

IMPEMENTATION OF FIRST IN FIRST OUT(FIFO)DESIGN FOR AVOIDING DATA LOSSES IN TRANSMISSION

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ABSTRACT

The majority of road accidents are caused by drowsy drivers. Drowsiness puts people's lives at danger on the road and can lead to serious injuries, death, and financial overlooking. When operating a vehicle, drowsiness is characterized as a sleepy sensation, a loss of attentiveness, or tired eyes. The majority of accidents in India are caused by a driver's inattention. The driver's performance progressively deteriorates as a result of exhaustion. To avoid this, we devised a device that can detect the driver's fatigue and alert him immediately.

Drowsiness has been experimentally controlled in a variety of methods, which is also described. We conclude that by developing a sleepiness detection system that integrates non-intrusive physiological measures with other metrics, one may reliably assess whether or not someone is drowsy. The design and implementation of a 'Drowsiness Alert system Using Embedded System' are covered in this study. Our system detects the closing of eyes due to drowsiness or loose grip due to dullness or fatigue, and sends notifications to the driver, as well as creating a loud alarm to fast awaken the driver.

INTRODUCTION

Every day, about 5% to 10% of car crashes are due to driver drowsiness. Drowsiness can be defined as the transition between the awake state and the sleep state where one's ability to observe and analyze are strongly reduced. The consequences are an increase in reaction time as well as a decrease in driver vivacity which lead to an impairment of driving abilities. Efforts to increase traffic safety have led the research community to focus on the detection of this unsafe state in an automated way. So, the above problem can be overcome by a

drowsiness detection system using both brain and visual activity. According to Renner and Mehning, from a physiological stand point, drowsiness can be described using both brain activity, which gives an indication of the brain's ability to process the information, and ocular movements, which gives an indication of perceptive ability. This is, therefore, the information used by expert doctors to evaluate drowsiness [7]. For Effective Assessment of Driver Vigilance and Warning According to Traffic Risk Estimation (AWAKE) consortium. The electroencephalogram, which measures brain electrical activity, is used here to detect burst of energy in the α ([8–12] Hz) and in the θ ([4–8] Hz) frequency bands. These frequency bands are known to be linked to drowsiness. The length of these bursts is used to evaluate drowsiness. At the same time, EEG analysis is complemented by an analysis of visual signs: blinking (lids movements) and eye movements. Unfortunately, there are no standardized rules to distinguish the different level of drowsiness (as the Rechtschaffen and Kales rules for the study of sleep for example). The drowsiness evaluation depends on the expert doctor analyzing the signal. As for sleep study, the evaluation may vary from one expert to another. Nevertheless, it can be seen in the literature that drowsiness mainly manifests itself through an increase of energy in α and θ bands, as well as a slowing down of eyes and lids movements. In literature, several systems have been developed using EEG to monitor driver drowsiness.

Drowsiness can be described through variations of spectral power in specific frequency bands of the brain activity. These variations are studied by processing a spectrum analysis of the EEG signal. Various means can be used to detect drowsy states using the variations of energy in EEG.



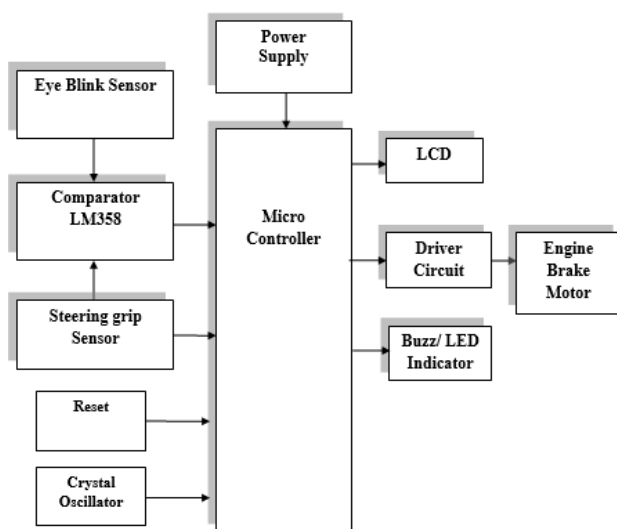
EXISTING SYSTEM

A Driver Drowsiness Detection System typically utilizes cameras and sensors to monitor eye movements, blink rates, head position, steering patterns, and vehicle behavior. These systems often incorporate machine learning algorithms to analyze data and detect signs of drowsiness. When drowsiness is detected, alerts are issued to prompt the driver to take a break, enhancing road safety.

PROPOSED SYSTEM

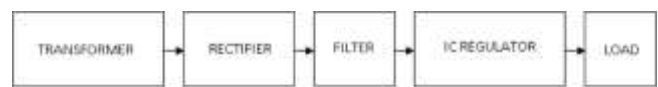
The proposed Driver Drowsiness Detection System using NodeMCU aims to monitor driver alertness by integrating sensors directly with the NodeMCU microcontroller. This system will track eye movements, blink rates, and head position using connected sensors. The NodeMCU will process this data using algorithms to detect drowsiness patterns. Upon detecting drowsiness, the system will issue visual, auditory, or tactile alerts, prompting the driver to take necessary action to ensure safety. This approach leverages the versatility and low power consumption of NodeMCU for an efficient and cost-effective solution.

BLOCK DIAGRAM



POWER SUPPLY

The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V. The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.



Block Diagram of Power Supply

Transformer

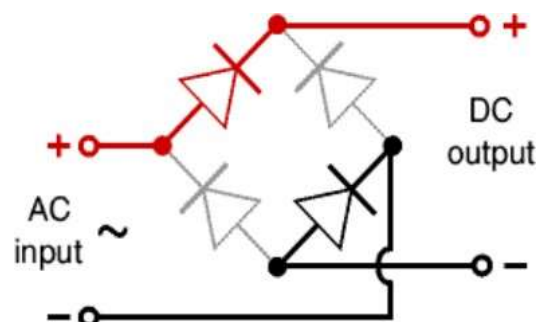
Transformers convert AC electricity from one voltage to another with little loss of power. Transformers work only with AC and this is one of the reasons why mains electricity is AC. Step-up transformers increase voltage, step-down transformers reduce voltage. Most power supplies use a step-down transformer to reduce the dangerously high mains voltage (230V in India) to a safer low voltage.

Rectifier

There are several ways of connecting diodes to make a rectifier to convert AC to DC. The bridge rectifier is the most important and it produces full-wave varying DC. A full-wave rectifier can also be made from just two diodes if a centre-tap transformer is used, but this method is rarely used now that diodes are cheaper. A single diode can be used as a rectifier but it only uses the positive (+) parts of the AC wave to produce half-wave varying DC.

Bridge Rectifier

When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The 11 input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4.

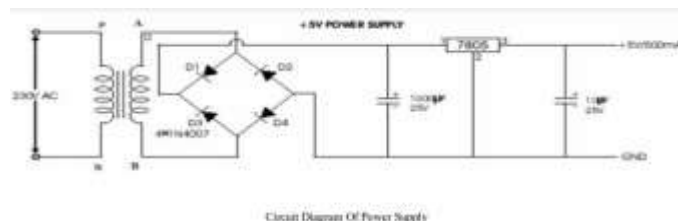


Bridge Rectifier

Voltage Regulators

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference

source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage. The regulators can be selected for operation with load currents from hundreds of milli amperes to tens of amperes, corresponding to power ratings from milli watts to tens of watts.



MICROCONTROLLER

A Microcontroller (or MCU) is a computer-on-a-chip used to control electronic devices. It is a type of microprocessor emphasizing self-sufficiency and cost-effectiveness, in contrast to a general-purpose microprocessor (the kind used in a PC). A typical microcontroller contains all the memory and interfaces needed for a simple application, whereas a general purpose microprocessor requires additional chips to provide these functions. A microcontroller is a single integrated circuit with the following key features: • central processing unit - ranging from small and simple 8-bit processors to sophisticated 32- or 64-bit processors

LIQUID CRYSTAL DISPLAY (LCD)

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

IR SENSOR

IR sensor is very useful if you are trying to make a obstacle avoider robot or a line follower. In 32 this project we are going to make a simple IR sensor which can detect a object around 6-7 cm. IR sensor is nothing but a diode, which is sensitive for infrared radiation. This infrared transmitter and receiver is called as IR TX-RX pair.

PIEZO SENSOR

A sensor that utilizes the piezoelectric effect, to measure changes in acceleration, strain, pressure, and force by converting them into electrical charge is called as a piezoelectric sensor. Piezo is a Greek word which means 'press' or 'squeeze'. Piezoelectric effect causes the occurrence of electric dipole moments in solids due to the pressure applied to certain solid materials such as piezoelectric crystals, ceramics, bone, DNA, and some proteins that generates electric charge. This generated piezoelectricity is proportional to the pressure applied to the solid piezoelectric crystal materials. In this article, we will discuss about one of the most frequently used piezoelectric sensor applications, that is, piezo sensor switch.

RELAY

Generally, the relay consists a inductor coil, a spring (not shown in the figure), Swing terminal, and two high power contacts named as normally closed (NC) and normally opened (NO). Relay uses an Electromagnet to move swing terminal between two contacts (NO and NC). When there is no power applied to the inductor coil (Relay is OFF), the spring holds the swing terminal is attached to NC contact.

DC MOTOR

A DC motor in simple words is a device that converts direct current(electrical energy) into mechanical energy. It's of vital importance for the industry today. A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homo-polar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty.

BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, house hold appliances such as a microwave oven, or game shows.

SOFTWARE SPECIFICATION

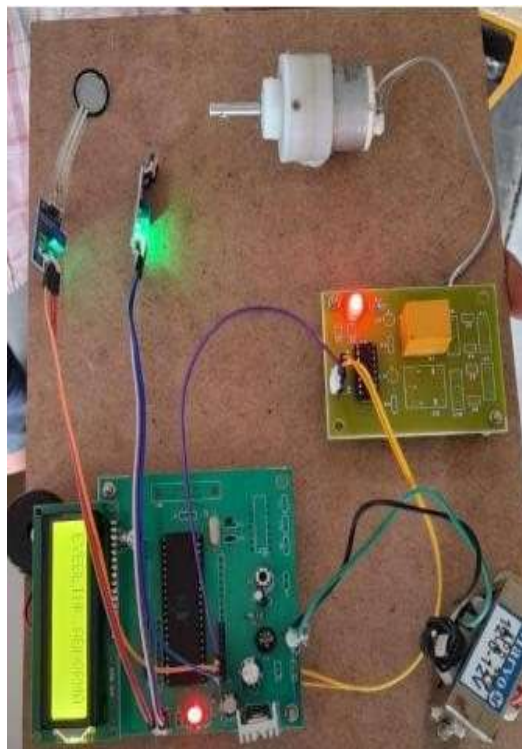
KEIL SOFTWARE

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

GENERAL INTRODUCTION: Keil Software is the leading vendor for 8/16-bit development tools (ranked at first position in the 2004 Embedded Market Study of the Embedded Systems and EE Times magazine). Keil Software is represented world-wide in more than 40 countries. Since the market introduction in 1988, the Keil C51 Compiler is the de facto industry standard and supports more than 500 current 8051 device variants. Now, Keil Software offers development tools for ARM. Keil Software makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, and evaluation boards for the 8051, 251, ARM, and XC16x/C16x/ST10 microcontroller families.

µVision3 Overview:

The µVision3 IDE is a Windows-based software development platform that combines a robust editor, project manager, and makes facility. µVision3 integrates all tools including the C compiler, macro assembler, linker/locator, and HEX file generator. µVision3 helps expedite the development process of your embedded applications by providing the following:



SIMULATION AND CIRCUIT DESIGN

