

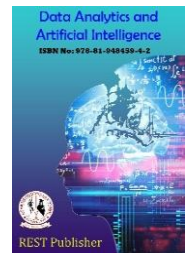


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Driver Drowsiness Detection System Using IOT

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Abstract: Research shows that driver fatigue is one of the major reasons of road accidents. In this paper, we discuss our system which can be used to measure the level of alertness of the driver based on some critical physiological parameters. The system will analyze these parameters and accordingly issue an audio warning to the driver in case significant drowsiness is detected. The system is a software prototype of this system in vehicles, where images that are captured will be processed using image processing techniques and accordingly issue warning. The overall goal of the system is to reduce the number of accidents, and therefore improve the worsening road conditions. Drowsiness and Fatigue of drivers are amongst the significant causes of road accidents. Every year, they increase the amounts of deaths and fatalities injuries globally. In this paper, a module for Advanced Driver Assistance System (ADAS) is presented to reduce the number of accidents due to drivers fatigue and hence increase the transportation safety. This system deals with automatic driver drowsiness detection. With the help of Eyeblink sensor and Steering sensor, the condition of drivers are monitored automatically and then do necessary actions.

Keywords: Steering Sensor, Eye Blink Sensor, Alcohol Sensor, Motor, LCD, LED, Buzzer, GSM Module, Power supply.

1. INTRODUCTION

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded system - Generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc. Lower end embedded systems - Generally 8, 16 Bit Controllers used with a minimal operating systems and hardware layout designed for the specific purpose. An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. Ninety-eight percent of all microprocessors are manufactured as components of embedded systems. Examples of properties of typical embedded computers when compared with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. This comes at the price of limited processing resources, which make them significantly more difficult to program and to interact with. However, by building intelligence mechanisms on top of the hardware, taking advantage of possible existing sensors and DRIVER DROWSINESS DETECTION SYSTEM USING IOT Mr. N. THANGA SELVIN thangaselvin01@gmail.com , Assistant Professor. KANNAN. M, KATHIRESAN.K, KIRTHU OLI. S, UG scholar, Second year, Department of Mechatronics Engineering. PSN INSTITUTE OF TECHNOLOGY AND SCIENCE, TIRUNELVELI the existence of a network of embedded units, one can both optimally manage



FIGURE 1: Embedded Chip

2. BLOCK DIAGRAM

A block diagram is a diagram of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationships of the blocks. Block diagrams are typically used for higher level, less detailed descriptions that are intended to clarify overall concepts without concern for the details of implementation. The represent the block diagram of our proposed Driver Drowsiness Detection System. In our proposed system we use three sensors for monitoring the Steering Sensor, Eye Blink Sensor, and Alcohol Sensor. The steering angle sensor (SAS) is a critical part of the ESC system that measures the steering wheel position angle and rate of turn.

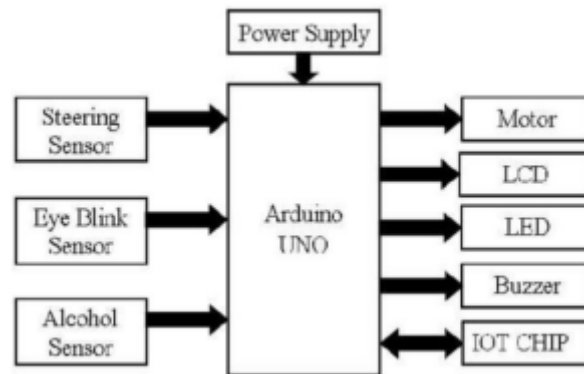


FIGURE 2. Block Diagram

3. CIRCUIT DIAGRAM DESCRIPTION

Driving while fatigued is just as dangerous as drunk driving and may result in car accidents. However, the detection reliability has been lower than anticipated, because the HRV signals of drivers were always regarded as stationary signals. This system reduces the number of accidents that are happening due to drivers fatigue and thereby increases the transportation safety. It monitors the driver drowsiness and fatigue automatically. This system uses an Eye-blink sensor, which is used to switch on the indicator signal and reduces the speed of the vehicle. The Steering sensor detects whether the driver has slept by measuring the pressure applied on it and then slows down the vehicle if it is needed.

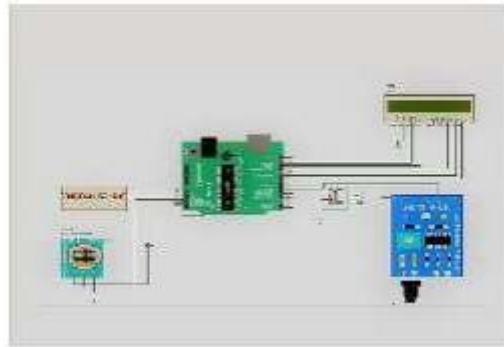


FIGURE 3. Circuit diagram

4. Arduino UNO microcontroller

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Arduino UNO and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform. The Arduino Uno is a microcontroller board based on ATmega328. The controller used in Arduino no is ATmega328. Arduino has 20 digital input/output pins which consist of 6 PWM outputs and 6 used as analog inputs. It also consist of a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button. It contains simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Arduino is an open-source, prototyping platform and its simplicity makes it ideal for hobbyists to use as well as professionals. The Arduino open-sourced IDE drivers can be downloaded for free in all Windows XP. Figure 3.6 represent the Arduino UNO board which was used in our project.



FIGURE 4. Arduino UNO Board

Pin Description: Port A (PA7-PA0) It is used for analog inputs of A / D. But if A/D converter is not enabled it also serves as a self in 8-bit bi-directional port for input and output. Port pins can provide internal pull-up resistors (selected for each bit). Port B (PB7-PB0) Port B is used as input/output 8-bit bi-directional port having internal pull- up resistors. The output buffers of Port B are of symmetrical drive characteristics having high sink and source capability. When acting as input pins, Port B pins; if pulled externally low; will source current if the pull-up resistors are activated. Port C (PC7-PC0) Port C's special feature is JTAG interface. If the JTAG interface is enabled, the pull-up resistors on pins PC5 (TDI), PC3 (TMS) and PC2 (TCK) will be activated even if a reset occurs. Along with this Port C can also be used as input/output 8-bit bi-directional port having internal pull-up resistors. Port D (PD7-PD0) Port D serves the functions of various special features of the ATmega16 like

interrupts input, timer/counter output and UART. In addition to this Port D is used as input/output 8-bit bi-directional port having internal pull-up resistors.

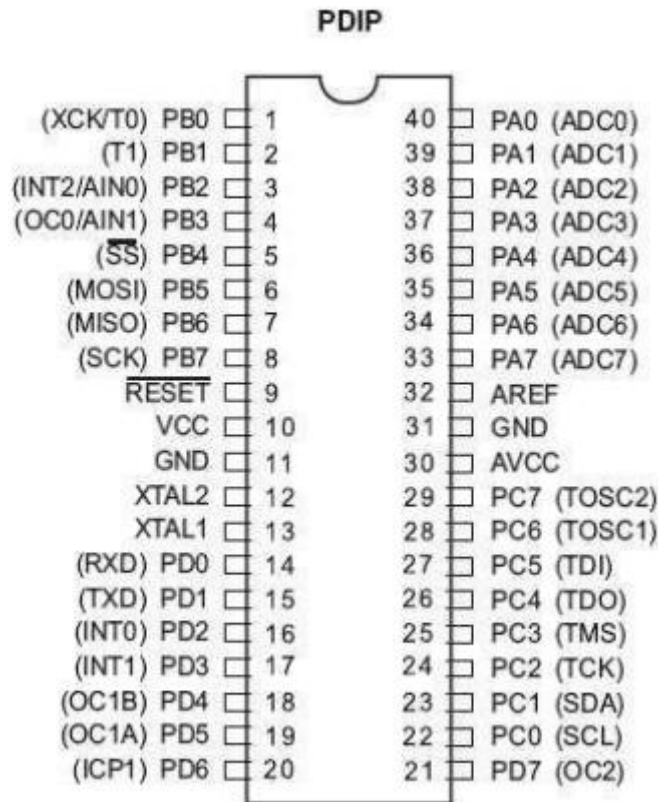


FIGURE 5. ATmega328 Microcontroller Pin Descriptions

5. STEERING SENSOR

The steering angle sensor (SAS) is a critical part of the ESC system that measures the steering wheel position angle and rate of turn. A scan tool can be used to obtain this data in degrees. The SAS is located in a sensor cluster in the steering column. The cluster always has more than one steering position sensor for redundancy and to confirm data. The ESC module must receive two signals to confirm the steering wheel position.



FIGURE 5. Steering Sensor

6. CONCLUSION

Driver errors still remain the main cause of casualties in the roads. Texting at the wheel, talking in the cell phone, checking maps and drowsiness are different types of activities that take the driver away from his primary task of driving and decreases drastically his attention. Recent technological advances have brought vehicle

designers to design low cost and high performance vehicles with sensors such as Steering sensor, Eye Blink Sensor and Alcohol sensors. Those sensors gather data, detect driving conditions and the environment and helps drivers in taking necessary actions. Drowsiness is one of the measures of driver fatigue, which is the cause of most of the accidents on our roads. This system is a step in the direction of bringing about a positive change for better equipped vehicles, which will alert drivers in case drowsiness is detected and avoid a potential accident. Four parameters have been used to measure drowsiness, and their computed outputs together help to get the result. The system can also be extended once complete, to suit vehicle specific needs and integrate it with the other mechanical components to yield better results.

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