A Course Project report Submitted in partial fulfilment of the Academic requirements for the award of the degree of

Bachelor of Technology

Submitted by

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UNDER THE COURSE

SOCIAL INNOVATION AND PRACTISE

CENTRE FOR ENGINEERING EDUCATION RESEARCH

CMR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
(NAAC Accredited with 'A+' Grade & NBA Accredited)
(Approved by AICTE, Permanently Affiliated to JNTU Hyderabad)
KANDLAKOYA, MEDCHAL ROAD, HYDERABAD-501401

2022-23

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CERTIFICATE

This is to certify that the course project report entitled **"ANTI SLEEP ALARM WHILE DRIVING"** is a bonafide work done by**B. Dileep (21H51A04G1), G. Ram Viswanath (22H55A0411), I .Venkata Narayana (22H55A0414), G. Jaya Prakash Varma (22H55A0412) , J. Sunil (22H55A0415), M. Aravind (22H55A0419),** of II B. Tech, in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology, submitted to Centre for Engineering Education Research, CMR College of Engineering & Technology, Hyderabad during the Academic Year 2022-23.

(Names of the project coordinators)

1.Mr.K.Raju ,Asst Prof (ECE-CEER)

2.Mrs.B.Shireesha,Asst Prof (CSE-CEER)

(Mr.B. Suresh Ram)

HOD CEER

DECLARATION

We, the students of II Year B. Tech II Sem of Centre for Engineering Education Research , **CMR COLLEGE OF ENGINEERING &TECHNOLOGY**, Kandlakoya , Hyderabad, hereby declare, that under the supervision of our guide course coordinators, we have independently carried out the project titled "**Anti-Sleep Alarm while Driving**" and submitted the report in partial fulfilment of the requirement for the award of Bachelor of Technology in by the Jawaharlal Nehru Technological University, Hyderabad (JNTUH) during the academic year 2022-2023.

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Finally, we thank all our faculty members and Lab Assistants for their valid support.

We own all our success to our beloved parents, whose vision, love and inspiration has made us reach out for these glories.

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ABSTRACT

The main goal of this project is to reduce accidents caused by drowsy driving and save at least 4 out of 10 drivers who are prone to such incidents. The core module of this system incorporates an Eyeblink sensor that accurately measures the rate of eye blinks. If the driver's eyes remain closed for 5 seconds, an alert is triggered by a ringing buzzer, accompanied by an increase in the intensity of the buzzer sound. Simultaneously, the speed of the vehicle decreases exponentially, ensuring safety. This innovative module specifically benefits commercial drivers, shift workers, drivers with sleep disorders, drivers using sedating medications, and those who do not get adequate sleep. The drowsiness detection system is designed to swiftly identify signs of drowsiness by distinguishing normal eye blinks from those indicating sleepiness. By detecting closed eyes and issuing a warning signal when they remain closed for an extended period, it effectively prevents drivers from falling asleep while on the road.

CHAPTER – 1

INTRODUCTION:

Drowsy driving is a significant yet often overlooked traffic safety problem. According to the NHTSA, drowsiness contributes to over 100,000 collisions annually, resulting in more than 1,500 deaths and 40,000 injuries. It is important to note that drowsiness further exacerbates the impairment caused by alcohol. Certain groups, such as teenagers, professional drivers (including truck drivers), military personnel on leave, and shift workers, are particularly susceptible to drowsy driving incidents. Additionally, untreated sleep disorders like sleep apnea significantly increase the risk of drowsy driving.

To address these challenges, we propose the "**Anti Sleep Alarms Preventing Accidents**", a novel solution incorporating a completely wireless module functioning through RF transmission. This innovative system aims to prevent accidents caused by drowsy driving. It utilizes advanced technology to detect signs of drowsiness and alert the driver in real-time. By implementing this solution, drivers can proactively mitigate the risks associated with drowsy driving.

CHAPTER -2

LITERATURE REVIEW:

Drowsy driving is a significant contributor to road accidents, leading to severe consequences for driver performance and road safety. Extensive research has demonstrated the prevalence and impact of drowsy driving incidents. Factors such as sleep deprivation, circadian rhythm disruption, and sleep disorders contribute to driver fatigue. To address this issue, anti-sleep alarm systems have been developed to detect drowsiness and alert drivers. These systems utilize technologies like facial recognition, eye tracking, brainwave monitoring, and steering behavior analysis. Studies evaluating the effectiveness of anti-sleep alarms have provided insights into their limitations and user acceptance. Another approach to combating driver fatigue is the implementation of regular breaks while driving. Research suggests that taking optimal breaks based on duration and frequency can help reduce fatigue-related accidents. Strategies for effective break scheduling, including time-based and fatigue-based approaches, have been explored. However, ensuring driver compliance with break recommendations remains a challenge. Behavioral interventions and education programs play a crucial role in promoting responsible driving and fatigue management. Legal and policy perspectives also need to be considered, including the enforcement of drowsy driving laws. Overall, while anti-sleep alarms and breaks while driving show promise in mitigating drowsy driving risks, further research is needed to improve their reliability, explore innovative approaches, and encourage widespread adoption for enhanced road safety.

CHAPTER -3

PROBLEM DEFINITION:

The problem definition of this project is mainly due to the drowsy driving related accidents and we see most of the accidents you to drowsy driving and reckless driving this is due to irregulars of the driver and these issues we came up with the project on the wireless transmission.

3.1.PROBLEM STATEMENT:

The problem is the high risk of accidents caused by drowsy driving due to driver fatigue. The project aims to develop interventions such as anti-sleep alarms and regular breaks to prevent drowsiness, enhance driver alertness, and improve road safety.

3.2.OBJECTIVE:

The objective of the Anti-Sleep Alarm and Breaks while Driving project is to develop and evaluate interventions that address the problem of drowsy driving. The primary goal is to enhance driver safety by creating an accurate and reliable anti-sleep alarm system capable of detecting signs of drowsiness and alerting drivers in a timely manner. By preventing accidents caused by driver fatigue, this intervention aims to improve overall road safety. Additionally, the project aims to promote driver alertness by establishing guidelines for optimal break durations and frequencies during long journeys. Through the implementation of these breaks, the project seeks to reduce the risk of drowsy driving incidents

3.3.METHODOLOGY:

- The Anti-Sleep while Driving project involves using an eyeblink sensor to detect driver drowsiness.
- The Arduino Nano processes the sensor data and controls the overall operation of the system.
- Wireless communication is established between the driver and the vehicle using RF transmitter and receiver modules.
- The DC motor and 5V relay control the movement of the toy car.
- When drowsiness is detected, the system triggers a response, activating the buzzer for an alert and stopping the vehicle's movement.

3.4.WORKING MODEL:

The Anti-Sleep while Driving project is designed to address the issue of driver drowsiness and prevent the risks of accidents caused by falling asleep behind the wheel. The system consists of various components working together. Firstly, the eyeblink sensor continuously monitors the driver's eyeblink activity. When the ignition switch is turned on, the Arduino Nano microcontroller initiates the monitoring process. If the sensor detects that the driver's eyes have been closed for more than 5 seconds, a series of actions are triggered. The Arduino activates the RF transmitter, which sends a signal to the vehicle, alerting it to the driver's drowsiness. Simultaneously, a buzzer is activated, creating an audible alert for the driver. Furthermore, the Arduino triggers the 5V relay, cutting off power to the DC motor, which controls the movement of the toy car representing the vehicle. As a result, the car comes to a stop, preventing any potential accidents. The system continuously monitors the driver's eyeblink activity, and the process repeats to ensure ongoing safety. On the vehicle side, the RF receiver detects the signal from the driver and responds by activating the buzzer and cutting off power to the DC motor, halting the vehicle's movement until the driver's eyes are open again. Overall, the Anti-Sleep while Driving project effectively detects drowsiness and implements timely preventive measures to ensure driver safety during travel.

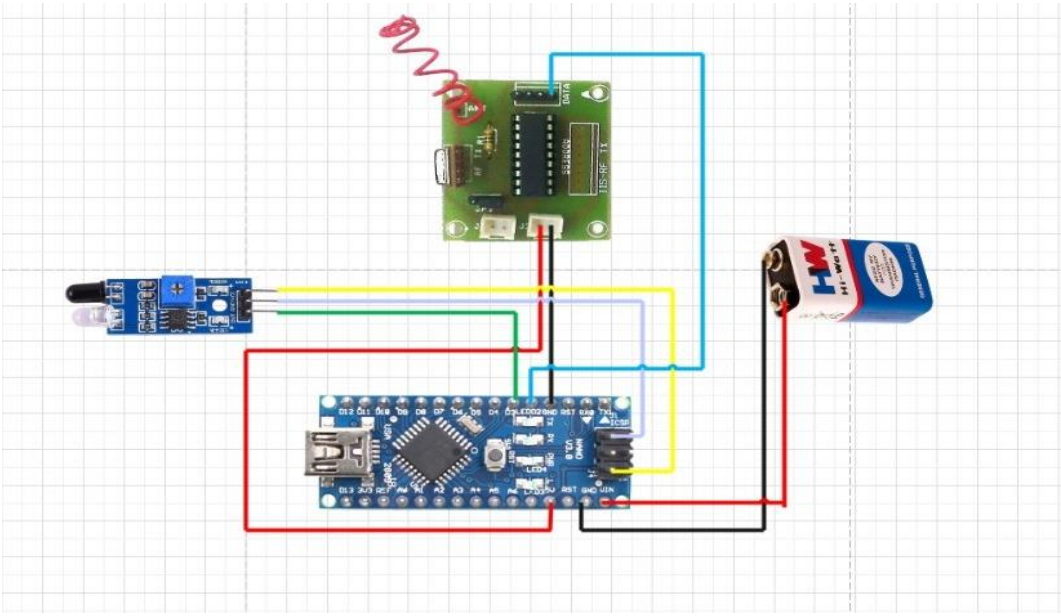
CHAPTER -4

CONCEPTUAL DESIGN:

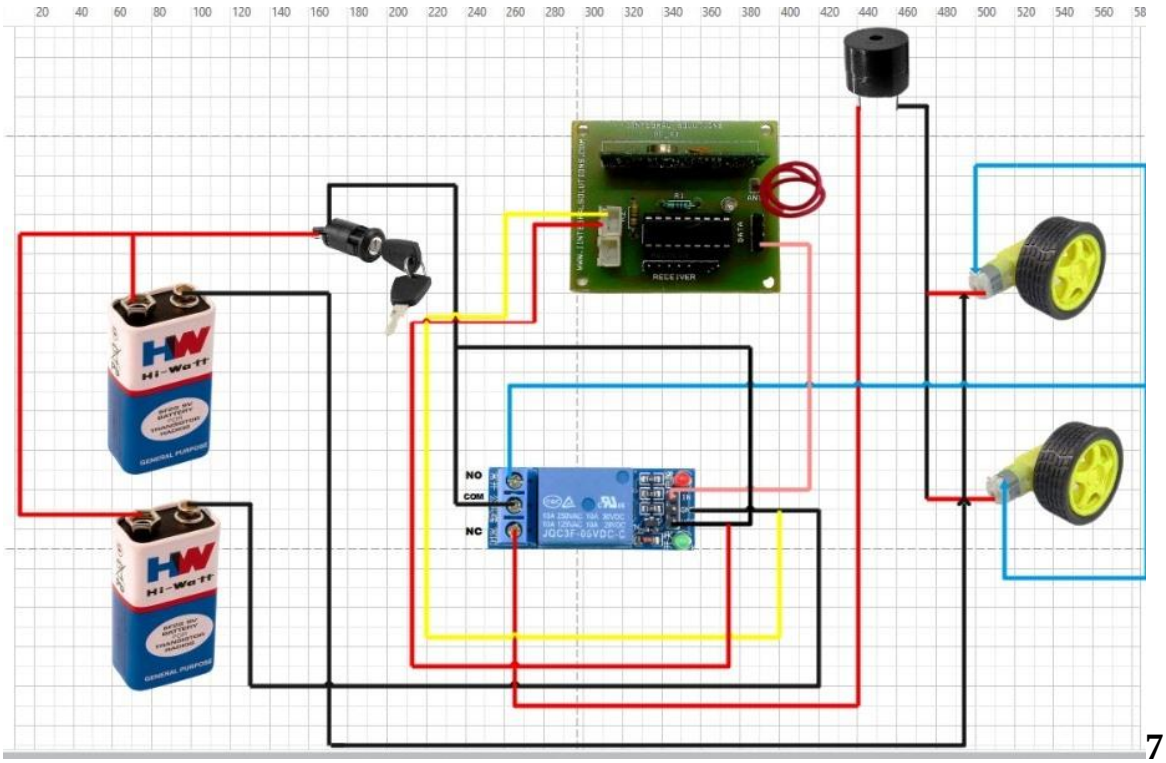
- The ignition switch is used to start the system.
- The eyeblink sensor is used to monitor the driver's eyeblink activity.
- The Arduino Nano acts as the central control unit and processes the sensor data.
- The RF transmitter and receiver facilitate communication between the driver and the vehicle.
- The DC motor controls the movement of the toy car, representing a real vehicle.
- The 5V relay is used to control the motor's operation.

4.1.BLOCK DIAGRAM

TRANSMISSION CIRCUIT LAYOUT



RECEPTION CIRCUIT LAYOUT:



4.2.DESIGN DESCRIPTION:

1. Eye Blink Sensor
2. Arduino Nano
3. RF Transmission set
4. RF Receiver set
5. 5v Relay
6. DC Motors
7. Electric Bike lock
8. 9v Battery
9. Jumper wires

1. EYE BLINK SENSOR:

- Eye blink sensors are devices that can detect when a person's eyes blink.
- They are typically used in applications such as driver drowsiness detection, eye tracking, and human-computer interaction.
- Eye blink sensors work by emitting infrared light and then detecting changes in the reflected light when the eye blinks.
- The working principle of an eye blink sensor is based on the fact that the amount of light reflected from the eye changes when the eye blinks.
- When the eye is open, the majority of the light that is emitted by the sensor is reflected back to the sensor.

Fig 4.2.1 Eye blink sensor

2. ARDUINO NANO:

- The Arduino Nano is a small, inexpensive microcontroller board based on the ATmega328P microcontroller.
- It is a popular choice for hobbyists and makers because of its small size, low cost, and wide range of capabilities.
- The Arduino Nano has 14 digital input/output pins (of which 6 can be used as PWM outputs), 8 analog input pins, a 16 MHz crystal oscillator, a USB connector, a power jack, and an ICSP header.
- The Arduino Nano can be programmed using the Arduino IDE, which is a free and open-source integrated development environment (IDE) for the Arduino platform.
- The Arduino Nano can be used to control a wide variety of devices, including LEDs, motors, sensors, and more.
- It is also a popular choice for prototyping and developing new applications.

Specifications:

- Operating voltage: 5 volts
- Input voltage: 5 to 20 volts
- Digital I/O pins: 14 (of which 6 can be used as PWM outputs)
- Analog input pins: 8
- DC per I/O pin: 40 mA
- DC for 3.3 V pin: 50 mA

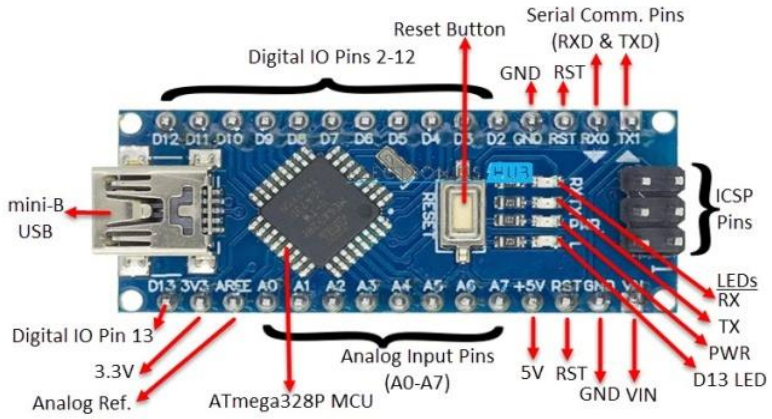


Fig 4.2.2 Arduino Nano

3. JUMPER WIRES:

A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Jumper wires are of three types :male-male, female-male ,female-female. Jumper wires typically vary in colour and size depending on what they are being used for. In breadboards, jump wires are used to establish connections between the central micro controller and other devices such as buttons and sensors.

If possible, the jumper wire should always be placed on the component side of a circuit board during assembly.The wires should also be routed in an X-Y manner, avoiding any bends. Jump wires should never be raised more than 1/8 of an inch above the surface of the circuit board.

Fig 4.2.3 Jumper wires

4. BUZZER:

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

The **pin configuration of the buzzer** is shown below. It includes two pins namely positive and negative. The positive terminal of this is represented with the '+' symbol or a longer terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '-'symbol or short terminal and it is connected to the GND terminal.

Specifications

- Color is black
- The frequency range is 3,300Hz
- Operating Temperature ranges from – 20° C to +60°C
- Operating voltage ranges from 3V to 24V DC
- The sound pressure level is 85dBA or 10cm
- The supply current is below 15mA

Fig 4.2.4 Buzzer

5. RF TRANSMITTER :

- RF transmitters are devices that send radio waves over a specific frequency range.
- They are used in a variety of applications, such as remote control, telemetry, and wireless networking.
- RF transmitters typically have a low power consumption, making them ideal for battery-powered devices.
- They can be used over short distances, typically up to a few hundred meters.
- Transmitters generate radio waves, while receivers detect them. This means that transmitters must have a power source, while receivers do not.

Fig 4.2.5 RF Transmitter

6. RF RECEIVER:

- RF receivers are devices that receive radio waves over a specific frequency range.
- The frequency range of an RF receiver is determined by the resonant frequency of its antenna.
- The sensitivity of an RF receiver is measured in decibels (dBm).
- The range of an RF receiver is affected by the sensitivity, the antenna, and the environment.
- RF receivers can be demodulated to extract data, such as digital or analog signals.

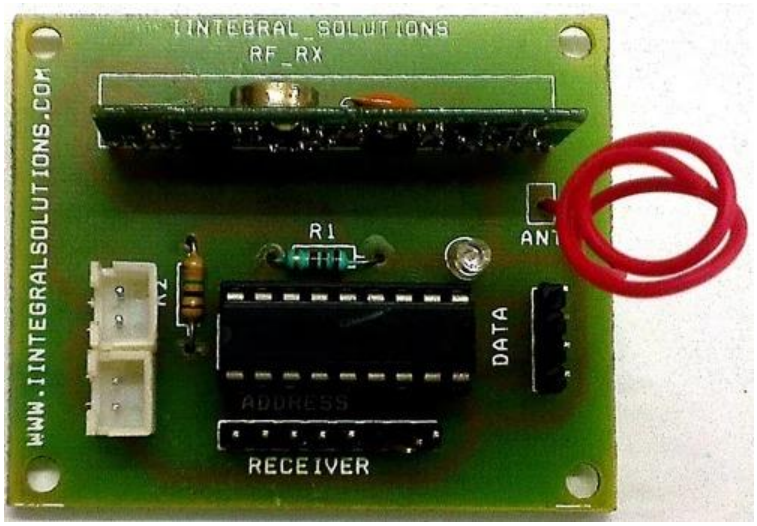


Fig 4.2.6 RF Reciever

7. 5V RELAY:

- A 5V relay is an electrical switch that is activated by a low-voltage signal.
- The input voltage of a 5V relay is typically between 3.3V and 6V.
- The maximum current that a 5V relay can switch depends on the specific relay, but it is typically in the range of 10A to 20A.
- 5V relays are commonly used in electronic projects to control high-current devices, such as motors, solenoids, and lights.
- They are also used in industrial applications, such as control panels and automation systems.

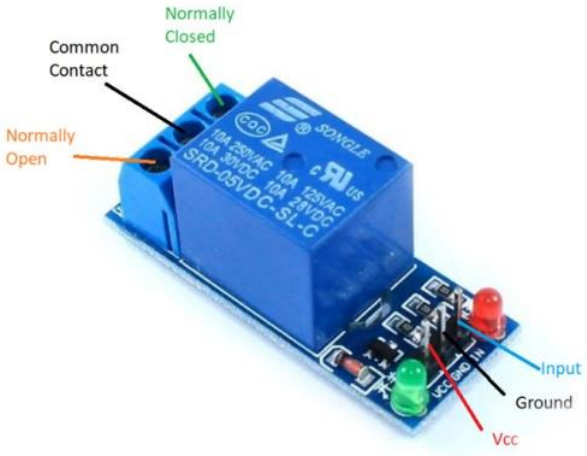


Fig 4.2.7 Relay Module

8. DC MOTOR :

- DC motors are a type of electric motor that uses direct current (DC) to power it.
- They are commonly used in a variety of applications, including toys, tools, appliances, and vehicles.
- The speed of a DC motor can be controlled by varying the voltage applied to it.
- The direction of rotation of a DC motor can be reversed by reversing the polarity of the voltage applied to it.
- DC motors are typically powered by batteries, but they can also be powered by AC adapters.

Fig 4.2.8 DC Motor

9. IGNITION SWITCH :

- The ignition switch is typically connected to the battery and the starter motor.
- When the ignition switch is turned to the ON position, it sends a signal to the starter motor, which starts the engine.
- The ignition switch also controls the power to the electrical system.
- The ignition switch is operated by a key.
- The key has a series of tumblers that must be aligned in order to turn the ignition switch.
- If the key is not inserted correctly or if the tumblers are not aligned, the ignition switch will not turn.

Fig 4.2.9 Ignition Switch

10.9V BATTERY :

- HW batteries are a type of 9V battery that uses zinc-carbon chemistry.
- They are less expensive than alkaline 9V batteries, but they have a shorter lifespan.
- HW batteries typically have a capacity of 400 to 600 milliampere-hours (mAh).
- The average lifespan of an HW battery is 50 to 100 hours.
- HW batteries are available in both disposable and rechargeable versions.

Fig 4.2.10 9v DC battery

CHAPTER –5

RESULT:

This Project "**ANTI-SLEEP ALARM WHILE DRIVING**" is successfully designed, and tested and demo unit is fabricated.

The goal of this project is to develop a device that can accurately detect sleepy driving and make alarms accordingly, which aims to prevent the drivers from drowsy driving and create a safer driving environment.

5.1 CONCLUSION:

The findings highlight the potential benefits of utilizing anti-sleep alarm technologies and implementing regular breaks to mitigate the risks associated with drowsy driving. However, several challenges and limitations need to be addressed, including user acceptance, false alarms, and compliance. Future research should focus on developing more reliable and accurate anti-sleep alarm systems, exploring innovative approaches to break scheduling, and promoting widespread adoption of strategies to combat driver fatigue and improve road safety.

5.2 SOURCE CODE :

```
unsigned intx,p,q;
void setup()
{
pinMode(2,OUTPUT);
pinMode(3,INPUT);
}
void loop()
{
 while(digitalRead(3)!=LOW);
digitalWrite(2, LOW);
while(1)
 {
  loop1:
  for(x=0;x<=200;x++)
  {
delay(10);
   if(digitalRead(3)==HIGH && q==0)
   {
     x=0;
delay(500);
     p=0;
digitalWrite(2, LOW);
   }
  }
  if(digitalRead(3)==LOW && p==0 && q==0)
  {
    p=1;
goto loop1;
  }
  if((digitalRead(3)==LOW) && p==1 && q==0)
  {
digitalWrite(2, HIGH);
delay(10);
  }
```

5.3 REFERENCES:

- https://www.nhtsa.gov/risky-driving/drowsy-driving
- https://electronics.howstuffworks.com/gadgets/automotive/anti-sleep-alarm.htm
- https://www.motorindiaonline.in/drowsy-driving-a-safety-challenge/
- https://electronics.howstuffworks.com/gadgets/automotive/anti-sleep-alarm.htm

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