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HIGH SENSITIVE ALCOHOL DETECTOR

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Abstract: Nowadays, we hear a lot about accidents brought on by drunk driving. Drunk drivers will not be in stable condition, therefore reckless driving puts other road users in danger and poses a life-or-death dilemma for both the intoxicated driver and other road users. We are creating an auto-lock mechanism in this project. The system's input comes from a detection sensor, which may be activated by an alcohol breath sample or any other method. The controller never stops checking for these sensors' output. The device will lock the engine if there are any traces of alcohol that are over the predetermined level.

I. INTRODUCTION

An instrument known as a high sensitivity alcohol detector monitors the amount of alcohol in the air and emits a warning signal if the level rises over a certain limit. This kind of gadget is often used to check on the sobriety of drivers or to catch people drinking in public or at work. An interface, a microprocessor, a signal conditioning circuit, and a sensing device are the fundamental parts of a high sensitivity alcohol detector. An electrical signal produced by the sensing element, which is often an alcohol-specific sensor, is proportional to the amount of alcohol in the atmosphere. To reduce noise and increase accuracy, the signal conditioning circuit amplifies and filters the input signal. If the alcohol level exceeds the threshold, the microcontroller analyses the signal, does any required computations, and produces a warning signal. The user interface, which is commonly an LED or an LCD display, offers details about the device's state and the alcohol content.

II. LITERATURESURVEY

A literature review for high sensitivity alcohol detection may include a broad spectrum of research, including investigations into the creation of novel and enhanced alcohol detection techniques as well as analyses of current techniques and their shortcomings. Breath analysis is one of the most used techniques for detecting alcohol. Breathalyzers, which test the level of alcohol in a person's breath, may be used to do this.

The drawbacks of this approach include the need for a large sample size and the possibility of interference from other compounds in the breath. Other alcohol detection techniques that are more sensitive and precise have drawn considerable attention in recent years.

To assess alcohol levels via the skin, researchers have studied the use of transdermal alcohol sensors, for instance. While these sensors are non-invasive and simple to use, they may not be as sensitive as breath analysis.

The creation of more accurate blood alcohol tests has been the subject of more study. High-performance liquid chromatography (HPLC) and mass spectrometry (MS), which can identify alcohol at lower quantities than conventional blood tests, may be used to do this.

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In addition to the development of brand new methods for the detection of alcohol, researchers have also investigated the efficacy of methods that have been around for some time in certain populations, such as those who are pregnant or who have liver disease. The purpose of these research was to determine whether or not there were any constraints that needed to be addressed, as well as the accuracy and reliability of the tests that are currently being administered to these groups.

In conclusion, a significant amount of effort has been put into developing alcohol detection methods that are very sensitive. Nevertheless, most of this research is still being carried out, and there is still a great deal to learn about the methods that are the most reliable and effective for determining whether or not a person or group has consumed alcohol.

III.WORKING PRINCIPLE

High-sensitivity alcohol detectors typically function by detecting vaporised alcohol as their primary mode of operation. An electrical signal is then sent to a processing unit once the alcohol detector has detected alcohol vapour, which is formed when alcohol evaporates from the skin. This processing device decides if the air alcohol concentration is above or below a predetermined threshold after performing an analysis on the signal.

High sensitive alcohol detectors use a variety of alcohol sensors, including the following:

1. Semiconductor sensors: These sensors detect changes in a semiconductor material's electrical conductivity after exposure to alcohol vapour. The amount of alcohol in the air directly relates to the change in conductivity.
2. Infrared (IR) sensors: These sensors track how much alcohol vapour absorbs infrared light. The quantity of IR light that is absorbed is inversely correlated with the level of alcohol in the atmosphere.
3. Electrochemical sensors: These sensors function by detecting the electrical current produced when alcohol vapour interacts with a particular electrode. The amount of alcohol in the air directly correlates with the electrical current.

When the alcohol concentration has been calculated, the processing unit included inside the alcohol detector is able to transmit a signal of caution or alarm if the alcohol concentration is found to be higher than the limit that was previously established. The alarm may be a sound, a visual indication, or a mix of the two. It may also be a combination of both.

It is essential to be aware that high sensitivity alcohol detectors are developed to be very precise and trustworthy, but it is possible that they are not appropriate for all applications. The accuracy of the detector may be impacted by a variety of factors, including ambient circumstances (for example, temperature and humidity), the presence of other volatile organic compounds, and the kind of alcohol that is being detected.

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IV. BLOCKDIAGRAM

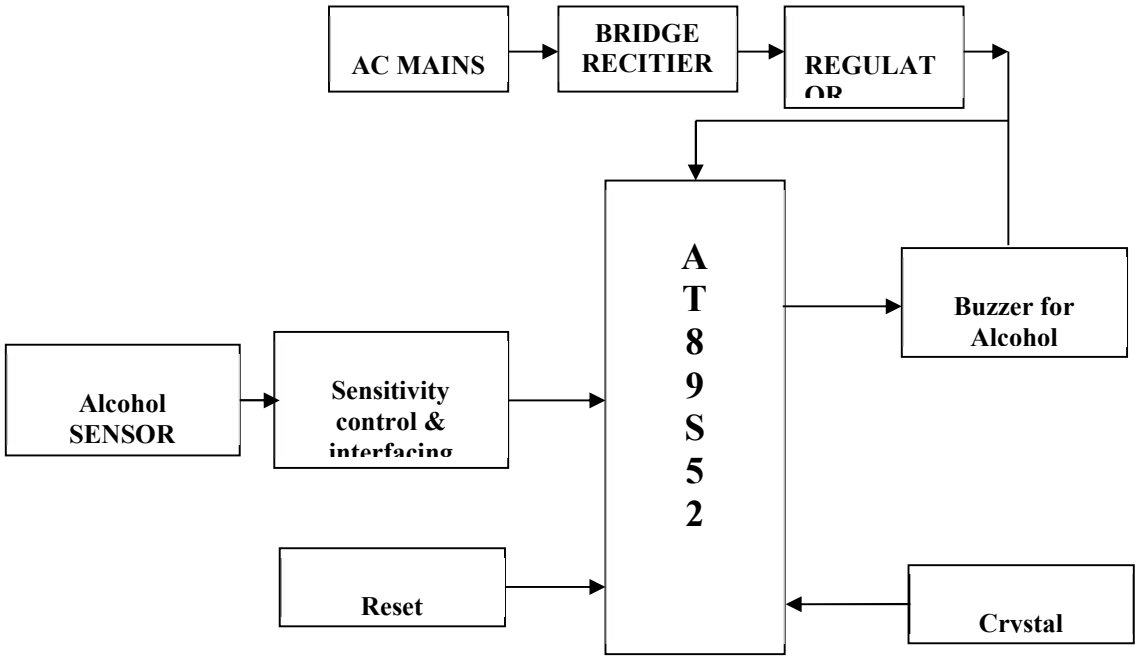
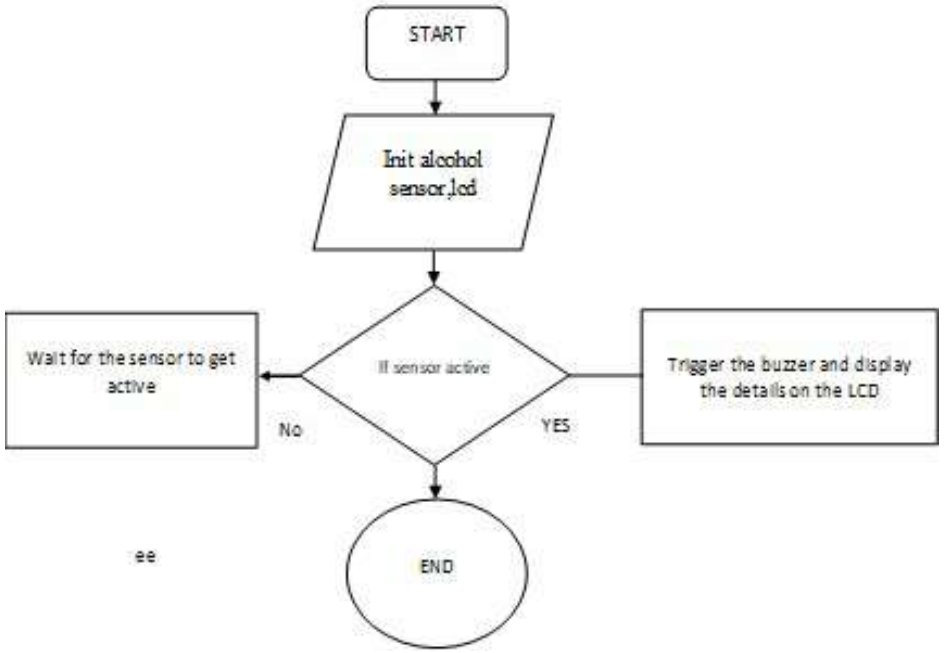


Figure 1: Block diagram of proposed model

V. FLOWCHART



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VI. SCHEMATICDIAGRAM:

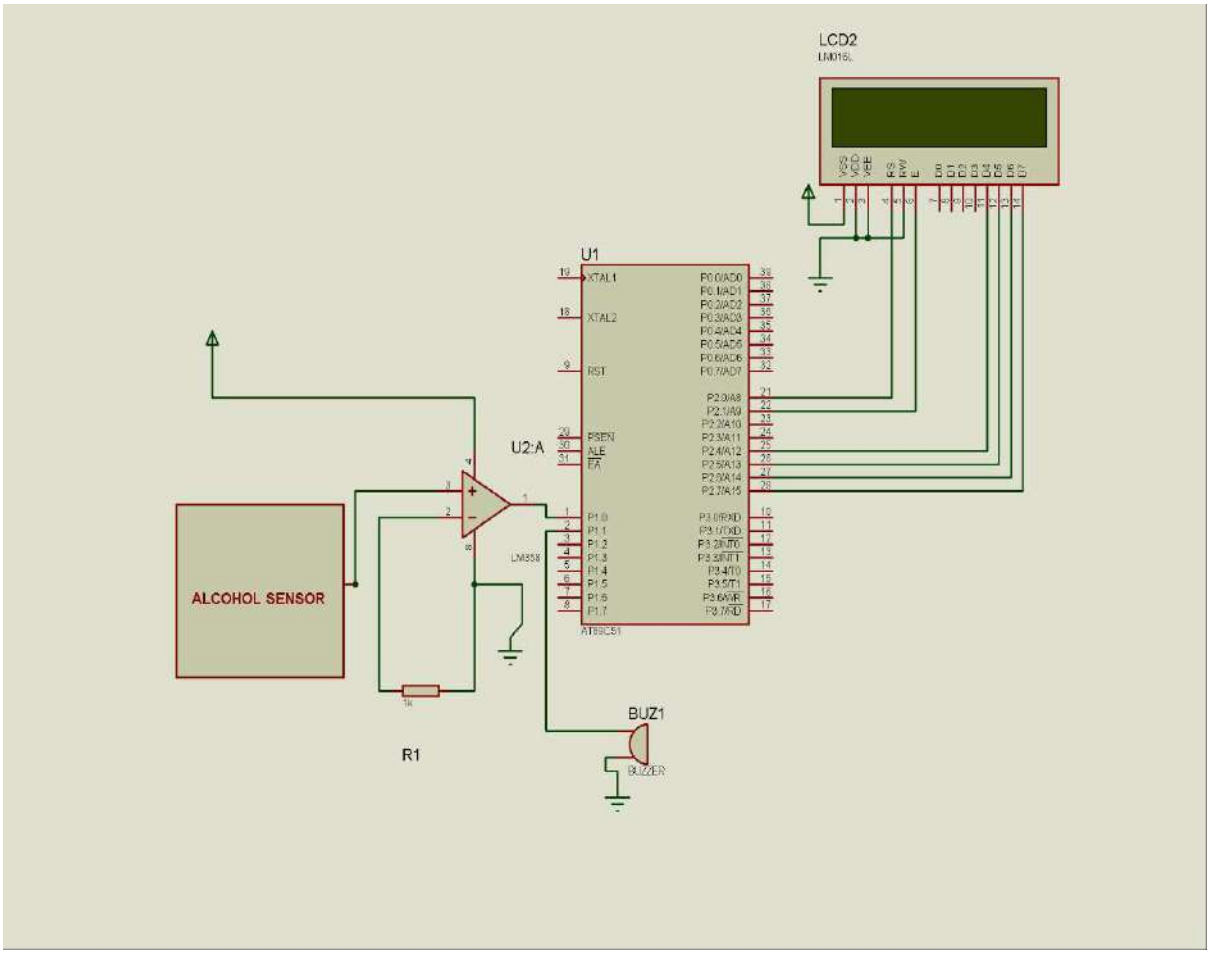

Figure: Schematic diagram

VII. HARDWAREDESCRIPTION

a. *POWERSUPPLY*

The portion that supplies +5V for the components to function is the power supply section. For delivering a steady power of +5V, utilise the IC LM7805.

A transformer is used to scale down the ac voltage, which is normally 220V, to the level of the required dc output. After being first filtered by a straightforward capacitor filter to provide a dc voltage, a diode rectifier subsequently generates a full-wave rectified voltage. Usually, there is some ripple or ac voltage change in the resultant dc voltage.

Even if the input dc voltage fluctuates or the load attached to the output dc voltage changes, a regulator circuit eliminates the ripples and maintains the same dc value. Typically, one of the well-liked voltage regulator IC chips is used to do this voltage control.

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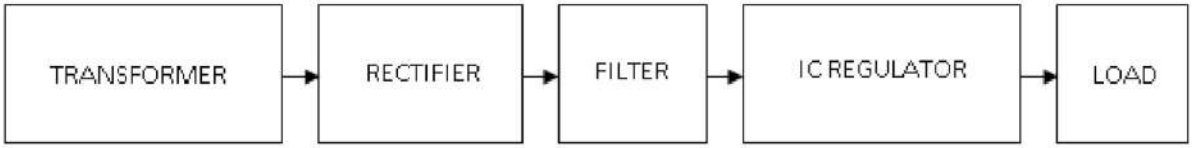

Figure : Block Diagram of Power Supply

b. *MICROCONTROLLER*

A computer-on-a-chip used to operate electrical devices is called a microcontroller (or MCU). Unlike a general-purpose microprocessor, it is a kind of microprocessor that places a focus on cost-effectiveness and self-sufficiency (the kind used in a PC). In contrast to broader purpose microprocessors, which need extra chips to do these tasks, ordinary microcontrollers come with all the memory and ports required for basic applications.

An integrated circuit known as a microcontroller has the following salient characteristics:

- Input/output devices like serial ports; a central processing unit that might be as basic as an 8-bit processor or as complex as a 32- or 64-bit CPU; RAM for data storage;
- Flash memory, EEPROM, or ROM for storing programmes
- An oscillator for a quartz timing crystal, resonator, or RC circuit serves as the clock generator. There are microcontrollers in many different types of electrical devices .

They make up the lion's share of all available processing chips. 20% of controllers are more sophisticated digital signal processors (DSPs), while over 50% are "basic" controllers (ref?). One or two general-purpose microprocessors and between one and twenty microcontrollers are likely to be found in a typical developed rural house. Up to 50 microcontrollers or more are common in mid-range vehicles. They are also present in practically every electrical appliance, including cellphones, microwave ovens, and washing machines.

c. *BRIDGE RECTIFIER*

The circuit is known as a bridge rectifier when four diodes are linked as in the illustration. The network's diagonally opposed corners serve as the circuit's input, while the remaining two corners serve as the network's output. Assume for the moment that the transformer is in good working order and that points A and B have positive and negative potentials, respectively. With point A's positive potential, D3 will be skewed forward, while D4 will be skewed backward.

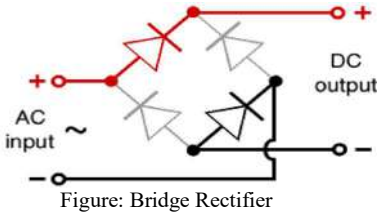

Figure: Bridge Rectifier

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Point B's negative potential will cause D1 and D2 to move in the opposite direction. D3 and D1 are now forward biassed, allowing current to flow through them; D4 and D2 are reverse biassed, preventing current flow.

The fact that a bridge rectifier provides an output voltage that is almost twice as high as a traditional full-wave circuit with a given transformer is one benefit it has over the former.

This bridge circuit's key benefit is that it doesn't need a specific center-tapped transformer, which reduces both its size and cost.

According to the diagram below, the load is linked to one side of the diode bridge network and the single secondary winding to the other.

The end consequence is a pulsing direct current that is now twice as frequent.

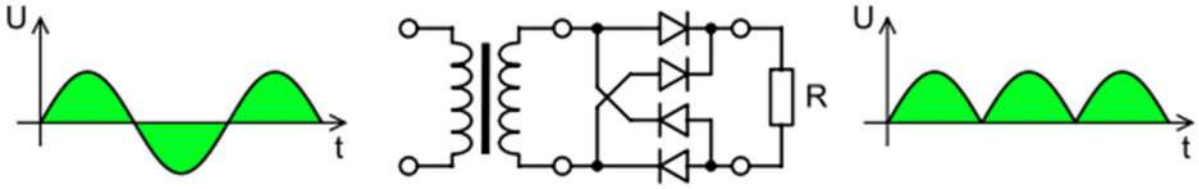

Figure: Output Wave from of DC

d. ALCOHOLSENSOR

Alcohol Sensor to detect the presence of alcohol vapours in Breathalyzers or alarm systems. This sensor device has an extremely high sensitivity and a quick reaction time. The device has high stability and extended life and may be operated using a simple driving circuit. The device is prepared to evaluate a new sample after all of the acetic acid has been removed from the fuel cell.

Figure: Alcohol detector

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VIII. RESULT & DISCUSSION

I.

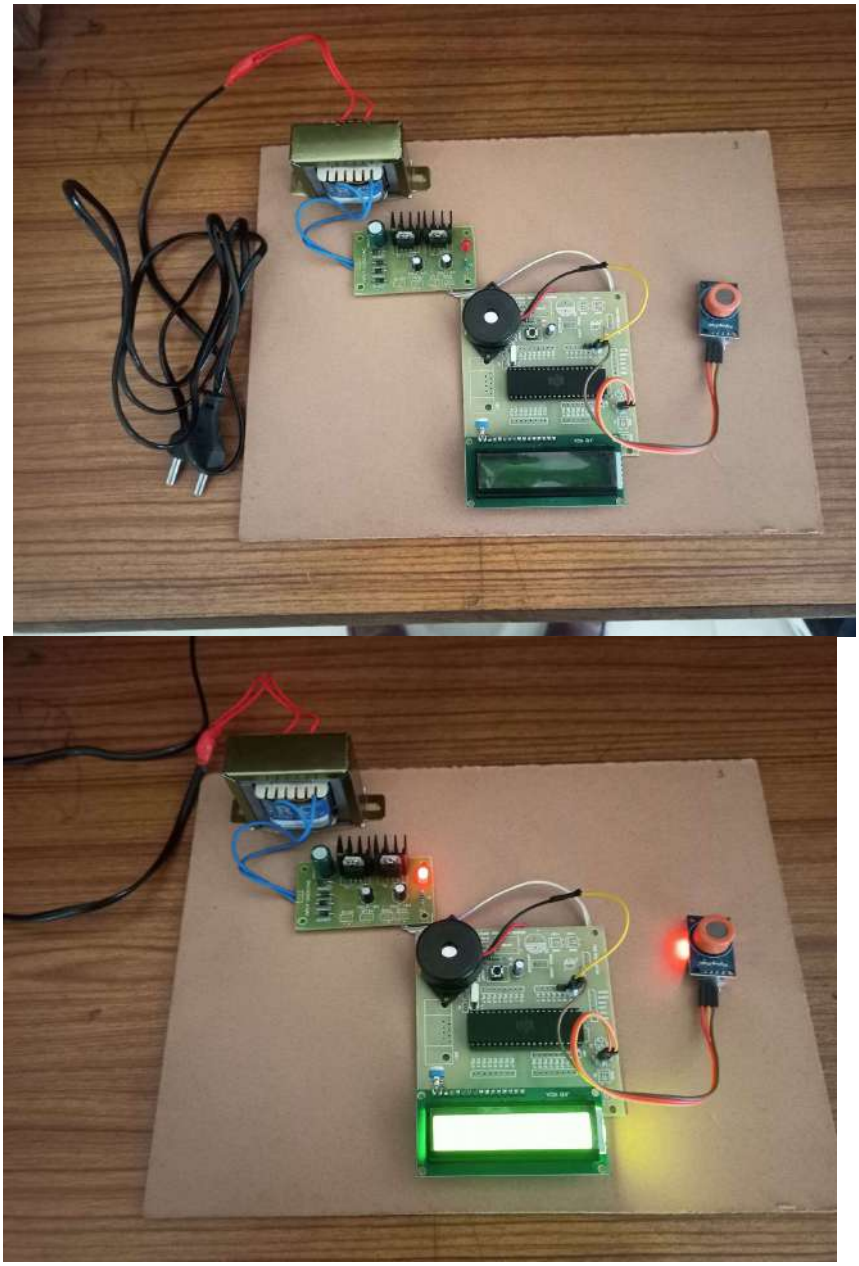

FIGURE: WORKING

IX. CONCLUSION

The project "HIGH SENSITIVE ALCOHOL DETECTOR" has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly using highly advanced IC's and with the help of growing technology the project has been successfully implemented

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X. REFRENCES

[1] Alcohol Biosensors: A Review" by Zhiyong Fan and Xiaoyuan Chen, published in Analytical Chemistry, 2008.

[2] Development and Characterization of a Portable and High Sensitive Alcohol Biosensor" by Wei Liu et al., published in Sensors and Actuators B: Chemical, 2010.

[3] High Sensitivity Alcohol Sensing with a Piezoresistive Al2O3/SiO2 Nanogenerator" by X. Zhang et al., published in ACS Applied Materials & Interfaces, 2012.

[4] Development of a High Sensitive Alcohol Sensor Based on ZnO Nanorods" by S. Kim et al., published in Sensors and Actuators B: Chemical, 2013.

[5] These articles provide an in-depth look at the development and characterization of high sensitive alcohol detectors and can be useful for further research and development in this field.

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