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Driver Drowsiness Detection and Alerting System for Vehicle Safety

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ABSTRACT: Detection of drowsiness of driver is a vehicle safety technology, which helps to put off accidents which caused by the driver being dozy. A variety of studies have recommended that around 20% of all road accidents are due to drowsiness of the driver. The developments of technologies for detecting or preventing drowsiness while driving is a major confront in accident evasion systems. Because of the peril of the tiredness while driving, different new methods need to be developed for counteracting the effect. The paper is based on a example for detection of drowsiness system. The intend of this paper is design of an automated system for safety of driver from improper driving. The system is designed such that it will precisely scrutinize the eye blink.

In this paper, the eye blink of the driver is detected by using eye blink sensor which is IR based. The disparity across the eye will vary as per eye blink. The output is high, if the eye is closed or else output is low. It indicates closing or opening position of an eye. The IR output is given to circuit to signify the alarm. The controller will send a warning signal so that it is displayed on liquid crystal display screen. The buzzer, which is placed near the driver, will be activated and alters the driver when he falls asleep during driving and stops the vehicle.

I. INTRODUCTION

A methodology for estimating the destination of passenger journeys from automated fare collection (AFC) system data is described. It proposes new spatial validation features to increase the accuracy of destination inference results and to verify key assumptions present in previous origin-destination estimation literature. The methodology applies to entry-only system configurations combined with distance-based fare structures, and it aims to enhance raw AFC system data with the destination of individual journeys. This paper describes an algorithm developed to implement the methodology and the results from its application to bus service data from Porto. The data relate to an AFC system integrated with an automatic vehicle location system that records a transaction for each passenger boarding a bus, containing attributes regarding the route, the vehicle, and the travel card used, along with the time and the location where the journey began. Some of these are recorded for the purpose of allowing onboard ticket inspection but additionally enable innovative spatial validation features introduced by the methodology. The results led to the conclusion that the methodology is effective for estimating journey destinations at the disaggregate level and identifies false positives reliably.

II. EXISTING METHOD

In existing methods, for fare allocation a conductor is needed to provide the ticket to the passenger according to the destination. But there may be chances of human errors like listening errors and getting the ticket of other than destination, not reliable for conductor to monitor each passenger boarding in bus, which may lead to loss of revenues to respective transportation departments.

- ✓ Manual operation
- ✓ Monitoring depends on conductor
- ✓ Less Accuracy system
- ✓ Loss of revenue

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III. PROPOSED REASERCH METHODOLY

In proposed system, eliminating the above disadvantages and having a more efficient and accurate bus system is provided with an RFID reader to read multiple tags information here we are using RFID application for four applications

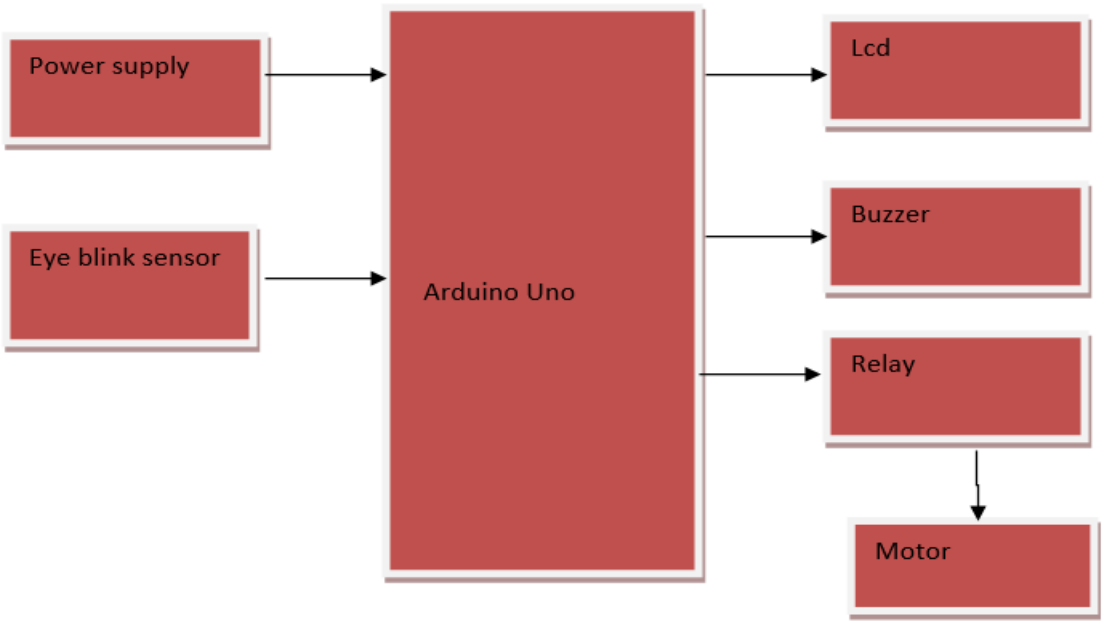
1. To provide ticketing system for passengers
2. To update the area information
3. To update the bus stop information

On roads with proper vicinity the tags have been placed and when ever bus enters into the particular area from the tag the location will be updated and the stop arrival is also updated automatically through RFID then the bus is stopped and door will be opened, here there is also scope for replacement of conductor i.e. passengers are provided with RFID tags and the tags shown by passengers valid means then only the door will be opened. After reading ticket tags present station and its destination station will be calculated and automated fare will be generated and deducted from the card.

IV. EXPERIMENTAL ENVIRONMENT

Experimental settings and parameter settings :

BLOCKDIAGRAM :



POWER SUPPLY

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

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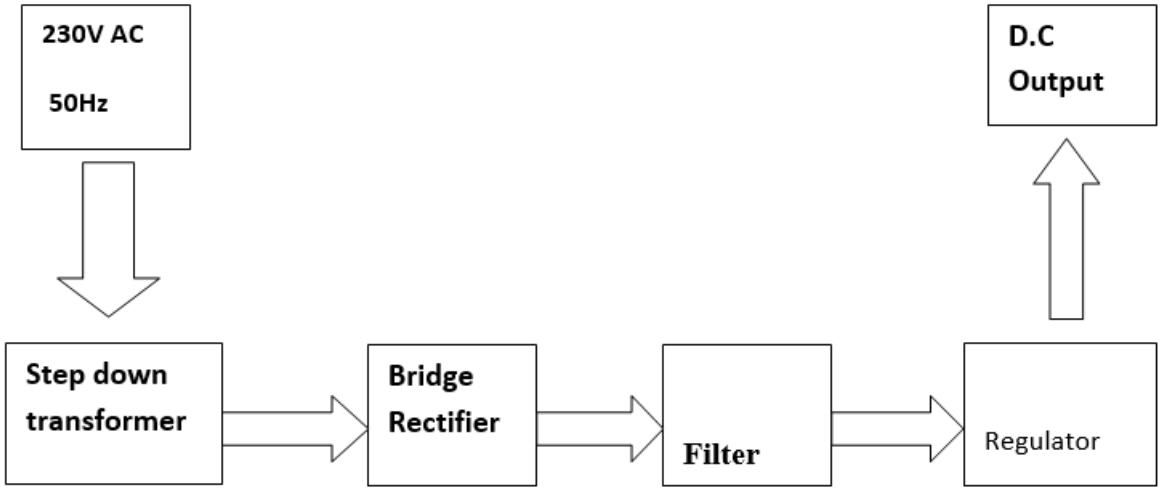

TRANSFORMER

A transformer consists of two coils also called as "WINDINGS" namely PRIMARY & SECONDARY. They are linked together through inductively coupled electrical conductors also called as CORE. A changing current in the primary causes a change in the Magnetic Field in the core & this in turn induces an alternating voltage in the secondary coil. If load is applied to the secondary then an alternating current will flow through the load. If we consider an ideal condition then all the energy from the primary circuit will be transferred to the secondary circuit through the magnetic field.

$$P_{primary} = P_{secondary}$$

So

$$I_p V_p = I_s V_s$$

$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

Rectifier

A rectifier is a device that converts an AC signal into DC signal. For rectification purpose we use a diode, a diode is a device that allows current to pass only in one direction i.e. when the anode of the diode is positive with respect to the cathode also called as forward biased condition & blocks current in the reversed biased condition.

FILTER CAPACITOR

Even though half wave & full wave rectifier give DC output, none of them provides a constant output voltage. For this we require to smoothen the waveform received from the rectifier. This can be done by using a capacitor at the output of the rectifier this capacitor is also called as "FILTER CAPACITOR" or "SMOOTHING CAPACITOR" or "RESERVOIR CAPACITOR". Even after using this capacitor a small amount of ripple will remain.

We place the Filter Capacitor at the output of the rectifier the capacitor will charge to the peak voltage during each half cycle then will discharge its stored energy slowly through the load while the rectified voltage drops to zero, thus trying to keep the voltage as constant as possible.

If we go on increasing the value of the filter capacitor then the Ripple will decrease. But then the costing will increase. The value of the Filter capacitor depends on the current consumed by the circuit, the frequency of the waveform & the accepted ripple.

$$C = \frac{V_r F}{I}$$

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Where,
Vr= accepted ripple voltage.(should not be more than 10% of the voltage)
I= current consumed by the circuit in Amperes.
F= frequency of the waveform. A half wave rectifier has only one peak in one cycle so F=25hz
Whereas a full wave rectifier has Two peaks in one cycle so F=100hz.

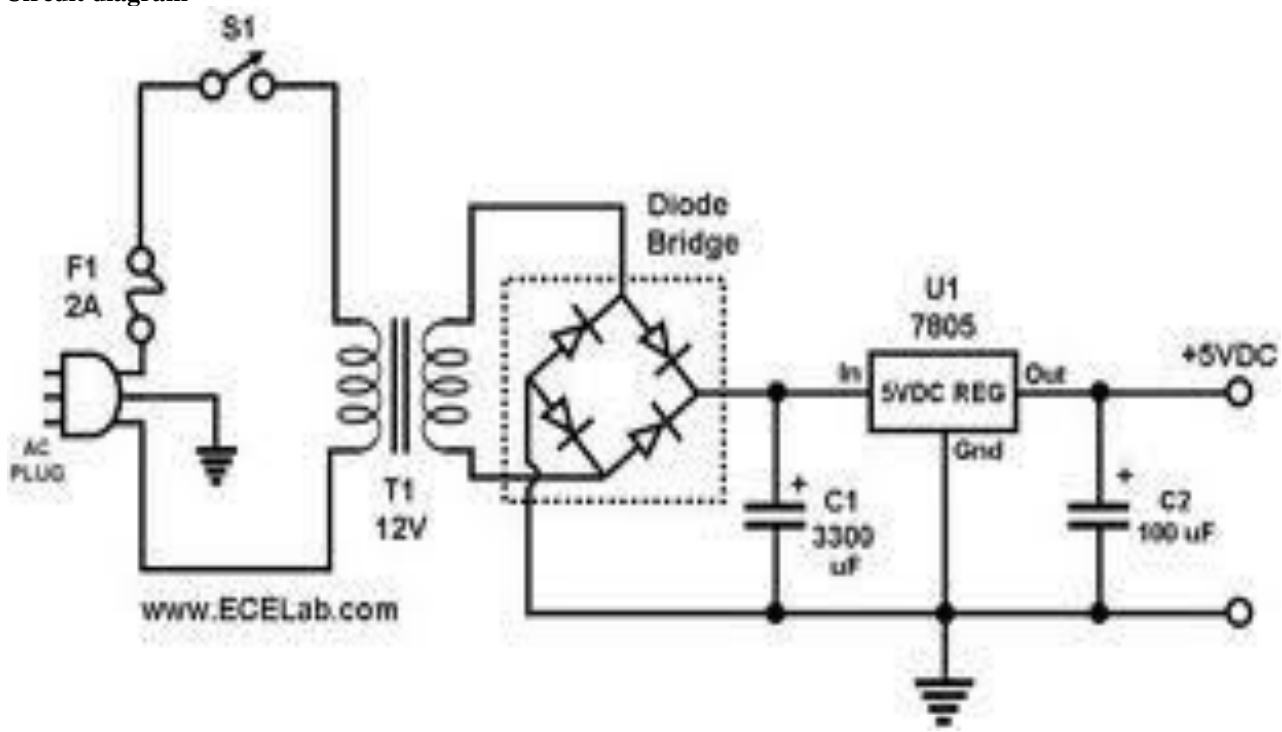
VOLTAGE REGULATOR

A Voltage regulator is a device which converts varying input voltage into a constant regulated output voltage. Voltage regulator can be of two types

1) Linear Voltage Regulator
   Also called as Resistive Voltage regulator because they dissipate the excessive voltage resistively as heat.
2) Switching Regulators.

They regulate the output voltage by switching the Current ON/OFF very rapidly. Since their output is either ON or OFF it dissipates very low power thus achieving higher efficiency as compared to linear voltage regulators. But they are more complex & generate high noise due to their switching action. For low level of output power switching regulators tend to be costly but for higher output wattage they are much cheaper than linear regulators.
The most commonly available Linear Positive Voltage Regulators are the 78XX series where the XX indicates the output voltage. And 79XX series is for Negative Voltage Regulators.After filtering the rectifier output the signal is given to a voltage regulator. The maximum input voltage that can be applied at the input is 35V.Normally there is a 2-3 Volts drop across the regulator so the input voltage should be at least 2-3 Volts higher than the output voltage. If the input voltage gets below the Vmin of the regulator due to the ripple voltage or due to any other reason the voltage regulator will not be able to produce the correct regulated voltage.

Circuit diagram



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EYE BLINK SENSOR

The **eye blink sensor** is used to detect the eye blinks and using which we can also detect the activities like the Drowsiness of the driver while driving. It works based on the technology of Infrared LED. It contains an Infrared transmitter and Receiver LED which is used to detect the eye blink.

V.EXPERIMENTAL RESULT

The analysis and design of driver drowsiness detection and alert system is presented. The proposed system is used to avoid various road accidents caused by drowsy driving. And also this system used for security purpose of a driver to caution the driver if any fire accident or any gas leakage .This paper involves avoiding accident to unconsciousness through Eye blink. Here one eye blink sensor is fixed in vehicle where if driver lose his consciousness, then it alerts the driver through buzzer to prevent vehicle from accident. The alcohol and temperature sensor are used for further safety system in the vehicle. Development of a hybrid microcontroller for a vehicle which also consists of an alcohol and temperature detector which will sense if the driver is drunk and would not start the vehicle. A complete study on road safety is going to be the next boom for the automobile industry for it to flourish and survive every human from the risk

VI.CONCLUSION

This is because of the fact that the driver is not able to control his vehicle when he is asleep and by the time he realizes it, there is an accident. The vehicle is at a very high speed on highways due to which handling is tough and getting the vehicle to halt in such a condition is difficult. Due to this many automobile companies are trying to research onto how an accident which occurs due to driver fatigue can be prevented. In this research we will generate a model which can prevent such an incident. The Purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents.

The main components of the system consists of an eye blink sensor for driver blink acquisition and an adaptive speed controller designed using stepper motor for providing precise positioning of the throttle valve to control the speed of vehicle. Advanced technology offers some hope avoid these up to some extent. This research involves measure and controls through alcohol sensor and eye blink using IR sensor. The aim to build this system is to provide a product which will assist driver while driving such that though driver is drowsy we can alert the driver at earlier stage to avoid

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further mishaps. The system is characterized by maintaining simplicity, low cost and nonobstructive real time monitoring of drowsiness.

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