DRIVER ANTI SLEEP DEVICE
LUGGAGE SECURITY ALARM

20EC5203 - ELECTRONIC DESIGN PROJECT I

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report titled **"DRIVER ANTI SLEEP DEVICE"**, **"LUGGAGE SECURITY ALARM"** is the Bonafide work of **MOHAMED AMMAR.M (811722106055), MUGUNTHAN.S (811722106059), OVEYAA.S (811722106071)** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported here in does not from part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

We jointly declare that the project report on "**DRIVER ANTI SLEEP DEVICE", "LUGGAGE SECURITY ALARAM**" is the result of original work done by us andbest of our knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfillment of the requirement of the awardof Degree of **BACHELOR OF ENGINEERING**.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVATION

AC	-	ALTERNATING CURRENT
BJT	-	BIPOLAR JUNCTION TRANSISTOR
CAD	-	COMPUTER-AIDED DESIGN
DASD	-	DIRECT ACCESS STORAGE DEVICE
DC	-	DIRECT CURRENT
IC	-	INTEGRATED CIRCUIT
JFET	-	JUNCTION FIELD-EFFECT TRANSISTOR
LDR	-	LIGHT DEPENDENT RESISTOR
MOSFET	-	METAL-OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR
PCB	-	PRINTED CIRCUIT BOARD
FET	-	FIELD EFFECT TRANSISTOR
NPN	-	NEGATIVE-POSITIVE-NEGATIVE
PNP	-	POSITIVE NEGATIVE POSITIVE
GSM	-	GRAMS PER SQUARE METER

CHAPTER-1

COMPONENTS

1.1 BREAD BOARD

A breadboard serves as an indispensable tool in the realm of electronics, providing a versatile platform for the assembly and testing of electronic components. Comprising a rectangular board with a grid of interconnected holes, the breadboard is designed to offer a user-friendly environment that facilitates the creation of electronic circuits without the need for soldering. The grid arrangement follows rows and columns, and within each row, multiple holes are electrically connected. Beneath the surface of the board, metal clips establish electrical connections, allowing for the creation of intricate circuits without the permanency associated with soldered connections. Figure 1.1 shows the image of Bread Board.

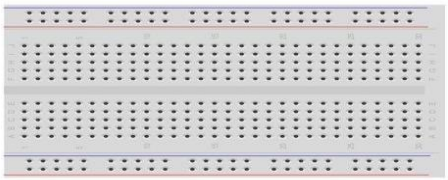


Figure 1.1 Bread board

In addition to its grid structure, breadboards typically feature power rails along the sides, commonly colored in red and blue. These power rails provide accessible points for connecting power sources, whether they be batteries or external power supplies. The ease of access to power facilitates the testing and experimentation of circuits. Connecting wires play a crucial role in establishing electrical connections between various components on the breadboard.

1.2 DIODE

A diode, a fundamental semiconductor device with two terminals known as the anode and cathode, plays a pivotal role in electronic circuits due to its unique electrical properties. The primary function of a diode is to control the flow of electric current by allowing it in one direction while blocking it in the opposite direction. This property is vital in rectification processes, especially in power supply circuits, where diodes are instrumental in converting alternating current (AC) to direct current (DC). Figure 1.2 shows the image of Diode. The behavior of a diode is characterized by its voltage-current relationship, described by the Shockley diode equation, which exhibits an exponential relationship between the voltage across the diode and the current flowing through it. When the diode is forward-biased,meaning a positive voltage is applied to the anode with respect to the cathode, it conducts current, allowing the flow of electrons. In contrast, when the diode is reverse-biased (negative voltage applied to the anode), it blocks current, essentiallyacting as a one-way valve for electric current.

Figure 1.2 Diode

1.3 LED

Light Emitting Diodes (LEDs) represent a groundbreaking technology with wide ranging applications across diverse industries. Functioning on the principle of electroluminescence, LEDs emit light as a result of electrons moving within a semiconductor material. The advantages of LEDs are manifold. They excel in energy efficiency by converting a significant portion of electrical energy into visible light, surpassing traditional incandescent bulbs that dissipate a substantial amount as heat. This not only contributes to lower electricity bills but also aligns with global efforts towards energy conservation. The durability of LEDs is a key asset, attributed to their solid-state construction, lacking delicate components like filaments or glass bulbs. Figure 1.3 shows the image of LED.

Figure 1.3 LED

Beyond their use in indicators and displays, LEDs play a pivotal role in driving technological advancements. Their low power consumption makes them ideal for battery-operated devices, while their contribution to energy efficiency aligns with sustainability goals. In the automotive industry, LEDs are extensively used in headlights and taillights, improving visibility and safety.

1.4 POWER SUPPLY

A battery stands as a fundamental component in the realm of portable electronics, operating as a versatile electrochemical device designed to store and deliver electrical energy through a controlled chemical reaction. Typically composed of one or more electrochemical cells, a battery consists of positive (cathode) and negative (anode) electrodes immersed in an electrolyte solution. The chemical interaction between these components, when a circuit is closed, triggers a reaction that results in the flow of electrons, generating electrical energy. Alkaline batteries, for instance, are ubiquitous in everyday devices due to their reliability and cost-effectiveness. Figure 1.4 shows the image of Lithium-ion Batteries, renowned for their high energy density and rechargeable nature, are prevalent in various applications, including smartphones and electric vehicles. Nickel-cadmium batteries, also rechargeable, find their niche in portable electronics, offering a balance between efficiency and longevity. Alkaline batteries are ideal for low-drain devices, while lithium-ion batteries shine in applications demanding compactness and high energy storage.

Figure 1.4 Battery

Rechargeable batteries, a notable category, contribute significantly to sustainability efforts by minimizing waste and promoting resource efficiency. Particularly economical for devices with frequent usage patterns, rechargeable batteries not only reduce environmental impact but also prove cost-effective over time.

1.5 RESISTOR

A resistor is a fundamental electronic component that opposes the flow of electric current. It is a passive two-terminal device with the primary function of controlling or limiting the amount of current passing through a circuit. Figure 1.5 shows the image of Resistors are crucial in electronics for adjusting voltage levels, protecting components from excessive currents, and defining time constants in various applications. Resistors come in various types, including fixed resistors with specific resistance values and variable resistors like potentiometers and rheostats that allow manual adjustment. The resistance of a resistor is measured in ohms (Ω) and is governed by Ohm's Law, which relates the voltage (V), current (I), and resistance (R) in a circuit through the equation $V = I \times R$. In electronic circuits, resistors play essential roles in voltage dividers, signal conditioning, and setting bias points for active devices like transistors.

Figure1.5 Resistor

They are also employed in filters, oscillators, and numerous other applications where precise control of electrical parameters is necessary.

1.6 CAPACITOR

A capacitor is a fundamental electronic component that stores and releases electrical energy in a circuit. It consists of two conductive plates separated by an insulating material called a dielectric. When a voltage is applied across the plates, an field is established, causing the accumulation of positive and negative charges on the respective plates. Figure 1.6 shows the image of Capacitors are versatile components with various electric applications in electronics. They play a crucial role in smoothing voltage fluctuations, filtering signals, and providing energy storage in circuits. The ability to store electrical energy temporarily makes capacitors valuable in timing circuits, coupling AC and DC signals, and decoupling power supplies. Capacitors come in different types, including electrolytic capacitors, ceramic capacitors, and tantalum capacitors, each with specific properties suited to different applications. The capacitance of a capacitor, measured in farads (F), indicates its ability to store charge.

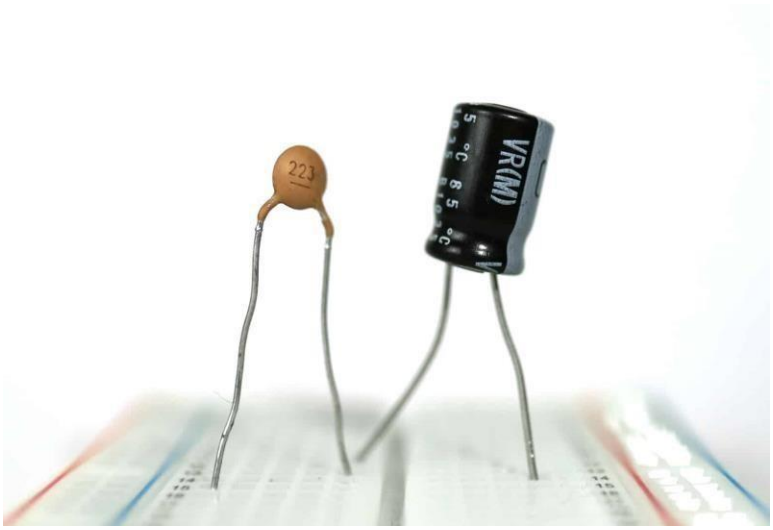


Figure 1.6 Capacitor

In Electronic Circuits, Capacitors Are Essential For Stabilizing Power Supplies, Eliminating Noise, And Facilitating The Proper Functioning Of Various Electronic Components. They Play Integral Roles In Audio Systems, Power Amplifiers, Filters, And Numerous Other Electronic Devices, Contributing Significantly To The Efficiency And Performance Of Electrical Systems

1.7 INTEGRATED CIRCUIT

An Integrated Circuit (IC) is a compact arrangement of interconnected electronic components, such as transistors, resistors, capacitors, and diodes, fabricated on a semiconductor material. The miniaturized design of an IC allows for the integration of multiple functions and electronic circuits into a single chip, providing a significant advancement in electronic technology. Digital ICs, such as microprocessors and memory chips, process binary information, enabling the operation of computers and digital devices. Figure 1.7 shows the image of Analog ICs, like operational amplifiers (op-amps) and voltage regulators, are designed for continuous signal processing, common in audio amplifiers and power supplies. The 555 timer IC and the 741 op-amp are notable examples.

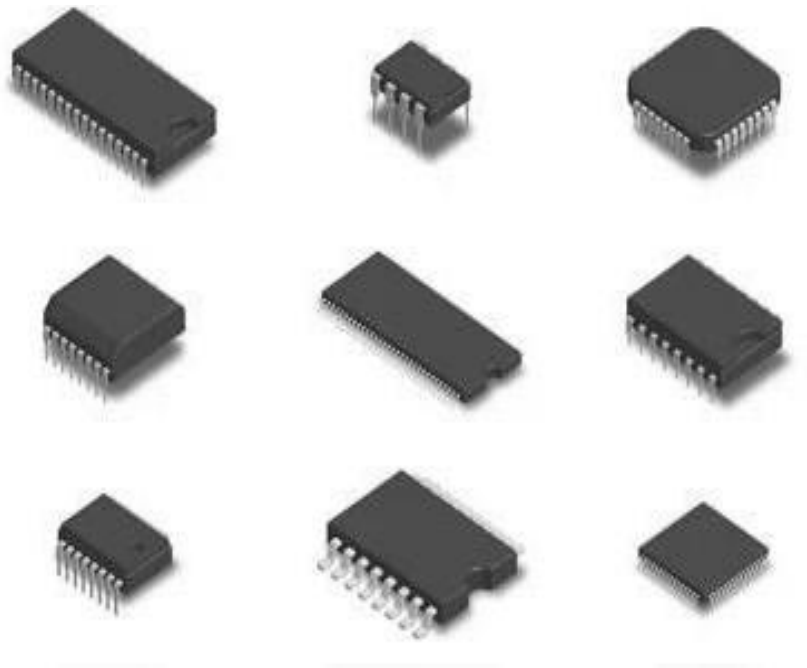


Figure 1.7 Integrated Circuit

The 555 timer is widely used for generating time delays, pulse-width modulation, and oscillations. The 741 op-amp, on the other hand, is versatile and commonly used in amplifiers and signal processing applications.

1.8 BUZZER

A buzzer, a straightforward yet essential component in electronics, functions as an audio signaling device designed to produce sound when an electrical current is applied. Operating as a transducer, the buzzer converts electrical energy into audible sound waves, making it a valuable component for providing alerts and notifications in various electronic devices. The basic construction of buzzers typically involves a vibrating element, which could be a diaphragm or a piezoelectric crystal, and an electromagnetic coil. When an electric current flows through the coil, it generates a magnetic field. This magnetic field interacts with the vibrating element, causing it to vibrate and produce sound waves. The vibration frequency determines the pitch or tone of the sound emitted by the buzzer. Figure 1.8 shows the image of Buzzers serve a wide range of applications, finding use in alarms, timers, notification systems, and any scenario where an audible alert is necessary.

Figure 1.8 Buzzer

In electronic circuits, the operation of buzzers is often controlled by oscillators or timer circuits. These circuits dictate the frequency at which the buzzer vibrates, resulting in distinct tones for different purposes.while in a timer application, it may produce intermittent sounds to indicate specific intervals or events.

1.9 LDR

LDR, or Light Dependent Resistor, is a type of photoresistor that exhibits a change in resistance based on the intensity of light falling on it. Composed of semiconductor materials, such as cadmium sulfide, Figure 1.9 shows the image of LDRs are commonly used in electronic circuits for light-sensing applications. In low-light conditions, the resistance of an LDR is high, limiting the flow of electric current. As ambient light increases, the resistance decreases, allowing more current to pass through.

Figure 1.9: LDR

This property makes LDRs valuable in automatic lighting control systems, dusk-to dawn sensors, camera exposure control, and other applications where the response to varying light levels is essential. The simplicity and sensitivity of LDRs make them versatile components for designing circuits that respond dynamically to changes in ambient light, contributing to energy efficiency and automation in various electronic devices.

1.10 TRANSISTOR

A transistor, a pivotal semiconductor device, stands as a cornerstone in the world of electronics due to its remarkable ability to amplify signals and act as a switch. Representing a fundamental building block in electronic circuits, transistors offer versatility and are integral to a broad spectrum of applications, ranging from amplifiers and oscillators to digital logic circuits. The two primary types of transistors are bipolar junction transistors (BJTs) and field-effect transistors (FETs), each with its own variations. BJTs, categorized as NPN (negative-positive-negative) and PNP (positive-negative-positive), involve the movement of charge carriers between two semiconductor materials. On the other hand, FETs encompass types like MOSFETs (Metal-Oxide-Semiconductor Field-Effect Transistors) and JFETs (Junction Field-Effect Transistors), relying on the modulation of conductivity within a channel. This ability to amplify signals is harnessed in various devices, including audio amplifiers that drive speakers, radio-frequency amplifiers in communication systems, and operational amplifiers in instrumentation.

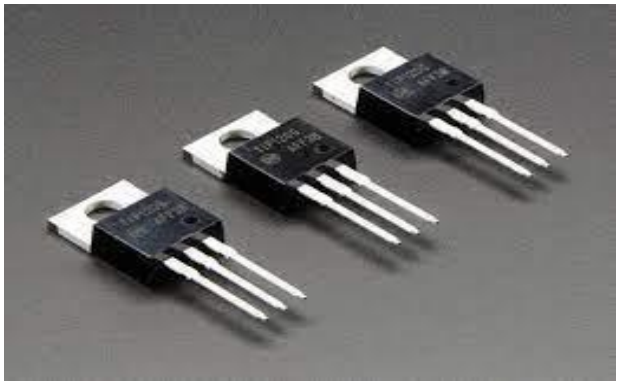


Figure1.10 Transistor

The compact size, low power consumption, and reliability of transistors have been instrumental in the miniaturization and advancement of electronic technology. Figure 1.10 shows the image of Transistors have played a transformative role in the evolution of electronic devices, contributing significantly to the development of computers, communication devices, and various electronic systems.

1.11 CONNECTING WIRES

Connecting wires form the indispensable infrastructure of electronic circuits, serving as the vital conduits that establish electrical pathways and facilitate the seamless flow of electric current. These wires, typically composed of conductive materials like copper or aluminum, play a fundamental role in ensuring the proper functioning of circuits, both on breadboards and within complex electronic systems. Figure 1.11 shows the image of The primary function of connecting wires is to link various components within a circuit, creating the necessary electrical connections for the circuit to operate as intended. Their conductivity allows for the transmission of electrical signals between different elements, forming the essential links that enable communication and cooperation among circuit components. Beyond their basic role in establishing electrical connections, connecting wires contribute significantly to the organization and structure of circuit layouts. Their flexibility allows for the creation of specific signal paths, aiding in the systematic arrangement of components.

Figure 1.11 Connecting wires

Different lengths accommodate diverse circuit layouts, while distinct colors aid in visually distinguishing between various connections. This visual clarity becomes particularly crucial during the prototyping and experimentation stages of electronic system development, Figure 1.11 shows the image of connecting wires where designers and engineers need to troubleshoot and optimize circuit configurations.

1.12 VARIABLE RESISTOR

A variable resistor, exemplified by components like potentiometers, stands out as a specialized and versatile device in electronics, offering a dynamic approach to controlling resistance within a circuit. Unlike fixed resistors, which maintain a constant resistance value, variable resistors enable users to manually adjust resistance, providing a means to control the flow of electric current. Potentiometers, a common type of variable resistor, often feature a rotary or linear mechanism that allows users to modify resistance by turning a knob or sliding a lever. Figure 1.12 shows the image of variable resistor This adjustability makes variable resistors highly valuable in electronic devices and systems where the fine-tuning of voltage or current levels is essential for optimal performance. One of the key applications of variable resistors is in volume controls for audio equipment. Tuning circuits in radios and other communication devices represent another significant application of variable resistors.

Figure 1.12 Variable Resistor

In electronic designs, variable resistors contribute to the adaptability and functionality of systems. The ability to manually adjust resistance allows for real time customization, providing users with control over the behavior of circuits. In summary, variable resistors, particularly exemplified by potentiometers, play a key role in electronic systems by offering a means for users to adjust resistance.

1.13 PRINTED CIRCUIT BOARD

A printed circuit board (PCB) is a vital component in modern electronics, serving as a robust and organized platform for the interconnection of electronic components. Typically composed of a substrate material, such as fiberglass-reinforced epoxy, the PCB hosts a complex network of conductive pathways. More intricate electronic devices often utilize multilayer PCBs, where multiple layers of conductive pathways are stacked atop each other. This design allows for more compact and sophisticated circuits, essential for advanced electronics. The fabrication process of a PCB involves several steps. Initially, the circuit design is created using computer-aided design (CAD) software, specifying the arrangement of components and the layout of conductive pathways They replace traditional point-to-point wiring, reducing the risk of errors and enhancing the overall reliability of the system. Figure 1.13 shows the image of PCBs Additionally, the compact design of PCBs contributes to the miniaturization of electronic devices, making them more portable and efficient. The versatility of PCBs has made them integral to a wide range of applications, from consumer electronics to industrial machinery and aerospace systems. As technology continues to advance, the development of innovative PCB designs and manufacturing techniques remains crucial for pushing the boundaries of electronic capabilities.

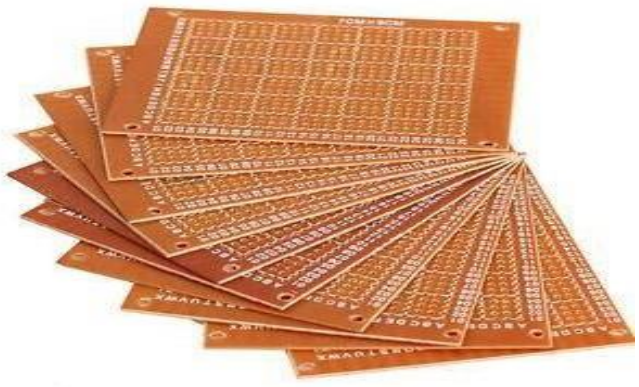


Figure 1.13 PC BOARDS

CHAPTER-2

DRIVE ANTI SLEEP DEVICE

2.1 ABSTRACT

The Driver Anti-Sleep Device (DASD) is an innovative technology designed to enhance road safety by preventing driver fatigue and drowsiness. As fatigue is a leading cause of traffic accidents, especially during long-distance travel, this device aims to monitor physiological indicators of sleepiness, such as eye movement, head posture, and facial expressions, through sensors and advanced algorithms. The DASD uses real-time data analysis to detect early signs of drowsiness and provides immediate alerts to the driver through audio, visual, or haptic feedback. Additionally, the device may include features like personalized reminders for breaks or access to external support systems. The goal is to minimize the risk of accidents related to driver fatigue, improve driver awareness, and promote safer driving environments for both drivers and passengers. The development of such a device holds promise for enhancing road safety, reducing traffic-related injuries, and promoting better driving practices in various vehicular contexts. Driver fatigue and drowsiness are major contributors to road accidents, posing significant risks to road safety. To address this issue, anti-sleep devices have been developed to monitor signs of driver drowsiness and alert the driver before fatigue leads to accidents. These devices utilize various technologies, including wearable sensors, in-vehicle monitoring systems, and machine learning algorithms. Wearable devices often track physiological parameters such as heart rate, body movement, and brain activity to detect early signs of drowsiness, while in-vehicle systems monitor driving behavior and facial expressions. Advanced driver-assistance systems (ADAS) such as lane departure warnings and facial recognition cameras also play a crucial role in identifying driver fatigue.

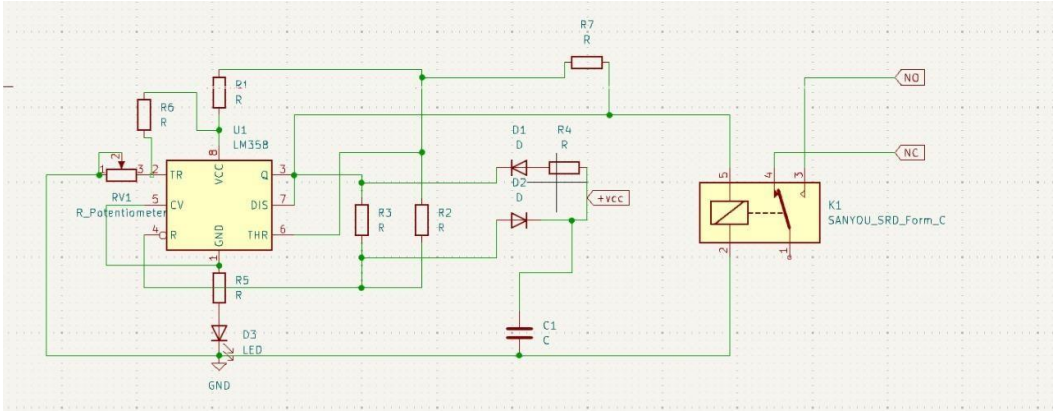
2.2 INTRODUCTION

Driver fatigue is a significant factor contributing to road traffic accidents worldwide, with drowsy driving being responsible for thousands of fatalities and injuries each year. Long hours behind the wheel, monotonous driving conditions, and inadequate rest contribute to drivers' inability to maintain full attention and alertness, ultimately increasing the likelihood of accidents. Traditional countermeasures such as rest breaks and caffeine consumption, while helpful, do not effectively address the root causes of fatigue during critical driving moments. In response to this issue, the Driver Anti-Sleep Device (DASD) has been developed to provide a proactive and continuous solution to combat driver drowsiness [1]. This device uses advanced sensors and machine learning algorithms to monitor the driver's physical state, detecting early signs of fatigue such as changes in eye movement, head tilt, and facial expressions. When signs of drowsiness are detected, the DASD triggers real-time alerts to the driver, encouraging them to take necessary actions before reaching a potentially dangerous level of fatigue [2].The implementation of such a device offers the potential to significantly reduce the risk of accidents caused by driver sleepiness[3], thus enhancing road safety. The DASD not only serves as a preventive tool but also promotes responsible driving by encouraging breaks and increased awareness of fatigue levels. As technology continues to evolve, the incorporation of such systems into vehicles holds promise for creating safer driving environments and helping to address. one of the most pressing issues in road safety today. Drowsy driving is a significant public safety concern, contributing to thousands of accidents, injuries, and fatalities each year. According to the National Highway Traffic Safety Administration (NHTSA), drowsy driving is responsible for an estimated 100,000 accidents annually in the United States, leading to over 1,500 deaths and 71,000 injuries. This paper aims to provide an overview of the current state of anti-sleep technology, exploring its various types, automation mechanisms[4]. effectiveness, and potential challenges, while highlighting the ongoing efforts to enhance these systems for improved road safety.

2.3 COMPONENTS USED

- 555 Timer IC
- Buzzer
- Resistors
- Capacitors
- Transistors
- Cables and Connectors
- Diodes
- PCB and Breadboards
- LED
- Transformer/Adapter
- Push Buttons
- Switch
- IC Sockets
- Relay

2.4 CIRCUIT DIAGRAM



2.1: Circuit Diagram of Driver Anti Sleep Alarm.

1. LM358 IC: Dual operational amplifier (op-amp) IC.
2. Tilt Sensor: Detects the head tilt (e.g., mercury tilt switch or accelerometer).
3. Potentiometer: For sensitivity adjustment.
4. Resistors and Capacitors: Used to set voltage levels and stabilize the circuit.
5. Buzzer: Produces an audible alarm.
6. LED: Provides a visual indication.
7. Power Supply: 9V battery or regulated 5V.

When the driver's head tilts, the sensor's output voltage rises above the reference voltage. The comparator outputs a HIGH signal, activating the buzzer and LED

2.4 WORKING MODEL

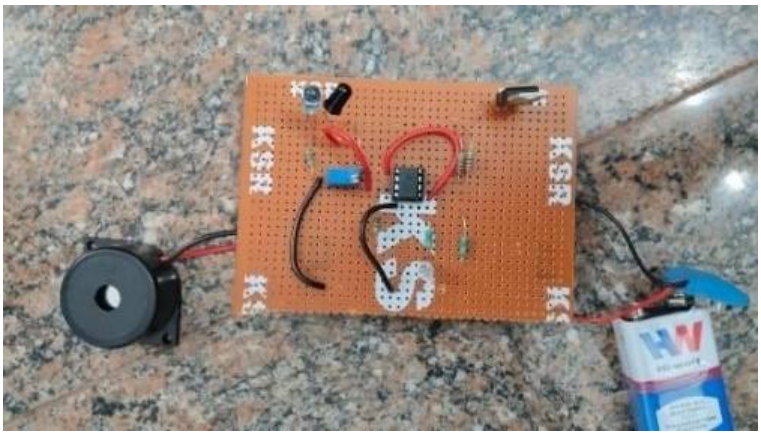


Figure 2.2 Working Model

National Sleep Foundation showed that 60 percent of Americans have driven while feeling sleepy, and 37 The names might sound funny, but the need for anti-sleep alarms is no joke. A poll conducted by the percent admit to falling asleep at the wheel in the past year. In fact, sleepy driving can be deadly: The National Highway Traffic Safety Administration (NHTSA) reports that drowsy driving causes more than 100,000 car crashes -- and kills more than 1,500 people -- each year. While the safest course of action is to get a good night's sleep or to take a nap before driving detection[1]. an anti-sleep alarm could come in handy on a late-night drive. Figure 2.5 shows the image of Working model.

Road traffic injuries and deaths have a terrible impact on individuals, communities and countries. Drowsy driving is defined as operation of a motor vehicle while being cognitively impaired by lack of sleep. According to the National Sleep Foundation, some of the drowsy driving signs are: difficulty focusing, yawning repeatedly or rubbing eyes and trouble keeping head up. In recent years, driver drowsiness has been one of the major causes of road accidents and can lead to severe physical injuries, deaths and economic losses. Annually and worldwide, over 1.3 million people die each year on the road and 20-50 million people suffer non-fatal injuries due to road accidents.

2.5 BLOCK DIAGRAM

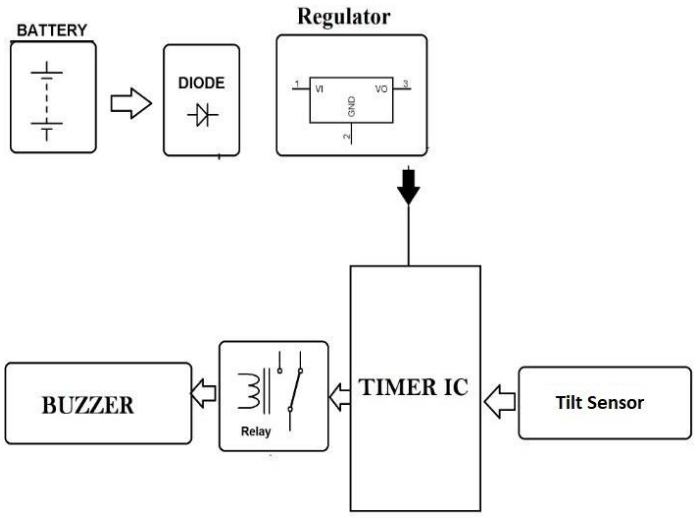


Figure 2.3 Block Diagram

POWER SUPPLY: A 9V Battery: The nine-volt battery, 9V Battery, is an electric battery that supplies a nominal voltage of 9 volts. Actual voltage measures 7.2 to 9.6 volts. Here we 9V battery for power supply to execute the working process.

RELAY: Relays are electrically operated switches that open and close the circuits by receiving electrical signals from outside sources. The relays embedded in electrical products work in a similar way; they receive an electrical signal and send the signal to other equipment by turning the switch on and of.

BUZZER: In simplest terms, a piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple construction, and it's typically a low-cost product.

2.6 ADVANTAGES

- It is used to avoid the accidents.
- It is more-efficient and simple to use.
- The Device is useful especially for people who travel long distance and Drive late at night.
- Using this Device helps the driver to wake up when he/she asleep while Driving.
- Affordable Cost and Portable Size.

2.7 APPLICATION

- Eyelid distance tracking to detect the Sleepiness.
- Sleepiness detection is Efficient and alarms will generate only when demanded (while in asleep).
- This can be used in high-end manufacturing cars to prevent accidents.
- Not only for Drivers but also, the device is used in number of ways like, ATM Guard Security, Military Base Security, bank Security and so on.

CHAPTER – 3

LUGGAGE SECURITY ALARM

3.1 ABSTRACT

Luggage security is a significant concern for travelers worldwide, particularly in airports, bus stations, and other public spaces. The increasing incidence of theft and tampering with personal belongings calls for a more reliable and automated solution to safeguard luggage. This paper proposes the design and implementation of a Luggage Security Alarm system. aimed at enhancing luggage protection. The system integrates motion sensors, weight sensors, and wireless communication to detect unauthorized tampering or movement of a suitcase. Upon detection, the system triggers an alarm to alert the owner, providing immediate feedback and prevention of potential theft or mishandling. Additionally, the system can be connected to a mobile app, offering real-time alerts and GPS tracking. The proposed solution is designed to be lightweight, cost-effective, and easily deployable, offering a significant improvement over traditional locks and physical security measures. The implementation of this system offers a practical, scalable approach to improving luggage security in various travel scenarios. Luggage security is a critical issue in the modern travel industry, as theft and mishandling of personal belongings remain prevalent in public spaces such as airports, train stations, and hotels. This paper demonstrates how such a system can be developed using available technologies such as wireless communication, Bluetooth, and smartphone connectivity. The integration of these technologies allows for a seamless user experience while providing a scalable solution that can be easily adapted to various travel environments. The implementation of the Luggage Security Alarm system represents a significant step forward in improving the security of personal belongings during travel, offering a modern solution to an ongoing problem in the global travel industry. In addition to the alarm feature, the system is designed to integrate with a mobile application that provides real-time notifications and GPS tracking, enabling users to monitor their luggage’s status remotely.

3.2 INTRODUCTION

Traveling has become an essential part of modern life, whether for work, leisure, or personal reasons. As the world becomes increasingly connected, ensuring the security of personal belongings, especially luggage, has become a major concern for travelers. The risk of theft or tampering with luggage is not just limited to crowded areas like airports and train stations but also extends to hotels and public spaces[1]. This growing concern has driven the need for innovative solutions to protect travelers' valuables.A luggage security alarm is a cutting-edge device designed to address this concern effectively. It provides an added layer of protection by alerting the owner to unauthorized access, tampering, or movement of their luggage. Unlike traditional locks, which can be picked or bypassed, a security alarm offers real-time audio or visual alerts, deterring potential thieves and immediately notifying the owner of any suspicious activity. These devices are compact, user-friendly, and often integrated with smart technologies such as Bluetooth and mobile apps. They not only enhance security but also add convenience by enabling remote monitoring and control system [2]. By incorporating modern features such as motion detection, GPS tracking, and alarm customization, luggage security alarms[3].cater to a wide range of traveler needs, making them a reliable and practical investment.In a world where safety and peace of mind are paramount, a luggage security alarm stands out as a practical solution. It empowers travelers to focus on their journey without the constant worry of losing their belongings. As awareness of travel security system[4], these devices are set to become an essential travel accessory for people across the globe. Traveling with luggage is an essential part of modern life, whether for business or leisure.In an era where technology continues to redefine personal security[5].luggage security alarms serve as a testament to the importance of protecting what matters most. By investing in such devices, travelers not only safeguard their belongings but also enhance their overall travel experience, making every journey stress-free and enjoyable. In a world where safety and peace of mind are paramount, a luggage security alarm stands out as a practical solution.

3.3 COMPONENTS USED

S.NO	COMPONENTS	VALUE
1	INTEGRATED CIRCUIT	IC1(CD4011)
2	RESISTOR	R1(1K) R2(4.7K)
3	CAPACITOR	C1(1uF)
4	MISCELLANEOUS	RELAY T1(BC547)

3.4 CIRCUIT DIAGRAM

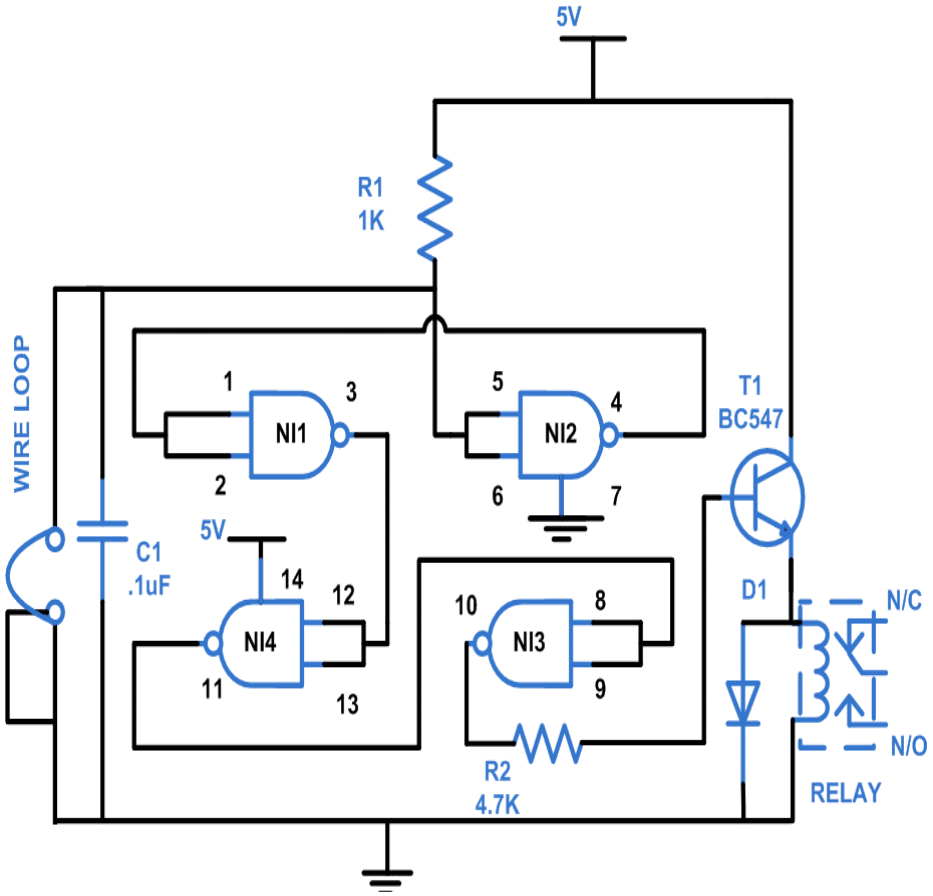


Figure 3.1 Circuit Diagram

3.5 WORKING MODEL

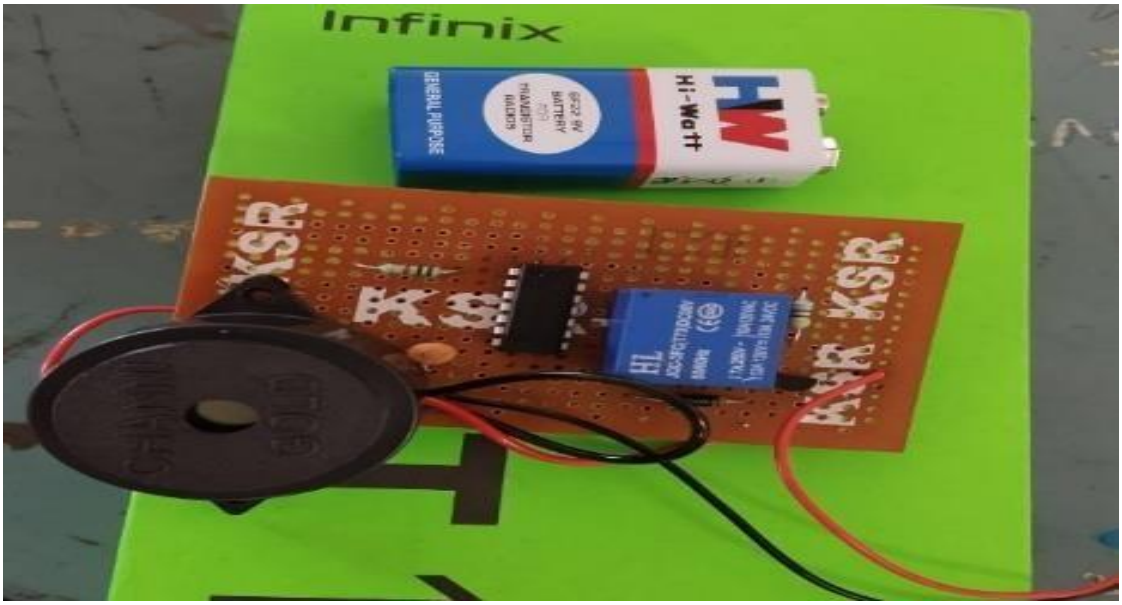


Figure 3.2 Working Model

To solve this problem here is a simple **luggage security alarm circuit** based on NAND gate. When somebody tries to steal the luggage, **the circuit will give a warning alarm**. An audio-visual indication can also be provided by connecting it to the relay. This project circuit can also be used in home to prevent the attempt of burglary as when somebody tries to open the door, the loop breaks and the alarm starts sounding.

The project is built around CD4011 with components like LDR, variable resistor, capacitor, transistor and relay. It generates a warning beep when somebody attempts to open the locker Figure 3.2 shows the image of working model.

A luggage security alarm is designed to safeguard luggage by detecting unauthorized access or movement and triggering an alert.

To understand the working, you should know about the truth table of NAND gate which is as follows-

Table 1: Working Model of Luggage Security Alarm.

INPUT	INPUT	OUTPUT
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

The truth table of NAND gate shows that the output will remain HIGH until any of the signals is LOW. If both the signals go HIGH then in that case the output will be LOW.

The output of circuit depends on Pin 5. When power supply is connected to the circuit the voltage at pin 5 is zero as loop is intact. Therefore, voltage at pin 4 becomes high which is connected to pin 1 and 2 which are also high. As the truth table of NAND gate says that if both the inputs are high then the output is low so we will receive LOW at pin 3 of gate 1 which is connected to pin 12 and 13 making them also LOW. Hence, pin 11 goes HIGH making pin 8 and 9 also HIGH and voltage at pin 10 as LOW. As a result, transistor connected to it through resistor will not be energized and we will not receive the alarm. Now imagine somebody tries to take the luggage therefore the loop connected to it breaks. When loop breaks pin 5 and 6 goes high and reverse action take place. As a result, pin 10 will become high and the transistor will start conducting and we will an alarm will sound. This alarm will not go off until the loop is intact again. In this circuit we can use battery of 6-15V depending on the rating of the relay. The buzzer can also be connected directly without using Relay. The relay is used in the circuit because if the alarm to be connected works on AC an extra isolation would be needed from sudden current spikes. A diode is used with the relay because any reverse-voltage spike can short-circuit at source and they can do any damage to the circuit.

3.6 BLOCK DIAGRAM

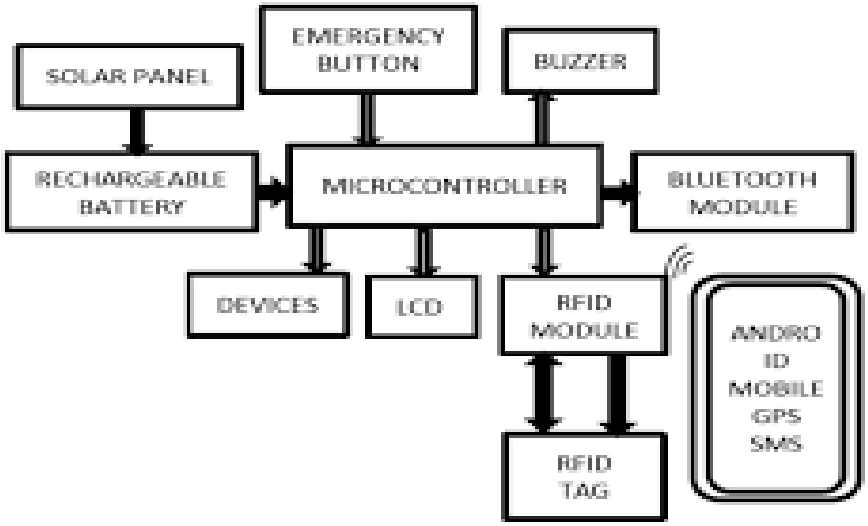


Figure 3.3 : Block Diagram of Luggage Security Alarm

IC1(CD4011): It is a CMOS integrated circuit (IC) containing **four independent NAND gates** in a single package. Each NAND gate has **two inputs** and one output. It is widely used in digital electronics for performing logical operations. The CD4011 typically comes in a 14-pin Dual Inline Package (DIP).

Table 2: Luggage Security Alarm

Pin	**Name**	**Description**
1, 2	Inputs of Gate 1	Two inputs for NAND gate 1
3	Output of Gate 1	Output for NAND gate 1
4, 5	Inputs of Gate 2	Two inputs for NAND gate 2
	Output of Gate 2	Output for NAND gate 2
7	GND	Ground (0V)
8, 9	Inputs of Gate 3	Two inputs for NAND gate 3
10	Output of Gate 3	Output for NAND gate 3
11, 12	Inputs of Gate 4	Two inputs for NAND gate 4
13	Output of Gate 4	Output for NAND gate 4

Resistors: It plays several crucial roles in the operation of a luggage security alarm circuit. Their primary function is to control and manage the flow of electrical current to ensure the proper functioning of various components. Here's how resistors work in a typical luggage security alarm. Resistors are often placed in series with components like LEDs, buzzers, or sensors to limit the current passing through them. If an LED is used as an indicator in the alarm system, a resistor is connected in series to prevent the LED from receiving excessive current, which could damage it.

Capacitor C1(.1uF): In a luggage security alarm circuit typically plays a vital role in stabilizing the circuit or assisting in specific functions. Here's how **C1** (with a value of 0.1 µF) might be utilized in such a system. C1 is often placed across the power supply lines (VCC and GND) near sensitive ICs or microcontrollers. It smooths out voltage fluctuations and noise caused by the operation of other components, such as sensors or actuators.If the alarm circuit involves sensor input (e.g., vibration or motion sensors), C1 may be used to filter out high-frequency noise from the sensor signal. This ensures the sensor reacts only to genuine triggers (like tampering) and not to random electrical noise or minor vibrations.

Microcontroller: Acts as the "brain" of the alarm system. Processes signals from sensors (motion, vibration, or tamper sensors) and decides when to trigger the alarm.

Power Supply:

- **Battery**:
    - Typically, luggage alarms are powered by a small battery pack (e.g., 9V or AA batteries) for portability.
- **Rechargeable Options**:
    - Some advanced alarms include Li-ion or NiMH batteries with USB charging.
- **Power Management**:
    - Includes voltage regulators and capacitors to ensure stable operation.

Communication Modules:

- **Bluetooth or Wi-Fi**:
  - Allows the user to monitor and control the alarm via a smartphone.
- **GSM Module**:
  - Sends SMS alerts in case of tampering.
- **GPS Tracker**:
  - Helps locate the luggage if stolen or misplaced.

ADVANTAGES:

1. Theft Prevention: The alarm alerts you if someone tries to open or tamper with your luggage, deterring theft.

2. Personal Identification: In crowded places like airports or train stations, it prevents your luggage from being mistaken for someone else's.

3. Easy Location Tracking: If you misplace your luggage, the alarm can help you locate it quickly by sound.

4. Peace of Mind: Knowing your belongings are secure allows you to travel with less stress.

APPLICATIONS:

- Theft Prevention
- Protection Against Tampering
- Easy Tracking (With GPS or GSM Modules)
- Customizable Security
- Portable and Convenient
- Long Battery Life

CHAPTER – 4

CONCLUSION

Driver anti-sleep devices play a vital role in enhancing road safety by preventing accidents caused by driver fatigue. These devices, equipped with advanced technologies like facial recognition, head movement sensors, or alarm systems, effectively monitor driver alertness and provide timely alerts to prevent drowsiness. By promoting sustained attention and improving response times, they not only save lives but also reduce the risk of property damage and associated costs. The adoption of these devices, combined with awareness about the dangers of drowsy driving, marks a significant step towards safer roads and responsible driving practices**.**

Luggage security alarms are an effective and practical solution to safeguard personal belongings during travel. These devices help protect luggage from theft and unauthorized access by providing real-time alerts when suspicious activity is detected. With features such as motion sensors, proximity alerts, and tamper-resistant mechanisms, they offer an extra layer of security, ensuring travelers' peace of mind. By reducing the risks of luggage loss or tampering, these alarms promote safe and stress-free travel experiences. Their compact design, ease of use, and reliability make them an indispensable tool for anyone concerned about their belongings' safety. Incorporating luggage security alarms into modern travel practices is a proactive step towards minimizing security challenges and ensuring smooth journeys. Luggage security alarms are essential tools for enhancing the safety of personal belongings during travel. These devices provide a reliable and efficient way to deter theft and unauthorized access by immediately alerting the owner to potential threats. With features like motion detection, proximity alerts, and tamper-resistant designs, they ensure peace of mind for travelers.

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