project is to avoid loss of lives within the name of road accidents caused thanks to human error. We've also discussed the project working algorithm intimately for both sudden unintended acceleration thanks to pedal misapplication and drowsiness detection system.[11]

II. METHODOLOGY:

The system comprises of three unites- signal acquisition, signal processing, and display unit. The signal acquisition comprises of EMG sensor, temperature sensor, and therefore the pulse sensor. These sensors acquire the respective parameters that are wireless EMG sensor acquires the muscle activity from the patient body. Pulse sensor and temperature sensor acquire the respective parameters[16]. The signal is acquired when there's a movement within the body. The surface electrode of the sensor is EMG that has integral electrodes with a hard and fast distance of 20mm. The signal processing unit comprises the microcontroller Arduino UNO which processes the acquired signal that's the place of remodeling the signal. The display unit gives the output of those signals within the sort of the waveforms within the display[19].



In our project we are combining pulse sensor, temperature sensor and EMG sensor to detect drowsiness. Here we will detect waveforms and transform the waveforms using Arduino software and determine rate supported drowsiness [19]. Using GSM, just in case of drowsiness the notification neither call is shipped to the respective registered number[10]. The components utilized are pulse sensor, temperature sensor; EMG sensor and microcontroller (Arduino UNO) are used for acquiring and processing the physiological parameters respectively. The developed low-cost device could avoid complicated procedures and provides continuous monitoring of drowsiness. EMG sensor detects the signal with the assistance of the muscle movements within the patient body. EMG sensors are usually wired but in her, in our paper we are using the wireless EMG sensor, which makes the detector a pleased one for the driving force[12]. These sensors when abide placed on finds its application with diabetes diagnosis. Heartbeat sensor is employed to live the change in volume of the can even be placed within the fingertip since it's very minute. Whenever when the guts pump blood this sensor indicates or flashes a little light[11].

A special feature of GSM is added to urge a notification from the user if there's any low rate within the sensor. A notification liking sent to a specific registered mobile number. Drowsiness detector abide highly reliable and portable. The merchandise would be a water-proof material. The sturdiness of the merchandise also lasts to 5-6 years, based upon the usage[16].

2.2 working model

The system comprises of three unites- signal acquisition, signal processing, and display unit. The signal acquisition comprises of EMG sensor, temperature sensor and therefore the pulse sensor. These sensors acquire the respective parameters that are wireless EMG sensor acquires the muscle activity from the patient body[12]. Pulse sensor and temperature sensor acquire the respective parameters. The signal is acquired when there's a movement within the body. The surface electrode of the sensor is EMG that has integral electrodes with a hard and fast distance of 20mm. The signal processing unit comprises of the microcontroller Arduino UNO which processes the acquired signal that's the place of remodeling the signal[19]. The display unit gives the output of those signals within the sort of the waveforms within the PC. In our project we are joining pulse sensor, temperature sensor and EMG sensor to detect the drowsiness. Using GSM, in regard to drowsiness a notification either call are going to be sent towards respective registered number[10]. The components utilized are pulse sensor, temperature sensor; EMG sensor and microcontroller (Adruino UNO) are used for acquiring and processing the physiological parameters respectively[16]. The developed low-cost device could avoid complicated procedures and provides continuous monitoring of the drowsiness. The Drowsiness detector could be pre-owned for, Detecting comic pulse, temperature and therefore the EMG associated with person. Management of drowsiness through continuous monitoring. Effective also as accurate drowsiness monitoring Non-invasively[21].

III. RESULTS AND DISCUSSION

We have conducted the test with some normal persons among us and got the relevant parameters. The parameters are more or less normal in condition. The following data is the results obtained from our drowsiness detector device.

Si: No	AGE	EMG SENSOR (Hz)	TEMPERATURE SENSOR (°c)	HEART RATE SENSOR (BPM)
1	21	15	24	94
2	23	17	23.5	96
3	25	10	24.5	99
4	22	18	22	101
5	23	11	21.9	92

IV. CONCLUSION

In conclusion, this project has suggested a way of PORTABLE WIRELESS DROWSINESS DETECTOR. With effective implementation supported EMG signal, there's a relation between pulse and therefore the temperature[16]. Although not as accurate as present-day invasive drowsiness detector, but the utilization of EMG, temperature, pulse with less pain and luxury to all or any the patients and improve the standard of their lives through effective management. A GSM module is additionally wont to notify the drowsiness[14],[10]. It is very reliable that it could even help normal people especially within the case of drivers and for the adulthood people[19].

ADVANTAGES:

The existing method does not use the wireless EMG sensor this may cause inconvenient to the patients. Most of the drowsiness detector are invasive which may cause discomfort for the patients mainly to drivers.

- Detecting the heart rate, temperature and the EMG of a person
- Effective and accurate drowsiness monitoring Non invasively.
- Additional set up GSM module has been added.
- Making the device in the form of wearable.

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