INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

**ISSN: 2454-132X**

**Impact factor: 4.295**

***(Volume 4, Issue 3)***

Available online at: www.ijariit.com

# Accident detection and warning system

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## ABSTRACT

***This system provides a unique method to curb drunken and drowsy people. This system has an alcohol sensor and eye blinking sensor embedded in the vehicles. Whenever the driver starts the vehicle, the sensors sense the eye blink and measures the content of alcohol in his breath and automatically sends the signal to the buzzer, gsm and LCD. In this system, the outputs of sensors are given to the microcontroller for comparison. If the value reaches the fixed limit then automatically gsm will send the SMS, the buzzer will produce sound and LCD will display the message.***

**Keywords:** *AT89C51 Microcontroller, 555 Monostable timers, Counters.*

## 1. INTRODUCTION

This project involves measure and controls the eye blink & alcohol content using IR sensor & alcohol detector. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of an eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position. Alcohol detector detects the content of alcohol in the breath and thus it attempts to clamp down alcoholics. [*fig.1*] This system uses a microcontroller, LCD display, alcohol detector, GSM and buzzer [1] The output of the sensor is directly proportional to the content of alcohol consumed. This output is given to logic circuit to indicate the alarm. This project involves controlling accident due to unconscious through Eye blink & alcohol detector. Here one eye blink sensor and alcohol detector are fixed in a vehicle where if anybody loses conscious and indicate through the alarm, LCD and GSM [2] The circuit [*fig.2*] has an alcohol sensor. This sensor measures the content of alcohol from the breath of drunken people. The output of the sensor is directly proportional to the alcohol content. When the alcohol molecules in the air meet the electrode that is between alumina and tin dioxide in the sensor, ethanol burns into acetic acid then more current is produced [3] So, the more alcohol molecules more will be the current produced. Output of the sensor is then fed to the microcontroller for comparison [4] The output of the sensors is in the analog nature which should be converted into digital format. This is done by the Analog to digital converter of the microcontroller unit. The microcontroller controls the entire circuit. The LCD displays [5] the message, GSM sends message and buzzer produces an alarm. The working conditions and various constraints were properly studied before carrying out further steps [6]

 

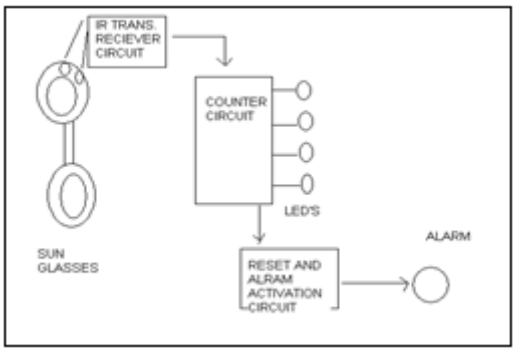


**Fig.1 Basic Model of the System**

## 2. CIRCUIT DESCRIPTION

In this IR detector and transmitter circuit the IC 555 is working under MONOSTABLE mode [7] The pin 2 i.e. trigger pin and when grounded via IR receiver, the pin 3 output is low. As soon as the IR light beam transmitted is obstructed, a momentary pulse actuates the relay output (or LED). The IR transmitter is simple series connected resistor network from the battery. The timing capacitor connected to pin 6 and 7 to ground. The time can have varied as per requirement by changing the R-value.

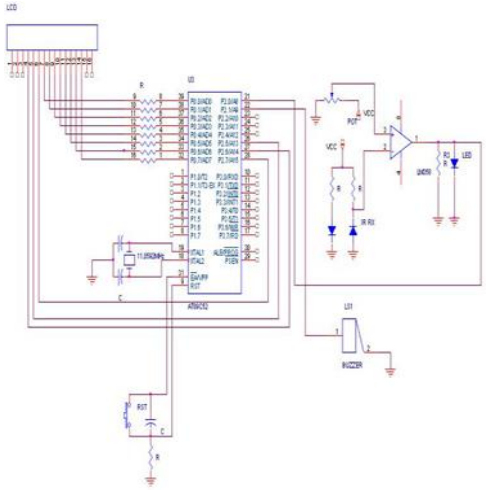

**Fig.2 Systematic Circuit Diagram of the model**

The circuit is simple NPN transistor [8] common emitter switching circuit. The transistor T-1 is supplied through negative at the emitter. The base is conducted through the port output from computer and collector gives output to energies the relay commonly connected to the +ve supply. The diode prevents back emf produced by relay while working.

Current long-term physiological signal detection system [9] is based on traditional wire transmission technique [10] Lots of electrodes need to be placed on a tester, connected to an amplifier by wire for analog/digital signal converting and further digital signal processing. It's rather inconvenient in practical because of numerous wire application and restricted movement for a tester. Therefore, the current physiological signal detection system is hard to serve as a warning equipment in everyday life.

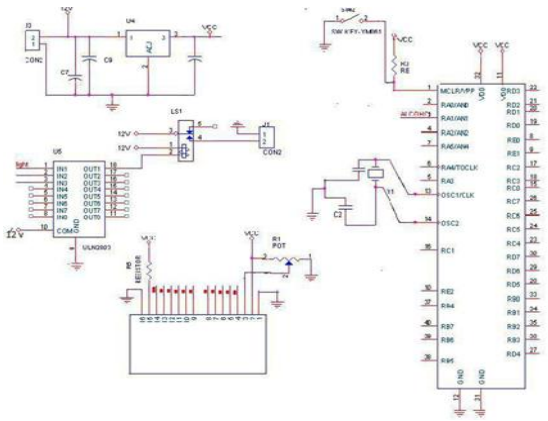

**Fig.3 Description of the circuit of the model**

 

Lots of detection methods are not easy to operate. They usually require professional technicians with long-term training to accomplish all the physiological signal detection system is not easy to handle.

One disadvantage of the most current recorder is that it cannot monitor a patient's health condition real-time [11 ]In another word, the current recorder does not have real-time warning function while recording. It would be hard to use for sleep warning and preventing.

In general, a sleep preventing and detecting device includes two parts: a sensor and a digital signal processor. The development of the sensor is the upstream source of this technology. Without the appropriate sensor, even an excellent digital signal processor is in no use. However, an accurate sensor with the inconvenient operation cannot satisfy the desire of convenience and comfort for users either. Therefore, how to design a sensor combined with function, comfort, and convenience is the key factor for the technology development.

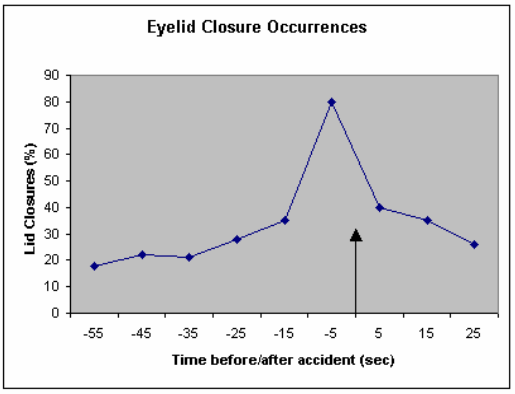


**Fig.4 Eyelid Closure Occurrences**

## 3. WORKING OF COUNTER

Visualize the Q outputs as a binary word: Q = Q3 Q2 Q1 Q0

Q3 is the most significant bit (MSB), and Q0 is the least significant bit (LSB). When CLR goes low; all flip-flops reset. This results in a digital word of: -

Q = 0000

If CLR goes low then high, the register contents of figure become

Q = 0000

When the first clock pulse hits the LSB flip-flop, Q0 becomes a 1. So the first output word is

Q = 0001

When the second clock pulse arrives, Q0 resets and carries; therefore, the next output word is

Q = 0010

The third clock pulse advances Q0 to 1 this gives

Q = 0011

The fourth clock pulse forces the Q0 the flip-flop to reset and carry. In turn, the Q1 flip-flop resets and carries. The resulting output word is

Q = 0100

The fifth clock pulse gives

Q = 0110

And the seventh gives

Q = 0111

On the eighth clock pulse, Q0 resets and carries, Q1 resets and carries, Q2 resets and carries, and Q3 advances to 1. So the output word becomes

Q = 1000

The ninth clock pulse gives

Q = 1001

The tenth gives

 

Q = 1010

And so on.

The last word is

Q = 1111

Corresponding to the fifteenth clock pulse. The next clock pulse resets all flip-flops. Therefore, the counter resets to

Q = 0000

And the cycle repeats.

Table1 on the next page given summarizes the operation of the counter. The count represents the number of clock pulses that have arrived. As you see, the counter output is the binary equivalent of the decimal count.

**Table 1: Ripple Counter**

| COUNT | Q3 | Q2 |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 0 | 0 |
| 4 | 0 | 1 |
| 5 | 0 | 1 |
| 6 | 0 | 1 |
| 7 | 0 | 1 |
| 8 | 0 | 1 |
| 9 | 1 | 0 |
| 10 | 1 | 0 |
| 11 | 1 | 0 |
| 12 | 1 | 0 |
| 13 | 1 | 1 |
| 14 | 1 | 1 |

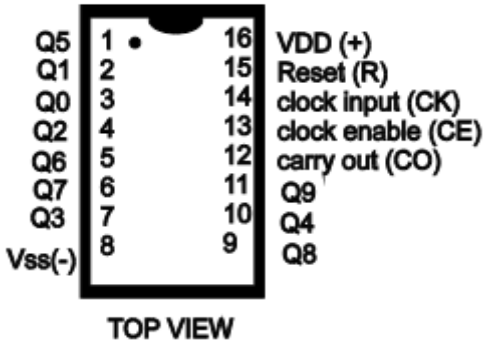


**Fig.5 Pin Diagram of Ripple Counter**

 

**Table2: Ripple Counter**

| Q1 | Q0 |
|---|---|
| 0 | 1 |
| 0 | 1 |
| 1 | 0 |
| 1 | 1 |
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |
| 1 | 1 |
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |
| **1** | 1 |
| 0 | 0 |
| 0 | 1 |

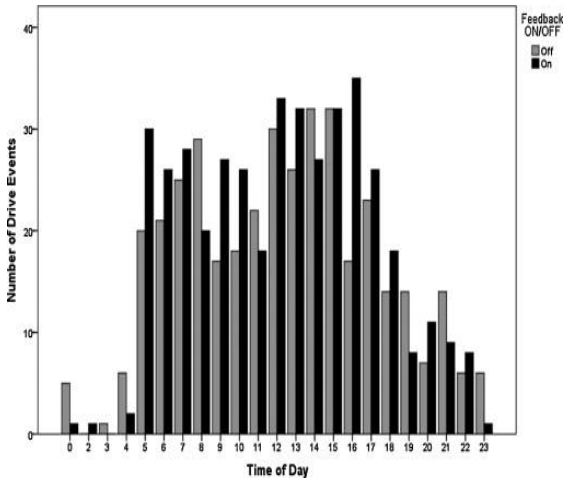


**Fig.6 Distribution of drive events for two conditions across time of day. *Note*: *x*-axis values correspond to trip start times**

If the circuit is connected(fig.6) (pins 2 and 6connected) [12] It will trigger itself and freerun as multivariate. The external capacitor charges through Ra and Rb and discharges through Rb only. Thus, the duty cycle may be precisely set by the ratio of these two resistors. In this mode of operation, the capacitor charges and discharges between 1/3 Vcc and 2/3 Vcc. As in the triggered mode, the charge, and discharge times, and therefore, the frequency is independent of the supply voltage. The figure shows the actual waveforms generated in this mode of operation.

The charge time (output high) is given by:

$$t1 = 0.685\ (Ra + Rb)\ C$$

And the discharge time (output low) by:

$$t2 = 0.685\ (Rb)\ C$$

Thus, the total period is given by:

$$T = t1 + t2$$
$$= 0.685\ (Ra + 2Rb)\ C$$

The frequency of oscillation is then:

$$F = \frac{1.46}{(Ra + 2Rb)\ C}$$

 

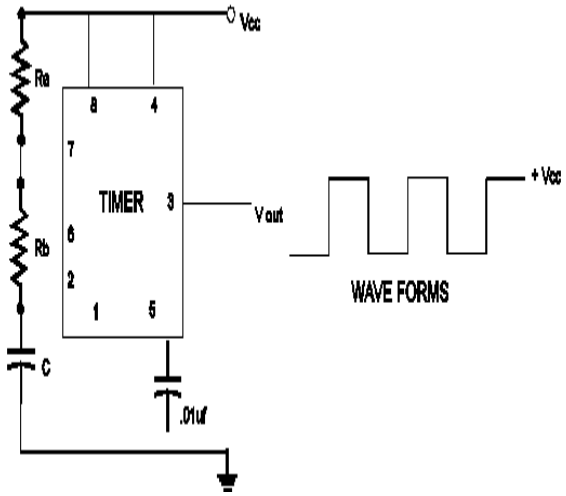


**Fig7. Square Wave generator**

## 4. IC 555-MONOSTABLE OPERATIONS

In the monostable mode of operation, [13] the timer functions as a one shot. Referring to figure7 the external capacitor is initially held discharged by a transistor inside the timer. Upon applications of a negative trigger pulse to pin 2, the flip-flop is set, which releases the short circuit across the external capacitor and drives the output high. The voltage across the capacitor increases exponentially with the time constant.

$$t = Ra\ C$$

When the voltage across the capacitor equals 2/3 Vcc. The comparator resets the flip-flop, which, in turn, discharges the capacitor rapidly and drives the output to its low state. The figure shows the actual waveforms generated in this mode of operation.

The circuit triggers a negative going input signal when the level reaches 1/3 Vcc. Once triggered, the circuit will remain in this state until the set time is elapsed, even if it is triggered again during this interval. The time that the output is in the high state is given by:

$$t = 1.1\ Ra\ C$$

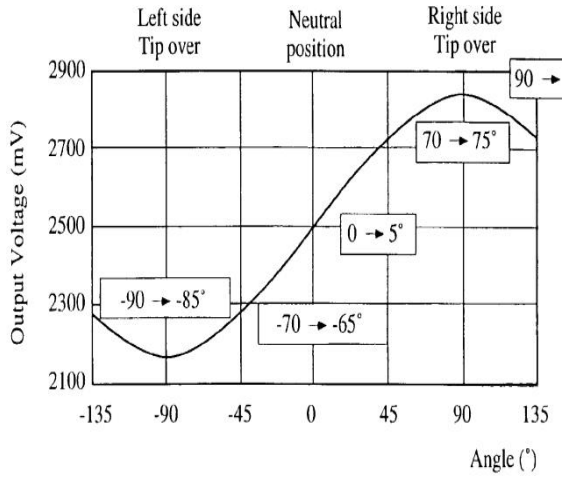


**Fig.8 Accelerometer detection using reference angle**

Applying a negative pulse to the reset terminal (pin 4) during the timing cycle discharges the external capacitor [14] and causes the cycle to start over again. The timing cycle will now commence on the positive edge of the reset pulse. During the time the reset pulse is applied, the output is driven to its low state.

 

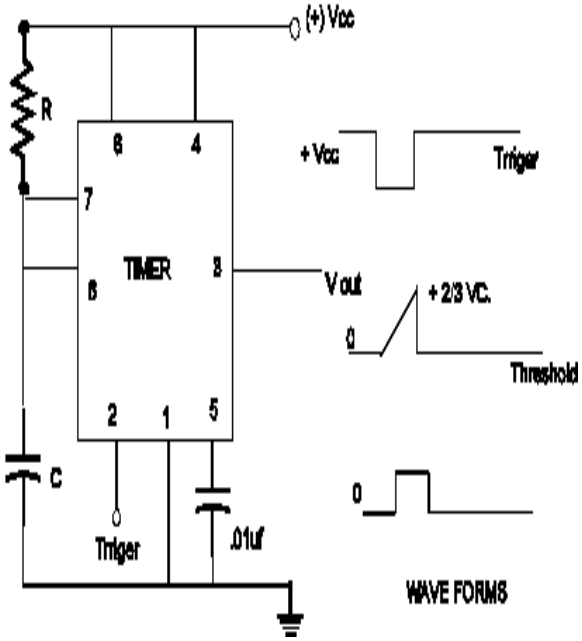


**Fig.9 Block Diagram of 555 Integrated Circuit**

The 555-integrated circuit [15] is an extremely versatile timer that can be used in many different applications. This IC is a monolithic timing circuit that is a highly stable controller capable of producing accurate time delays or oscillations. Additional terminals are producing are provided for triggering or resetting if desires. In the time delay mode of resistance and a capacitor. For a stable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled with two external resistors and one capacitor. The circuit may be triggered and reset on falling waveforms, and the output structure can source or sink up to 200ma or drive TTL Circuits.

This integrated circuit contains nearly 25 transistors, a diode or two, and more than 10 resistors. Obviously, if you built this IC from separate components, it would be many, many times larger than on a monolithic chip [16].
The 555 timer offers to time from microseconds through hours and operates in both astable and monostable [17] modes. It has an adjustable duty cycle, and the output can drive TTL devices. Its output can operate in normally on and normally off modes and the IC offers a frequency stability of 0.005% per degrees centigrade [18]

Applications for the 555 chip [19] include precision timing, pulse generation, pulse width modulation, pulse position modulation, sequential timing, and missing pulse detection.

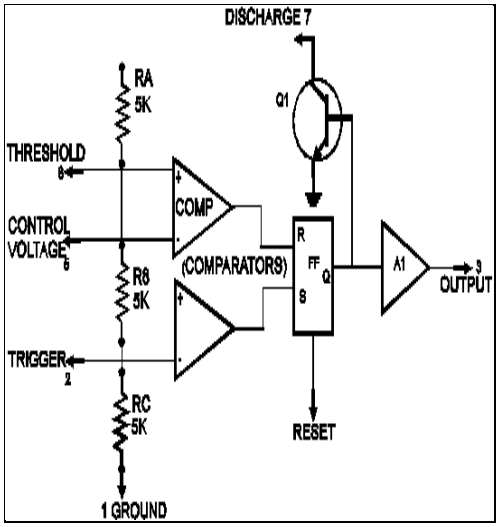


**Fig.10 555 Timer IC**

## 5. AT89C51 MICROCONTROLLER

Microcontroller [20] is a general-purpose device, which integrates a number of the components of a microprocessor system on to a single chip. It has inbuilt CPU, memory, and peripherals to make it as a mini computer.

AT89C51 [21] is the 40 pins, 8 bit microcontroller manufactured by Atmel group. It is the flash type reprogrammable memory. The advantage of this flash memory is we can erase the program with in few minutes. It has 4kb on-chip ROM and 128 bytes internal

 

RAM and 32 I/O pin as arranged as port 0 to port 3 each has 8-bit bin .Port 0 contain 8 data line(D0-D7) as well as low order address line(AO-A7).

Port 2 contain higher order address line (A8-A15). Port 3 contains special purpose register [22] such as serial input receiver register SBUF, interrupt INT0,INT1 and timers $T_0$ , $T_1$ many of the pins have multi-functions which can be used as general purpose I/O pins (or) Special purpose function [23] can be decided by the programmer itself.

## 6. CONCLUSION

The Objective of this project is to develop a system to keep the vehicle secure and protect it by the occupation of the intruders This project is very used to provide the easy access to maintain the attendance. In this project, RFID card is used as an employee or student ID card. This project is very useful to the company and office in order to maintain the employee attendance. Attendance is maintained in the data base in PC. So we can easily cross verify the attendance. In this project, we can maintain the employee IN and Out time. We can also use this project in school and college to maintain the attendance of the student. So this project improves the security performance because we cannot make the duplicate RFID card.

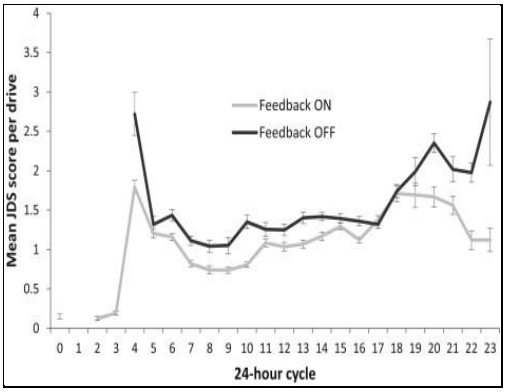


**Fig.11The effect of feedback on levels of drowsiness (JDS scores) across the circadian cycle**

This project involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of an eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position. This output is given to logic circuit to indicate the alarm.

This project involves controlling accident due to unconscious through Eye blink. Here one eye blink sensor is fixed in a vehicle where if anybody loses conscious and indicate through the alarm. We can't take care of ours while in running by less conscious. If we did all the vehicles with an automated security system that provides high security to the driver, also gives the alarm.

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