1. Smart Street

Urban environments are increasingly affected by issues related to energy inefficiency, public safety, and environmental monitoring. Conventional street lighting systems often consume excessive electricity due to continuous operation throughout the night, regardless of the level of pedestrian or vehicle activity. Additionally, conventional streetlights lack integration with smart technologies, limiting their functionality to merely providing illumination.

To address these challenges, the **Smart Street** project proposes an innovative, cost-effective system using the Arduino Uno to develop an intelligent, sensor-driven street lighting and monitoring solution. This system will aim to optimize energy usage, enhance public safety, and monitor environmental conditions to create a sustainable and responsive urban infrastructure.

Expected Outcomes

1. **Reduction in Energy Costs**: With automated lighting control, electricity consumption for street lighting could be reduced by up to 50%, especially in low-traffic hours.
2. **Improved Urban Safety**: The adaptive lighting system provides better visibility when people are present, reducing the risk of accidents and increasing the sense of security in urban areas.
3. **Real-Time Environmental Data Collection**: Useful data for urban planning, air quality management, and traffic control, which could be expanded to improve community health and environmental sustainability.

2. Smart Dustbin

In many urban and rural areas, waste management remains a significant challenge. Overflowing dustbins, improper waste disposal, and inefficient garbage collection are common issues that negatively impact public health, sanitation, and the environment. Traditional waste collection systems often operate on fixed schedules, leading to situations where bins are either overflowing or emptied unnecessarily, both of which are inefficient and costly.

The **Smart Dustbin** project aims to develop an IoT-enabled waste management solution using sensors and a microcontroller to make waste collection more efficient, sanitary, and sustainable. By detecting and monitoring fill levels in real-time, Smart Dustbins can notify waste management systems when bins need to be emptied, thus optimizing collection schedules, reducing fuel consumption, and improving urban cleanliness.

Expected Outcomes

1. **Optimized Waste Collection**: Collection schedules will be based on real-time data rather than fixed intervals, resulting in more efficient use of resources.
2. **Enhanced Public Hygiene**: Preventing bins from overflowing will improve public hygiene and reduce littering, contributing to a cleaner urban environment.

3. **Cost Savings**: More efficient collection routes will reduce fuel and labor costs for waste management companies.
4. **Environmental Impact Reduction**: Reduced trips and optimized collection routes will lower the carbon footprint associated with waste management.

3. Smart Bottle

Hydration is essential for health, but many people struggle to consume enough water daily due to busy schedules, forgetfulness, or lack of awareness about their hydration needs. Dehydration can lead to fatigue, reduced cognitive function, and various health issues, particularly in children, elderly individuals, and athletes. Current solutions, such as reminders or drinking water apps, can lack personalization and effectiveness.

The **Smart Bottle** project aims to address this issue by developing an interactive, sensor-enabled water bottle that tracks a user's water intake, provides reminders, and offers feedback based on individual hydration goals. This bottle will encourage healthier hydration habits, improve user engagement, and make it easier for people to maintain optimal hydration levels.

Expected Outcomes

1. **Improved Hydration Habits**: By monitoring intake and providing reminders, users are more likely to stay hydrated, promoting better health and well-being.
2. **Personalized User Experience**: The system can adapt hydration goals to individual needs and environmental factors, making hydration advice more relevant and effective.
3. **Data for Self-Awareness**: Users gain insight into their hydration patterns, helping them develop better habits over time.
4. **Scalable for Various Applications**: This solution can benefit athletes, office workers, children, and elderly individuals who need consistent hydration support.

4. Smart Footwear

Footwear serves as an essential accessory in daily life, offering protection and support. However, conventional footwear often lacks features that can improve mobility, monitor health, and enhance safety. For specific groups—like the elderly, athletes, and people with visual impairments—footwear with integrated smart features could greatly improve health monitoring, activity tracking, and safety. Existing wearable devices (such as smartwatches) are not always practical or convenient for all users, especially in situations where hands-free operation and subtle monitoring are desired.

The **Smart Footwear** project aims to develop an innovative, sensor-enabled shoe that can monitor health metrics, track activity levels, and offer safety features. This footwear can provide insights into physical activity, detect falls, guide visually impaired users, and even alert users to posture issues, ultimately enhancing the quality of life and promoting well-being.

Expected Outcomes

1. **Improved Physical Activity and Health Awareness**: Users will gain insights into their activity levels, posture, and potential foot health issues, encouraging healthier lifestyles.
2. **Enhanced Safety**: The footwear provides real-time alerts for falls or inactivity, which can be critical for the elderly and those with mobility concerns.
3. **Greater Mobility for Visually Impaired Users**: Haptic feedback for navigation can significantly improve confidence and independence for people with visual impairments.
4. **Data-Driven Insights**: Long-term activity data can help users and healthcare professionals monitor health trends, enabling preventive care and tailored interventions.

5. Smart Wrist Band

The **Smart Wrist Band** system will be built using a compact microcontroller, such as ESP32 or similar, along with various health and activity sensors. Key components include:

1. **Heart Rate Sensor**: Monitors the user's heart rate, detecting any irregular patterns or spikes that may need attention.
2. **Pulse Oximeter (SpO2 Sensor)**: Measures blood oxygen levels, helping users monitor respiratory health.
3. **Accelerometer and Gyroscope**: Tracks movement and detects falls. This data is also used to measure activity levels, steps, and sleep patterns.
4. **Temperature Sensor**: Tracks skin temperature, which can be useful for detecting fever or monitoring changes in body temperature.
5. **Bluetooth/Wi-Fi Module**: Connects the wristband to a smartphone app, enabling data synchronization, notifications, and alerts.
6. **Vibration Motor**: Provides haptic feedback for reminders and alerts, such as notifications to hydrate, take medications, or move.
7. **Battery with Power Optimization**: Ensures the wristband can last through extended use on a single charge.

The **Smart Wrist Band** will collect health and activity data, which can be viewed in a companion mobile app. Users can set health and fitness goals, receive alerts for abnormal health readings, and get real-time reminders to maintain good habits. If a fall or abnormal health metric is detected, the wristband can automatically alert an emergency contact with the user's location.

6. Smart Helmet

Motorcycle riders face significant safety risks, as they are more vulnerable to accidents and road hazards than car occupants. Traditional helmets provide basic head protection, but they lack advanced safety features that could improve rider safety, convenience, and connectivity. Many motorcycle accidents occur due to visibility issues, lack of immediate assistance after an accident, and difficulty accessing navigational tools or communication devices while riding.

The **Smart Helmet** project aims to develop a helmet that integrates IoT, sensors, and communication technologies to enhance safety, convenience, and connectivity for riders. By

adding features like accident detection, navigation, and hands-free communication, the Smart Helmet can offer a safer and more user-friendly riding experience.

7. Smart Chair

In today's work and study environments, prolonged sitting has become common, leading to health issues such as poor posture, back pain, muscle strain, and reduced circulation. Traditional chairs do not provide feedback on posture, sitting duration, or reminders to take breaks, which can contribute to long-term health problems. Furthermore, individuals working from home often lack ergonomic office setups, leading to poor sitting habits.

The **Smart Chair** project aims to address these issues by developing a sensor-enabled, IoT-integrated chair that promotes healthy sitting habits, monitors posture, and provides real-time feedback and reminders. By making the sitting experience more dynamic and health-oriented, the Smart Chair can help reduce health risks associated with prolonged sedentary behavior.

Expected Outcomes

1. **Improved Sitting Posture**: Real-time posture feedback and reminders will encourage proper alignment and prevent slouching, reducing back and neck strain.
2. **Encouragement of Movement**: Reminders for breaks will encourage regular movement, promoting better circulation, reducing stiffness, and enhancing overall comfort.
3. **Enhanced Health Awareness**: Basic health metrics, such as heart rate, can give users insights into their physical state and alert them to the risks of prolonged sedentary behavior.
4. **Increased Productivity**: With regular reminders and breaks, users can experience reduced fatigue and discomfort, leading to higher productivity and focus.

8. Smart Parking

The **Smart Parking** project aims to develop an IoT-based system that provides real-time parking space availability, automated vehicle detection, and seamless payment solutions. By integrating sensors, cameras, and a mobile app, the Smart Parking system will help drivers quickly locate available spots, reserve them in advance, and make payments efficiently, thereby reducing congestion, saving time, and optimizing parking resources.

The **Smart Parking** system will use IoT-enabled devices, data analytics, and a mobile app to create an efficient parking solution. Key components and features include:

1. **Parking Sensors**:
    - **Infrared or Ultrasonic Sensors**: Installed in each parking space to detect the presence or absence of vehicles, allowing real-time tracking of space occupancy.

2. **Automated Gate Control**:

- **Smart Barriers**: Automatically opens for reserved and prepaid vehicles using LPR or RFID technology, minimizing manual entry checks.
- **Entry and Exit Sensors**: Track vehicle movement to and from parking spaces, allowing accurate billing based on parking duration.

9. Smart Water Tank

The **Smart Water Tank** project aims to create an IoT-enabled water tank system that provides real-time monitoring of water levels, automated refilling, leak detection, and water usage analytics. This system will help conserve water, reduce wastage, and allow users to optimize water usage effectively.

10. IoT-based Smart Irrigation System

In agriculture, efficient water management is essential for maximizing crop yield and conserving water. Traditional irrigation methods, such as manual watering and time-based irrigation systems, often lead to water wastage due to overwatering or underutilization. This is especially problematic in regions facing water scarcity. An **IoT-based Smart Irrigation System** addresses these issues by using real-time data to optimize water usage, ensuring crops receive the exact amount of water needed for healthy growth.

Project Objective

To develop a Smart Irrigation System that uses sensors and IoT technology to monitor soil moisture, environmental conditions, and water levels, enabling automated and efficient irrigation. The system will:

1. Conserve water by irrigating only when necessary.
2. Provide real-time monitoring of soil and environmental conditions.
3. Reduce manual labor and optimize irrigation schedules based on data.

11. Smart Color Differentiator

Problem Statement

Color differentiation is a critical task in various industries such as manufacturing, agriculture, recycling, and quality control. Many processes require identification of specific colors to automate sorting, detect defects, or classify items based on color. Traditional color identification methods often rely on manual inspection, which is time-consuming and prone to human error. A **Smart Color Differentiator** provides an efficient, automated solution to detect and classify colors accurately in real time.

Project Objective

To develop a **Smart Color Differentiator** that uses sensors to detect and classify colors, providing real-time information for automated processes or visual inspection. This device can be used in applications such as object sorting, agricultural grading, recycling separation, and quality control in manufacturing.

12. Smart Parcel Delivery System

Problem Statement

In the logistics and shipping industry, ensuring that parcels are handled with care is crucial to prevent damages and maintain customer satisfaction. However, there is currently limited visibility into how parcels are treated during transit, and incidents like excessive shaking, dropping, or rough handling can go unnoticed, affecting the contents of the package. A **Smart Parcel Delivery System** aims to address this issue by monitoring and reporting on the condition of packages in real time, enabling more accountable and transparent shipping processes.

Project Objective

To develop a Smart Parcel Delivery System that uses sensors and IoT technology to monitor a package's handling conditions during transit. The system will detect impacts, orientation changes, and environmental conditions (e.g., temperature) and alert the sender or recipient if the parcel undergoes rough handling or adverse conditions

13. Smart Walking Cane

Problem Statement

For elderly and mobility-impaired individuals, walking aids such as canes are vital for maintaining independence and preventing falls. However, traditional canes provide limited feedback and often lack features that can help in emergency situations or offer assistance in challenging environments. A **Smart Walking Cane** addresses these limitations by incorporating sensors, real-time monitoring, and safety features that enhance the user’s mobility, alert caregivers in case of falls, and provide environmental awareness.

Project Objective

To develop a **Smart Walking Cane** equipped with sensors such as accelerometers, gyroscopes, and GPS, along with features for fall detection, real-time alerts, and environmental sensing, to improve the safety and independence of elderly individuals and those with mobility challenges.

14. Virtual Reality (VR) Glove

Problem Statement

Virtual reality (VR) technology has made significant strides in recent years, offering immersive experiences for gaming, education, training, and simulation. However, one of the limitations of current VR systems is the lack of tactile feedback or the sensation of touch, which significantly reduces the realism and immersion of the experience. The **Virtual Reality Glove** aims to solve this problem by enabling users to interact with virtual environments using their hands and receive haptic feedback, creating a more lifelike and engaging experience.

Project Objective

To develop a **Virtual Reality Glove** that can detect hand and finger movements, allowing users to interact with virtual objects in real-time, while providing haptic feedback (e.g., vibrations or resistance) to simulate the sense of touch and improve the immersive experience in VR applications.

15. Fall Detection for Elderly Care

Problem Statement

Falls among elderly individuals are a major health risk and one of the leading causes of injury and death in older adults. In many cases, elderly people fall and are unable to get up or call for help, leading to prolonged exposure to potential health risks and delayed medical intervention. **Fall detection systems** can help address this problem by automatically detecting falls and alerting caregivers or emergency services immediately, improving response time and potentially saving lives.

Project Objective

To design and develop a **Fall Detection System for Elderly Care** that utilizes sensors, such as accelerometers and gyroscopes, integrated with a microcontroller to detect falls in real-time and notify caregivers or emergency services through an alert mechanism.

16. Earthquake Detection System

Problem Statement

Earthquakes are natural disasters that can cause significant damage to infrastructure, human life, and the environment. Early detection and early warning systems for earthquakes can significantly reduce the impact of these disasters. The challenge is to develop a reliable and cost-effective system that can detect seismic activities in real time, provide early warnings to affected areas, and help mitigate the potential damage by alerting people, emergency services, and infrastructure systems.

Project Objective

To design and implement an **Earthquake Detection System** that utilizes **seismic sensors** (such as accelerometers and seismometers) to monitor ground vibrations. The system will detect the occurrence of earthquakes in real time and send out alerts to the concerned authorities, emergency responders, and individuals to enable prompt action.

17. Fire Detection and Alarm System

Project Overview:

This system utilizes **smoke and flame sensors** to detect fire outbreaks in homes, offices, and industrial settings. Upon detecting smoke or a flame, the system activates an alarm to alert individuals and initiates safety protocols such as turning off electrical systems or triggering sprinkler systems.

Components:

- **Smoke sensor**: Such as MQ-2 or MQ-7 to detect the presence of smoke.
- **Flame sensor**: Like an **IR Flame sensor** (TGS 813) to detect visible flames.
- **Microcontroller**: Arduino or ESP32 to process sensor data.
- **Buzzer or Siren**: For alarm.
- **Relay Module**: To control connected devices like fans, water sprinklers, or power systems.

18. Smart Kitchen

The Smart Kitchen Fire Detection System is designed to automatically detect fire hazards in the kitchen and trigger appropriate responses to prevent damage and ensure safety. Using advanced smoke and flame sensors, the system can identify potential fire outbreaks caused by gas leaks, overheating cooking equipment, or malfunctioning appliances. The system can send real-time alerts to the users, activate safety measures like gas shutoff valves or fire suppression systems, and help reduce the risks associated with fire hazards in the kitchen. Kitchens are one of the most common places where fire accidents occur due to unattended cooking, overheating of appliances, gas leaks, and other risks. Traditional fire alarms may not be effective in detecting small fires early or specifically related to kitchen scenarios (such as cooking oil fires). Therefore, there is a need for an integrated system that not only detects fire but also allows for automatic intervention and alerting to mitigate the risks.

Project Objectives

- **Detect Fires Early**: To design a system that detects fire outbreaks in the kitchen at an early stage using **smoke** and **flame sensors**.
- **Automated Safety Measures**: To integrate automatic systems such as **gas shutoff valves** and **fire suppression mechanisms** to reduce the damage caused by kitchen fires.

- **Real-Time Alerts**: To send immediate alerts to users and emergency services via **SMS**, **mobile apps**, or **email notifications**.
- **User-Friendly Interface**: Provide a simple interface for users to monitor and control the system via a **smartphone app**.

19. Smart Fire Extinguisher System

Overview:

This project combines **flame sensors** to detect fires, **pressure sensors** to assess whether a fire extinguisher has been used, and **color sensors** to identify the type of fire (for example, oil-based or electrical) for targeted firefighting solutions.

Components:

- **Flame sensor**: Detects the presence of flames or fire.
- **Pressure sensor**: Used to measure the pressure inside a fire extinguisher. If the extinguisher has been deployed, the pressure will drop.
- **Color sensor**: Identifies the color of flames (e.g., blue or yellow) to differentiate between different types of fire (e.g., oil, electrical, wood).
- **Microcontroller**: Arduino, ESP32, or Raspberry Pi for controlling the system.
- **Fire suppression system**: Can be automated to activate once the fire is detected.
- **Buzzer/Alarm**: To alert users.

20. Smart Cooking Safety System

Overview:

A smart kitchen safety system that uses **flame sensors**, **pressure sensors**, and **color sensors** to detect cooking hazards such as gas leaks, cooking accidents, and flame detection.

Components:

- **Flame sensor**: Monitors for any unwanted flames or overheating from stoves.
- **Pressure sensor**: Detects gas pressure in the kitchen gas pipes or cylinders, providing early warnings for gas leaks or overpressure situations.
- **Color sensor**: Used to identify the color of the flame (e.g., red or orange for cooking, blue for proper combustion).
- **Microcontroller**: Arduino or similar microcontroller.
- **Mobile App**: Sends alerts for gas leaks or flame-related accidents.
- **Gas Valve**: Can automatically shut off gas supply if a leak or abnormal flame is detected.

21. Automated Greenhouse Environment Control System

The Automated Greenhouse Environment Control System is designed to monitor and regulate the conditions inside a greenhouse for optimal plant growth. The system integrates sensors such as flame sensors, pressure sensors, and color sensors to maintain a healthy environment. The goal is to automatically adjust variables like temperature, humidity, light intensity, and CO2 levels to create the perfect conditions for plant growth while reducing manual intervention and resource consumption.

Problem Statement

Greenhouses are often used to grow plants in controlled environments, but maintaining optimal growing conditions can be challenging. Factors like temperature fluctuations, humidity levels, light intensity, and air pressure can affect plant growth. In traditional setups, these variables are monitored manually or require complex automation systems, which can be costly and inefficient. There is a need for a system that automates the regulation of the greenhouse environment, improving crop yields, saving energy, and reducing water consumption.

22. Smart Pill Dispenser for Elderly Care

Project Overview

The **Smart Pill Dispenser for Elderly Care** is an IoT-based solution designed to assist elderly individuals in managing their medication schedules. With aging, many elderly people experience difficulty remembering to take their medication on time, which can lead to serious health complications. This system aims to provide a reliable, automated way to ensure that individuals adhere to their prescribed medication regimens, thus improving their overall health and well-being.

The **Smart Pill Dispenser** uses advanced technologies such as automation, sensors, and mobile connectivity to deliver medications at the right time and in the right doses. It also provides reminders and alerts for caregivers, ensuring proper medication management for elderly individuals.

Problem Statement

As the population ages, many elderly individuals suffer from chronic conditions that require regular medication. Unfortunately, forgetfulness or difficulty managing complex medication schedules often leads to missed doses or incorrect medication administration. This can result in worsened health conditions, hospitalizations, or even fatalities.

Traditional pill dispensers and medication management systems are either manual or require constant supervision, which is not always feasible for caregivers. Therefore, there is a significant need for an automated and user-friendly system to ensure that the elderly take their medications correctly, independently, and on time.

23. IoT-Based Fuel Theft Monitoring System

Project Overview

The **IoT-Based Fuel Theft Monitoring System** is designed to detect, monitor, and alert authorities about any unauthorized fuel theft in industrial, commercial, and transportation sectors. By leveraging IoT sensors and real-time data monitoring, the system aims to prevent fuel theft, reduce losses, and enhance the overall security of fuel storage and transportation systems. This system uses a combination of flow meters, temperature sensors, and pressure sensors to monitor fuel levels and provide instant alerts in case of any anomalies that may indicate theft or tampering.

Problem Statement

Fuel theft is a significant concern for industries, logistics companies, and transportation businesses. Whether it is from fuel tanks of trucks, fuel storage depots, or fuel pipelines, unauthorized theft results in massive financial losses. Traditional monitoring methods often rely on manual checks or rudimentary alarms that may not provide real-time information or alerts. There's a need for a more reliable and automated system that can provide real-time monitoring, track fuel consumption, and detect any irregularities associated with theft or unauthorized access.

24. Arduino-Based Light Following Robot with LDR Sensor for Industrial Applications

Project Overview

The **Arduino-Based Light Following Robot with LDR (Light Dependent Resistor) Sensor** is designed to automate tasks in industrial environments where consistent and precise light tracking is essential. By utilizing **LDR sensors** and **Arduino microcontroller** technology, this robot can autonomously follow a light source, adjusting its path based on the intensity of light detected. This application could be useful for tasks like warehouse lighting management, industrial inspections, or guiding automated processes in factories.

Problem Statement

In many industrial settings, lighting systems need to be optimized based on environmental conditions. For example, automated guided vehicles (AGVs) or robots could benefit from the ability to autonomously follow specific light paths for better positioning, inspection, or data collection. The challenge is to design a system that allows robots to track and follow light sources reliably in dynamic and industrial environments. The current manual methods of guiding or inspecting based on lighting conditions often require human intervention or static control systems that are inefficient or expensive.

There is a need for a low-cost, flexible, and efficient system that enables robots to follow light paths, which can be integrated into various industrial applications such as inspection, monitoring, and process automation.

25. IoT-Based Garage Door Automation

Project Overview

IoT-Based Garage Door Automation is a smart solution designed to automatically control and monitor garage doors through an internet-connected system. This system leverages **IoT (Internet of Things)** technology, allowing users to open or close their garage doors remotely via a mobile app, voice commands, or automated schedules. The project aims to enhance convenience, security, and energy efficiency by integrating sensors, microcontrollers, and cloud-based platforms.

Problem Statement

Traditional garage doors require manual operation, posing a challenge when you're away from home, under bad weather, or with hands full of groceries. Furthermore, many garage doors lack modern security features, such as remote access or real-time monitoring. This leads to inconvenience, energy inefficiencies, and potential security vulnerabilities. The solution is to automate the garage door using IoT technology, enabling smart control and monitoring, thus improving accessibility, safety, and energy efficiency.

26. Smart Cradle

The Smart Cradle brings together the latest advancements in IoT and automation to help parents care for their babies more efficiently and securely. With features like automatic rocking, cry detection, health monitoring, and real-time alerts, the smart cradle offers a comprehensive solution for parents looking to ensure the safety and comfort of their babies while also easing the burden of nighttime care. The project not only enhances convenience but also ensures that parents can provide the best care for their little ones

27. Smart Mirror

A **Smart Mirror** is a modern and interactive mirror that incorporates digital technology to provide users with real-time information and multimedia content while serving its traditional function as a reflective surface. Equipped with a display behind the mirror, it can show weather updates, news, time, calendar events, fitness data, or even integrate with other smart home devices like lighting, temperature, and security systems. This project focuses on the development and deployment of a smart mirror that can interact with users in an intuitive manner, offering functionalities beyond just reflection.

28. Smart Thermostat

Project Overview

A **Smart Thermostat** is a device that controls the temperature of a room or building based on user preferences, external weather conditions, and other intelligent algorithms. It is connected to the Internet of Things (IoT) and can be controlled remotely using smartphones, voice commands, or automation systems. The goal of the Smart Thermostat project is to develop an affordable, user-friendly, and energy-efficient system for regulating the temperature in homes or offices, saving energy while providing optimal comfort to the users.

Problem Statement

Maintaining an ideal temperature in a building while ensuring energy efficiency is a common challenge. Traditional thermostats require manual adjustments, which can lead to inefficient energy use. Users often forget to adjust the temperature when leaving home, or they may leave the heating or cooling system running unnecessarily, leading to higher utility bills. There is a need for a system that automates temperature control, learns user behavior, and adapts to changing environmental conditions in order to optimize both comfort and energy consumption.

29. IoT-Based Automated Fish Feeder

The IoT-Based Automated Fish Feeder is a smart system designed to automate the process of feeding fish in aquariums or fish tanks. This system uses IoT technology to allow fish owners to feed their fish at scheduled intervals, ensuring the fish are fed even when the owner is away. The system can be controlled remotely using a mobile application, ensuring convenience and precision in feeding. The feeder can also monitor the fish tank's conditions, such as water quality, and adjust the feeding schedule accordingly.

30. IoT-Based Rat Trapper

Project Overview

The **IoT-Based Rat Trapper** is an intelligent pest control system designed to detect and trap rats (or other rodents) in a controlled environment. The system utilizes IoT technology to automatically detect when a rat has entered the trap and send a notification to the user, ensuring timely action and preventing false triggers. The trap is designed to be humane, using sensors to determine when a rat is present and activating a mechanism to safely contain it.

Problem Statement

Rodent infestations are common in both residential and industrial spaces, causing significant damage to food, infrastructure, and health. Traditional rat traps often lack intelligence and require manual checking to determine whether the trap has been triggered. This results in inefficient pest control and potential delays in responding to a trapped rodent. There is a need for a more efficient and automated solution, which uses IoT technology to:

- Detect the presence of rats quickly.
- Send real-time notifications to the user for timely intervention.
- Reduce human effort by automating the trapping and monitoring process.
- Provide a more humane and safe method for trapping rodents.

31. IoT-Based Blind Aid Stick

Project Overview

The **IoT-Based Blind Aid Stick** is a smart mobility solution designed to assist visually impaired individuals in navigating their environment safely and independently. The smart stick incorporates IoT technology and various sensors to detect obstacles, navigate routes, and provide audio feedback or haptic vibrations to the user. It can also be connected to a mobile application for real-time updates, location tracking, and emergency alerts, enabling better navigation and ensuring user safety.

Problem Statement

Visually impaired individuals face numerous challenges when moving around, including difficulty detecting obstacles, navigating complex routes, and ensuring personal safety. Traditional white canes or sticks are effective for some tasks but lack advanced features like real-time obstacle detection, environmental awareness, and navigation assistance. There is a need for an **IoT-enabled blind aid stick** that enhances traditional mobility aids, providing a more efficient, safe, and user-friendly solution for the visually impaired.

32. Smart Women Protection System

Project Overview

The **Smart Women Protection System** is a comprehensive safety solution designed to provide real-time protection, prevention, and emergency alerts for women, particularly in vulnerable situations. It integrates various technologies, including IoT, GPS, mobile applications, and sensors, to offer personal safety features that can protect women from harassment, assault, or any form of danger. The system includes a wearable device, a mobile application for communication, and emergency services integration to ensure quick intervention during an emergency.

Problem Statement

Women around the world often face the threat of harassment, assault, or other forms of violence, especially in public spaces. Despite the growing awareness, safety measures in many regions remain insufficient. Traditional methods of protection, such as carrying a personal safety alarm or relying on phone calls, have limitations in terms of real-time response and tracking. There is a need for a **smart women protection system** that provides continuous monitoring, real-time alerts, and an automatic connection to emergency services or contacts when a woman feels threatened or is in danger.

33. Smart Wheelchair for Enhanced Mobility

Project Overview

The **Smart Wheelchair for Enhanced Mobility** is an intelligent, IoT-enabled mobility solution designed to assist individuals with limited mobility, including those with physical disabilities or age-related mobility issues. This wheelchair integrates advanced features such as automated navigation, obstacle detection, health monitoring, and real-time alerts to improve user independence and safety. By enhancing standard wheelchair functionality with sensors, connectivity, and automation, this smart wheelchair aims to make mobility more accessible and convenient for users.

Problem Statement

Individuals with limited mobility face various challenges when operating traditional wheelchairs, including difficulties in maneuvering in tight spaces, avoiding obstacles, and dealing with physical strain. In some cases, these individuals require constant assistance, reducing their independence. There is a need for a **Smart Wheelchair** that offers a high degree of autonomy, real-time health monitoring, and connectivity, improving user safety, convenience, and independence.

34. IoT-Enabled Earthquake Detection System

Project Overview

The **IoT-Enabled Earthquake Detection System** is a real-time seismic monitoring solution designed to detect early signs of earthquakes and issue alerts. By leveraging the Internet of Things (IoT), this system connects multiple seismic sensors to a cloud-based platform that continuously monitors, analyzes, and distributes data. When abnormal seismic activity is detected, the system sends immediate notifications to emergency response teams and the public, enabling proactive safety measures.

Problem Statement

Earthquakes are sudden natural disasters that can cause significant loss of life and property. Currently, many earthquake-prone regions lack accessible and timely detection and alert systems. There is a need for a **real-time, cost-effective, and widely deployable earthquake detection solution** that can provide early warning to individuals and organizations, allowing them to take swift, potentially life-saving actions.

35. AUTOMATIC CLOTH DRYING SYSTEM USING IOT

Project Overview

The **Automatic Cloth Drying System Using IoT** is designed to make the process of drying clothes more efficient and hassle-free. This system uses IoT sensors and automation to monitor weather conditions, detect moisture levels, and control the drying rack automatically. If it starts raining or humidity increases, the system retracts the drying rack indoors, and when conditions are suitable, it extends the rack outside. The smart cloth drying system ensures clothes are dried safely and efficiently without constant human intervention.

Problem Statement

Drying clothes outdoors is often dependent on weather conditions, which can be unpredictable. Rain, high humidity, or unexpected changes in weather can cause wet clothes to stay damp, leading to odor and inconvenience. Traditional drying systems require users to manually move clothes indoors if it rains, which may not always be possible if they are away. There is a need for a **smart, automated solution** that dries clothes effectively and protects them from rain and unfavorable weather.

36. IoT-Based Food Quality Detector

Project Overview

The **IoT-Based Food Quality Detector** is a smart system designed to assess the freshness and safety of food using various sensors. By monitoring gases emitted from food, temperature, humidity, and other quality indicators, the system determines the food's freshness level and alerts users in real-time. Using IoT, the data is sent to a mobile app or cloud platform where users can monitor the food's condition remotely, making it particularly useful for food storage facilities, restaurants, grocery stores, and homes.

Problem Statement

Food spoilage is a significant issue in the food supply chain, resulting in wastage and potential health hazards. Current methods of determining food freshness often rely on visual inspection, which may be inaccurate and inefficient. There is a need for a **smart, automated, and cost-effective solution** to monitor food quality indicators in real-time, alerting users when food starts to degrade to reduce waste and maintain food safety.

37. IoT-Enabled Gym Equipment Monitor

Project Overview

The **IoT-Enabled Gym Equipment Monitor** is a smart monitoring system that tracks gym equipment usage, maintenance needs, and user activity. This system integrates IoT sensors with

gym machines to record parameters like usage time, repetitions, force applied, and real-time user feedback. By collecting and analyzing this data, it optimizes equipment usage, tracks maintenance needs, and personalizes workout routines for users. The system can send data to a mobile app or dashboard, giving users and gym owners insights into equipment status and usage trends.

Problem Statement

Gyms often face challenges in monitoring equipment usage and maintenance needs, which can lead to equipment breakdowns and decreased user satisfaction. Additionally, gym users may struggle with tracking their workout progress and ensuring proper form and usage. A **smart IoT-based system** can help gym owners maintain equipment effectively and provide users with real-time feedback, increasing equipment lifespan, enhancing user experience, and promoting safe exercise practices.

38. Smart Backpack with Anti-Theft Features

Project Overview

The **Smart Backpack with Anti-Theft Features** is a technology-enhanced backpack that incorporates various sensors and IoT components to prevent theft, track location, and improve user convenience. Designed for travelers, students, and professionals, the backpack can alert users in real time if it's tampered with or moved unexpectedly. It includes features like proximity alerts, GPS tracking, lock mechanisms, and smartphone notifications, making it a reliable and practical solution for personal item security.

Problem Statement

Backpack theft is a common issue in crowded areas such as public transportation, airports, and schools, where backpacks are frequently unattended or left out of sight. Traditional backpacks offer limited security, increasing the risk of losing valuable items. A **smart anti-theft backpack** can address this problem by integrating IoT-based security and location features to prevent theft, providing users with peace of mind and increased security for their belongings.

39. Intelligent Soil Analysis System for Agriculture

Project Overview

The **Intelligent Soil Analysis System for Agriculture** is a sensor-based IoT solution designed to analyze soil properties in real-time, providing farmers with valuable insights for crop management and optimizing fertilizer use. This system monitors essential soil parameters such as moisture, pH, temperature, and nutrient content. By integrating IoT sensors and data analytics, the system allows farmers to make informed decisions on soil treatment and crop selection, ultimately improving yield and resource efficiency.

Problem Statement

Soil analysis is essential for effective crop management, but conventional soil testing is often costly and time-consuming, involving manual sample collection and laboratory testing. Farmers frequently lack timely insights into soil conditions, resulting in inefficient use of fertilizers and reduced crop yield. An **IoT-based intelligent soil analysis system** can enable real-time, cost-effective soil monitoring and empower farmers to manage soil health more effectively, thus enhancing agricultural productivity.

40. Personalized Learning Desk for Students

Project Overview

The **Personalized Learning Desk for Students** is an IoT-enabled desk that adapts to individual learning needs, providing an interactive, organized, and engaging workspace. This desk is equipped with sensors, interactive screens, and AI-based software to create a customized environment for each student. It monitors student posture, ambient light, and focus levels, suggesting personalized learning schedules, break reminders, and content based on student progress and engagement. The goal is to enhance learning outcomes by tailoring the environment and resources to each student's needs.

Problem Statement

Traditional learning spaces are often static and lack personalization, making it challenging for students to focus, especially when studying independently. Many students struggle with productivity, posture, and engagement due to distractions or an uncomfortable setup. The **Personalized Learning Desk** aims to solve these issues by creating an adaptable workspace that fosters productivity, engagement, and learning efficiency through tailored recommendations and automated adjustments.

41. Smart Refrigerator Management System

Project Overview

The **Smart Refrigerator Management System** is an IoT-based solution designed to transform conventional refrigerators into intelligent devices that manage food inventory, monitor item freshness, suggest recipes, and reduce food waste. Equipped with sensors, cameras, and machine learning, this system provides users with real-time information about stored items, sends expiration reminders, and tracks consumption patterns. Users can access this data via a mobile app, allowing for efficient food management and personalized meal planning.

Problem Statement

Households often face challenges in managing food efficiently, leading to food spoilage and waste due to poor tracking of expiration dates and inventory. Traditional refrigerators do not

provide information on stored items, requiring users to remember what's inside and check for spoilage manually. The **Smart Refrigerator Management System** addresses these issues by using IoT technology to track food items, optimize storage, and reduce waste through automated reminders and personalized recommendations.

42. Home Security System with Facial Recognition

Project Overview

The **Home Security System with Facial Recognition** is an advanced security solution leveraging facial recognition technology, motion detection, and IoT connectivity to enhance residential security. This system uses a camera and an AI-based facial recognition algorithm to identify and authenticate residents or notify the homeowner of unknown individuals approaching the door. The system also includes features such as remote access, real-time alerts, and integration with other smart home devices for comprehensive security monitoring.

Problem Statement

Traditional home security systems rely primarily on alarm triggers and limited access control methods, often resulting in false alarms or an inability to provide detailed alerts. With an increase in smart technology adoption, there is a need for a more precise and user-friendly security system that can accurately identify individuals and reduce unauthorized access attempts. This **Home Security System with Facial Recognition** aims to enhance security by providing real-time, accurate identification and reducing false alarms while giving users full remote control over home access.

43. Smart Wardrobe Organizer

Project Overview

The **Smart Wardrobe Organizer** is an IoT-based solution that revolutionizes the way individuals manage their clothing and accessories. By utilizing sensors, cameras, and a mobile application, the system helps users organize, track, and optimize their wardrobe. It can suggest outfits based on weather, personal preferences, and past usage, ensuring that users never waste time searching for clothes or forget about items they own. The system also integrates with other smart devices to offer a seamless, connected wardrobe experience.

Problem Statement

Many people struggle to organize their clothes efficiently, leading to disorganized wardrobes, difficulty in selecting outfits, and often forgetting items that they own. Traditional wardrobes don't offer a way to track or optimize clothing use, causing unnecessary purchases, overstuffed closets, and wasted time when dressing. The **Smart Wardrobe Organizer** solves these issues by

using technology to organize, track, and suggest clothing, making it easier for users to make informed decisions and optimize their wardrobe.

44. IoT-Based Pet Activity Monitor

Project Overview

The **IoT-Based Pet Activity Monitor** is an innovative solution designed to track and monitor the health and well-being of pets through IoT-enabled sensors. This system allows pet owners to monitor their pets' activity levels, sleep patterns, eating habits, and other key metrics remotely using a mobile app. By gathering real-time data and providing actionable insights, the system helps pet owners ensure that their pets are active, healthy, and living in a stress-free environment.

The system consists of a set of wearable sensors (such as collars or tags) that track pet activity and health data, which is then transmitted to a central server via IoT technology for processing and analysis.

Problem Statement

Pet owners often struggle to monitor their pets' activity levels, behavior, and health, especially when they are not at home. This can lead to missed signs of illness, stress, or inadequate physical activity. Traditional pet monitoring methods are either reactive or based on subjective observation, which can result in delayed intervention or misinterpretation of the pet's behavior. The **IoT-Based Pet Activity Monitor** aims to solve these issues by providing continuous, real-time tracking of the pet's health and activity, allowing for early detection of potential problems and promoting a healthier lifestyle for pets.

45. Remote Controlled Smart Gate System

Project Overview

The **Remote Controlled Smart Gate System** is an IoT-enabled security solution designed to provide seamless access control and enhance the security of residential, commercial, or industrial properties. By integrating IoT technology, the system allows gate operations to be controlled remotely via a smartphone, tablet, or web interface, providing convenience and improved security.

This system is equipped with sensors, motors, and wireless communication technology, enabling the gate to open or close with the press of a button, voice command, or automatically based on predefined conditions (e.g., proximity, time of day). In addition to remote control, the system may include features like real-time monitoring, security alerts, and access logs.

Problem Statement

Traditional gate systems are often manual or based on basic electronic control mechanisms, requiring users to exit their vehicles or homes to operate the gate. This can be inconvenient, especially in adverse weather conditions or for people with mobility issues. Moreover, manual systems provide limited security features, such as logging access events or remote monitoring. The lack of automation and advanced security features makes it difficult to ensure a high level of safety and convenience.

The **Remote Controlled Smart Gate System** addresses these issues by providing a fully automated, easy-to-use system that can be controlled remotely and integrated with modern security technologies.

46. Smart Window Control System

Project Overview

The **Smart Window Control System** is an IoT-enabled solution that automates the opening and closing of windows in response to various environmental conditions and user preferences. The system integrates sensors and actuators, enabling real-time monitoring and remote control of window operations. By leveraging data from environmental sensors such as temperature, humidity, and air quality, as well as using a mobile app or voice command, the system ensures optimal indoor comfort, energy efficiency, and security.

This system is suitable for homes, offices, greenhouses, and other environments where automated window control is needed to enhance ventilation, temperature regulation, and overall energy efficiency.

Problem Statement

In traditional window systems, windows are manually operated, often causing inconvenience and inefficiency in response to changing environmental conditions. In homes and offices, adjusting windows based on temperature, humidity, or air quality can be labor-intensive and ineffective in providing optimal indoor comfort. Furthermore, controlling windows manually or without real-time data leads to wasted energy or inadequate ventilation.

The **Smart Window Control System** addresses these issues by automating window operations, using real-time data to open or close windows efficiently and in response to environmental parameters. This automation will not only enhance comfort but also contribute to better energy management and environmental sustainability.

47. Smart In-Home Elderly Care System

Project Overview

The **Smart In-Home Elderly Care System** is an IoT-enabled solution designed to support the safety, health, and well-being of elderly individuals living independently. This system utilizes a

combination of sensors, wearables, and mobile applications to monitor the elderly person's activities, health status, and immediate surroundings. The goal is to provide both caregivers and family members with real-time data on the elderly person's condition while ensuring a safe, comfortable living environment.

The Smart In-Home Elderly Care System aims to prevent accidents, detect health anomalies, and offer emergency assistance in case of an emergency, all while promoting independence and improving the quality of life of elderly individuals.

Problem Statement

As the global population ages, many elderly people prefer to live in their own homes rather than moving to care facilities. However, aging individuals often face health risks, mobility issues, and isolation, which can lead to accidents, neglect, or unnoticed health deteriorations.

Traditional in-home care often lacks real-time monitoring and proactive alerts, leaving caregivers and family members unaware of issues until it's too late.

This project addresses these challenges by creating a **Smart In-Home Elderly Care System** that:

- Monitors vital signs and health metrics.
- Detects falls and other emergencies.
- Tracks daily activities and routines.
- Provides reminders for medication or appointments.
- Sends alerts to caregivers or family members in case of any anomalies or emergencies.

48. Smart Mattress for Sleep Monitoring

Objective: Use **pressure sensors** to monitor sleep posture, **force sensors** to detect changes in body weight or movement, and **shock sensors** to detect if the user falls out of bed.

Components:

- Pressure sensors: Measure the distribution of pressure and monitor body movement to detect sleep patterns.
- Force sensors: Detect when there's significant weight change, like getting up from the bed or lying back down.
- Shock sensors: Detect any sudden motion such as falling out of bed.
- Color sensor: Optional, used to adjust light intensity or color for better sleep environment based on time of day.

Use case: To improve sleep quality and monitor the elderly or patients who might fall out of bed.

49. Smart Industrial Safety System

Objective: Combine **shock sensors**, **pressure sensors**, and **force sensors** to detect workplace hazards such as machinery malfunctions, equipment pressure overload, or worker injury.

Components:

- Shock sensors: Detect sudden movements or shocks from machinery that may indicate a malfunction.
- Pressure sensors: Monitor the pressure in pipes, valves, or tanks to prevent accidents in industrial settings.
- Force sensors: Detect force application to ensure workers do not interact with hazardous machinery inappropriately.

Use case: To ensure the safety of industrial workers by automatically detecting hazardous situations and triggering emergency alerts or shutdowns.

50. Interactive Color Sorting System

Objective: Use a **color sensor** to sort different colored objects (e.g., in recycling processes) and combine **shock sensors**, **pressure sensors**, and **force sensors** to handle objects gently and ensure proper sorting.

Components:

- Color sensor: Detects the color of objects and sorts them into different bins.
- Pressure and force sensors: Ensure that objects are gently handled, especially fragile items, to avoid breakage during the sorting process.
- Shock sensors: Detect any sudden movement or mishandling of objects.

Use case: A smart sorting system for warehouses, recycling plants, or inventory management, where accurate object sorting and safe handling are critical.

51. Interactive Learning Tool for Children

Objective: An educational toy or learning system that uses **color sensors** to detect various objects (such as colors, shapes, or patterns), **shock sensors** to detect impact or falls, and **pressure/force sensors** to measure interaction strength (e.g., pressing buttons or objects).

Components:

- Color sensor: Detects colors for interactive learning (e.g., a toy that identifies different colors or objects).
- Shock sensor: Detects when the toy is dropped or subjected to force.

- Pressure/force sensor: Detects how hard a child presses buttons or interacts with the toy.

Use case: To create engaging educational toys that teach children about colors, shapes, and even basic physics through interactive play.

52. Smart Band : Vibration-Based Alert Mechanism

Purpose: Used to prevent falling asleep during critical tasks (e.g., while driving, operating machinery, or during long shifts).

Mechanism: A wearable device (like a wristband, ankle band, or headband) with a vibration motor. When the wearer starts to show signs of drowsiness, such as head nodding or reduced motion, the device vibrates to wake them up.

Technology: **Accelerometers**, **gyroscopes**, and **motion sensors** can detect changes in body posture and movement. The vibration increases as drowsiness is detected.

Example: Fatigue-monitoring bracelets for drivers or factory workers.

53. Light Therapy (Bright Light Exposure)

Purpose: Prevents drowsiness by exposure to high-intensity light, which can suppress melatonin production and help maintain alertness.

Mechanism: A device (like a wearable or a head-mounted system) that emits bright light at certain wavelengths (usually blue or white light) to simulate daylight and suppress the body's sleep-inducing hormone.

Technology: **Light-emitting diodes (LEDs)** in a headband or visor that are adjusted for light intensity and frequency to prevent sleepiness.

Example: **Smart glasses** or **alarm clocks with light therapy** to keep users awake, especially useful for night shift workers or those with jet lag.

54. Auditory Stimuli or Sound-Based Alerts

Purpose: To maintain wakefulness and attention.

Mechanism: A device that generates sounds or plays music designed to keep the user awake. This could include periodic beeps, alarm sounds, or even ambient noise that promotes alertness. The system could use an AI to detect low levels of alertness and trigger sound notifications.

Technology: Sound sensors or AI-based systems that analyze brainwave or body activity to adjust the sound stimuli.

Example: **Sleep prevention alarms** or **background noise generators** for people working late at night.

55. Smart Pantry

A cloud-based smart pantry system leverages IoT to track, manage, and optimize inventory in real-time. The system provides users with insights into pantry stock levels, expiration dates, and automated alerts when items are running low. By connecting IoT-enabled sensors to a cloud platform, the system allows users to access pantry data remotely via a mobile app or web interface. This setup is ideal for homes, restaurants, and retail, enhancing food management, reducing waste, and ensuring that essential items are always available.

Develop an IoT-enabled smart pantry system that connects to the cloud, automatically tracking pantry items and providing notifications on inventory levels and expiration dates. Users can view real-time data on their pantry and receive alerts for low stock or expiring products.

- **Weight Sensors**:
  - Measure the weight of pantry items, tracking inventory levels.
  - Detect changes as items are added or removed.
- **RFID or Barcode Scanners**:
  - Automate inventory tracking by identifying each item.
  - RFID tags or barcodes on each product provide specific details (e.g., product type, expiration date).
- **Humidity and Temperature Sensors**:
  - Track environmental conditions to prevent spoilage and maintain food quality.
  - Send alerts if temperature or humidity exceeds the optimal range.
- **Color and Proximity Sensors** (optional):
  - Detect visual characteristics, like spoilage (color change) in fresh produce or if items are properly placed in the pantry.

56. Smart movable road divider using IoT

A **smart movable road divider using IoT** is designed to dynamically adjust traffic lanes by shifting the position of the divider based on real-time traffic data. This IoT-enabled system aims to optimize road space during peak hours, reduce congestion, and ensure safer traffic flow. By collecting and analyzing traffic information, the system can make data-driven decisions on when and where to move the divider, providing flexibility for one-way or multi-lane traffic management as needed.

Project Overview

Develop a smart IoT-based road divider that can adjust lane allocation dynamically by moving in response to traffic flow, emergency situations, or roadwork. This system will leverage real-time data to improve traffic efficiency and reduce bottlenecks.

57. Noise-Activated Smart Lighting System

A **Noise-Activated Smart Lighting System** is a system that uses a noise sensor (microphone) to detect sounds in the environment and triggers the activation or deactivation of lighting based on the noise level. This system can be used to control lighting in various environments, such as homes, offices, event spaces, or public areas. For instance, it could turn on the lights when a sound (e.g., a clap or a voice) is detected or change the brightness based on ambient noise levels.

58. IoT-Based Pollution Monitoring System

The **IoT-Based Pollution Monitoring System** is designed to measure and monitor pollution levels in real-time, providing data on air quality and environmental conditions through various sensors. The system detects pollutants and environmental changes using sensors such as smoke sensors for particulate matter, color sensors to analyze smog and other pollutants, and additional sensors for measuring temperature, humidity, and harmful gases. This data is processed and transmitted to a cloud-based platform for real-time monitoring, alerts, and analysis.

Project Overview

To create an IoT-enabled system that monitors pollution levels, detects harmful gases, and provides real-time data and alerts to users, environmental agencies, or city planners. This system aims to assist in environmental management, health safety, and public awareness by providing accurate, real-time air quality information.

59. Smart Warehouse Monitoring System

The **Smart Warehouse Monitoring System** leverages IoT technology to ensure the real-time monitoring and management of warehouse conditions, such as temperature, humidity, inventory levels, and security. This system enhances warehouse operations by providing accurate, up-to-date information, helping to prevent damage to goods, streamline inventory management, and improve security.

Project Overview

To develop an IoT-enabled system that monitors environmental and inventory conditions in a warehouse, offering real-time data and alerts. The system ensures the protection of goods, efficient inventory tracking, and a safer environment, supporting overall operational efficiency.

60. Obstacle-Avoiding Robotic Arm

- **Project Overview**: This robotic arm can detect obstacles and adjust its position accordingly. The ultrasonic sensor detects objects within a certain range, while the accelerometer monitors the orientation of the arm. Servo motors control the arm's movement to avoid any nearby obstacles.
- **Working Mechanism**:

1. The ultrasonic sensor continuously scans for obstacles.
2. If an object is detected within a preset distance, the accelerometer data helps determine the orientation, and servo motors adjust the arm's position to avoid collision.

- **Applications**: Ideal for use in warehouse automation or assembly lines where robotic arms need to work in proximity to objects or other machinery.

61. Self-Balancing Robot with Obstacle Avoidance

- **Project Overview**: This project focuses on building a two-wheeled robot that can balance itself using data from an accelerometer. It also uses an ultrasonic sensor to detect and avoid obstacles.
- **Working Mechanism**:
    1. The accelerometer helps the robot maintain balance by constantly adjusting the servo motors' angles to keep the robot upright.
    2. The ultrasonic sensor detects obstacles in the robot's path, and the robot adjusts its direction accordingly to avoid collision.

62. Gesture-Controlled Robot

- **Components Used**: Accelerometer, Ultrasonic Sensor, Servo Motors, Microcontroller.
- **Project Overview**: In this project, an accelerometer is used to detect hand gestures that control the movement of a robot. The ultrasonic sensor provides obstacle detection, and servo motors control the robot’s motion.
- **Working Mechanism**:
    1. A user wears a device with an accelerometer that detects hand gestures (e.g., tilting left, right, forward, or backward).
    2. These gestures are translated into movement commands for the robot.
    3. The ultrasonic sensor on the robot detects obstacles and adjusts its path to avoid collisions.

63. Automatic Door with Obstacle Detection and Opening Control

Project Overview: This project uses a sensor to detect people approaching a door and another to monitor the tilt or motion of the door. A servo motor controls the door's opening and closing.

Working Mechanism:

1. A sensor detects an approaching object and signals the servo motor to open the door.
2. Another checks for any tilt or abnormal motion that may suggest improper door operation.

64. Tap Counter System Using Touch, Force, and Pressure Sensors

This project involves counting the number of taps or interactions using **touch sensors**, **force sensors**, and **pressure sensors**. The system can be used for applications where different types of input (touch, force, pressure) are required to detect user interactions or actions. For example, in a **smart door system**, you could use these sensors to count the number of touches or interactions with a surface.

65. Interactive Moving Target for Training and Gaming

Project Overview: This project creates a moving target for gaming or training that adjusts its movement based on proximity and user actions. The ultrasonic sensor measures distance from the user, and the accelerometer monitors orientation or movement speed.

Working Mechanism:

1. A sensor detects the user's distance, adjusting the target's speed or pattern accordingly.
2. Another ensures the target stays balanced and adjusts to changes in orientation.
3. An actuator control the target's movement, creating dynamic motion patterns.

66. Autonomous Car Using Sensors

An **autonomous car** is a vehicle capable of sensing its environment and operating without human intervention. This is achieved through the integration of various **sensors**, **actuators**, and **advanced algorithms** that enable the car to navigate safely on the road. These cars rely on a variety of sensors to perceive the surroundings and make decisions in real-time. The sensors are responsible for providing critical data, such as distance to objects, vehicle speed, road conditions, and environmental factors, which are then processed by the vehicle's computer system to make driving decisions.

67. Sleep Pattern Tracker

Eye ball tracking during sleep can be a fascinating and useful study, especially for understanding sleep patterns, detecting conditions like sleep apnea, or improving the quality of sleep. Eye movement during sleep can provide insight into the different sleep stages, such as Rapid Eye Movement (REM) sleep, where the most vivid dreams occur. Various sensors and techniques can be used to track eye movement during sleep.

Objective of the Project:

The primary goal of this project would be to monitor eye movements during sleep to determine the different stages of sleep, specifically REM sleep, and analyze potential sleep disorders such as sleep apnea or excessive eye movements during sleep. Additionally, it could provide valuable data on sleep quality, which could be used to enhance sleep therapy or for general wellness.

68. Crowd Monitor

A **crowd monitoring system** using microcontrollers can be designed to track the number of people in a specific area in real-time. Such systems can be used in various scenarios, such as in stadiums, concerts, shopping malls, public events, or emergency situations, to ensure safety and manage crowd density.

69. Temperature Sensitive Smart Fan Regulator using IoT

A **Temperature Sensitive Smart Fan Regulator** is an innovative system designed to automatically control the speed of a fan based on the surrounding temperature. The fan's speed is adjusted dynamically according to the temperature, ensuring comfort while minimizing energy consumption. This system can be implemented using **Arduino** or **ESP8266/ESP32** with **temperature sensors**, **fan motor control** using a **relay or motor driver**, and optional IoT integration for remote monitoring.