Excellence in Higher Education

AKSHAYA

COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recognized by UGC and Affiliated to Anna University)

Accredited by NAAC I Accredited by NBA : UG programmes of CSE, ECE & CIVIL

Kinathukadavu, Coimbatore-642109. www.acetcbe.edu.in

AN AUTONOMOUS INSTITUTION

TECHNICAL MAGAZINE

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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Department of Electrical and Electronics Engineering

Technical Magazine
Issue 1 [DEC 2025]

About the Department:

The department of Electrical and Electronics Engineering (EEE) at Akshaya College of Engineering and Technology offers an undergraduate programme in B.E (Electrical and Electronics Engineering), with an annual intake of 30 students. The department is dedicated to provide a comprehensive understanding of Electrical and Electronics Engineering built upon the principles of physical science, mathematics, computing, and technology. Approved by AICTE, New Delhi, and affiliated with Anna University Chennai, the department focuses on practical training in Electrical engineering, emphasizing experimental design and communication skills throughout the academic years.

Mrs. G.Balambigai, Assistant Professor
(HoD - i/c)

1. Vision and Mission of the Department

VISION

To produce globally competent Electrical and Electronics Engineering graduates through quality education, innovation, and professional ethics.

MISSION

DM 1: To achieve academic excellence in Electrical and Electronics Engineering through innovative, outcome-based teaching–learning practices enabled by using effective ICT tools.

DM 2: To develop industry-ready and employable graduates through focused career guidance, skill-based training, and effective industry collaboration.

DM 3: To enhance effective research and innovation in Electrical and Electronics engineering area through creative and project incubation.

2. Program Educational Objectives – PEOs

- **PEO 1:** The graduates will be able to apply domain knowledge in electrical and electronics engineering for providing solutions to complex problems in power system, renewable energy systems, power electronics and drives.
- **PEO 2:** The graduates will be able to fulfil the role and responsibility of the professional electrical engineers in their chosen career with a mind to serve the industry and society.
- **PEO 3:** The graduates will be able to work as an electrical engineering professional or perform as a researcher pursuing higher education in reputed institutions, thereby encouraging life-long learning, keeping pace with technological developments in Electrical Engineering.

3. Program Specific Outcomes – PSOs

PSO 1: Employ fundamental electrical engineering concepts to identify, formulate and solve power systems and power electronics challenges.

PSO 2: Apply modern intelligent computational tools to solve electrical engineering problems and engage in lifelong learning to adapt to technological advancements.

4. Program Outcomes –POs

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO 6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Message from the Editorial Team

We're thrilled to present the second issue of the **EEE Department's Technical Magazine** for the academic year 2024-2025 (Even Semester). This edition truly reflects our students' **talent, dedication, and hard work**, showcasing their remarkable accomplishments in both co-curricular and extra-curricular activities.

The primary goal of this magazine is to spotlight the **innovative projects, cutting-edge research, and robust technical skills** our students have cultivated. We firmly believe that sharing knowledge and experiences is crucial for shaping the future of E**lectrical Engineering and Technology**.

We extend our sincere gratitude to the **Management and our esteemed Principal** for their unwavering support and encouragement, which have been vital to this initiative's success.

We hope this magazine continues to **inspire and inform**, nurturing a strong spirit of collaboration and innovation within the EEE department.

Faculty Editor: Mr.Santhoshkumar M, AP/EEE

Student Editors: Vigneshwaran.R, Nisha.R, S. Pradeepa

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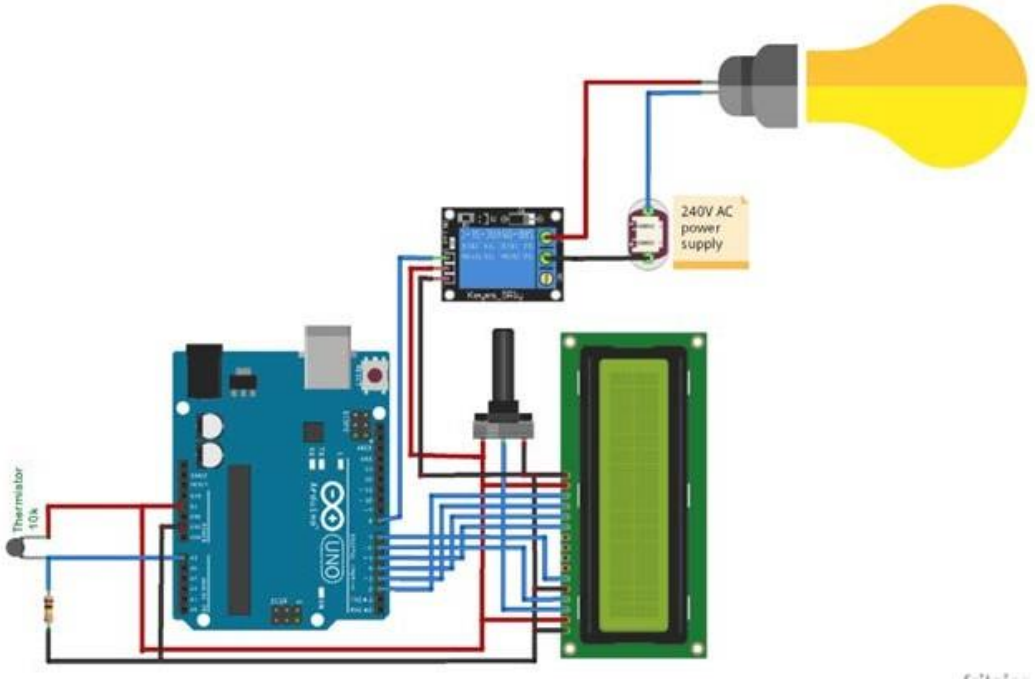
TEMPERATURE CONTROLLED AC HOME APPLIANCES USING ARDUINO AND THERMISTOR

Objective: The main objective of this project is to design and implement an automatic temperature-controlled system for home appliances using an Arduino microcontroller and a thermistor sensor. The system aims to maintain a comfortable room temperature by automatically turning an AC appliance, such as a fan or air conditioner, ON or OFF based on the surrounding temperature. By continuously sensing the temperature and responding without human intervention, the project seeks to enhance energy efficiency, user convenience, and automation in household environments. Additionally, it provides an opportunity to understand the practical application of microcontrollers, sensors, and relay-based control mechanisms in real-world scenarios.

Abstract: This project aims to develop an automatic temperature-controlled system for home appliances using an Arduino microcontroller and a thermistor sensor. The system monitors the surrounding temperature and controls an AC appliance (such as a fan or air conditioner) accordingly. When the room temperature rises above a predefined threshold, the Arduino activates the AC or fan. When the temperature falls below the threshold, it turns the appliance off. This automation helps in maintaining a comfortable environment and conserving energy by minimizing unnecessary power usage.

Block Diagram:



Hardware Requirements:

- Arduino UNO
- Relay (5v)
- 16*2 LCD display
- Light Bulb (CFL)
- NTC thermistor 10k
- Connecting wires
- Resistors (1k and 10k ohms)

• Potentiometer (10k)

Software Requirements: ARDUINO SOFTWARE

Working Principle:

1. When the system is powered ON, the Arduino continuously reads temperature data from the thermistor.

2. The analog value is converted into temperature (in °C) using the appropriate conversion formula. 3. The temperature value is compared to a set threshold.

4. If temperature > threshold → Arduino activates the relay → LIGHT/fan turns ON.

5. If temperature < threshold → Arduino deactivates the relay → LIGHT/fan turns OFF.

6. The cycle repeats continuously, ensuring automatic temperature-based control.

Results:

• The system successfully controls an AC appliance based on the ambient temperature.

• The appliance automatically switches ON when the temperature exceeds the preset limit and switches OFF when it falls below.

• This automation demonstrates efficient energy management and user convenience.

Shobana kamatchi B (III EEE)
S. Periyamma (II EEE)

Temperature Controlled AC Home Appliances using Arduino and Thermistor

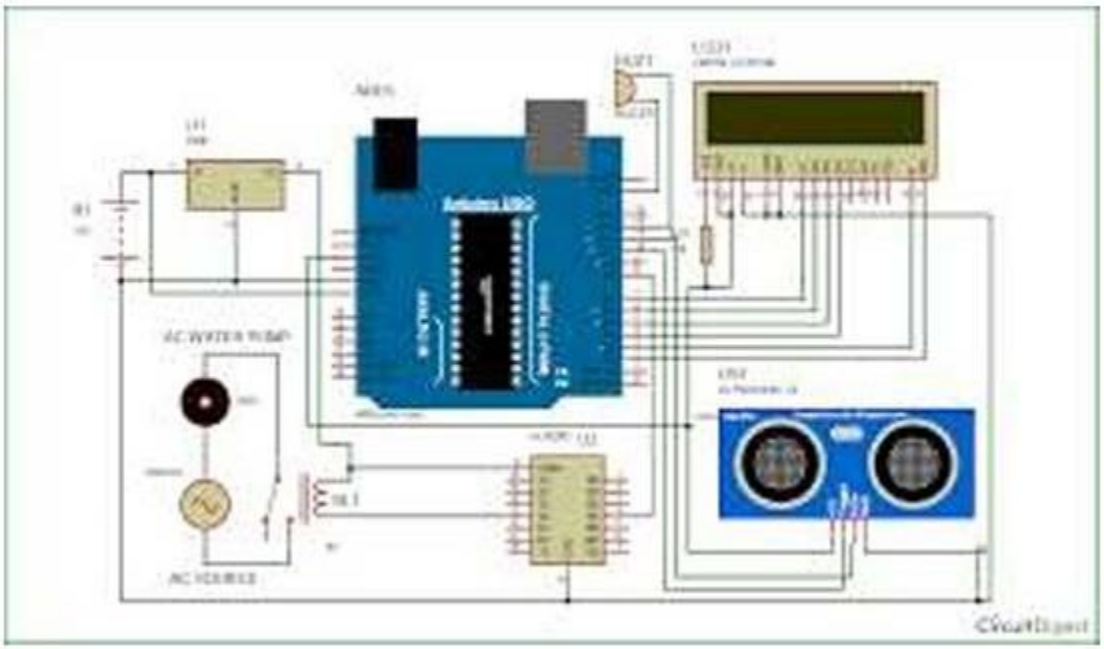
Project guide: Mr.K.Sabareeshwaran, AP(Sl.G)/EEE

SMART WATER LEVEL INDICATOR

Objective: The main objective of the Smart Water Level Indicator project is to automatically monitor and display the water level in a tank using an ultrasonic sensor and an LCD display, while providing real-time alerts through a buzzer and wireless updates via a Bluetooth module. This system aims to prevent water overflow and wastage by accurately measuring the water level using an Arduino microcontroller, ensuring efficient water management and convenient monitoring through a connected mobile device.

Abstract: The Smart Water Level Indicator using Arduino, Bluetooth module, ultrasonic sensor, LCD display, and buzzer is an efficient system designed to monitor and control the water level in a tank automatically. The ultrasonic sensor measures the distance between the water surface and the sensor to determine the current water level. This information is processed by the Arduino microcontroller, which displays the level on the LCD screen in real time. A buzzer alert is triggered when the water reaches a critical high or low level to prevent overflow or dry running. Additionally, the Bluetooth module allows the user to receive water level updates wirelessly on a smartphone. This project promotes smart water management, reduces wastage, and provides a convenient, low-cost solution for both household and industrial applications.

Block Diagram / System Overview



Hardware Requirements

- Arduino UNO – Acts as the main controller to process data from the sensor.
- Ultrasonic Sensor (HC-SR04) – Measures the distance (water level) in the tank.
- Bluetooth Module (HC-05 or HC-06) – Enables wireless communication with a smartphone.
- 16x2 LCD Display – Displays the current water level in percentage or centimeters.
- Buzzer – Provides an audible alert when the water level is too low or too high.

- Resistors and Jumper Wires – For connections between components.
- Breadboard – For circuit prototyping.
- Power Supply (5V or USB) – To power the Arduino and connected components.

Software Requirements

Arduino IDE – To write, compile, and upload the program to Arduino.
Arduino Libraries –

- LiquidCrystal.h or LiquidCrystal_I2C.h for LCD display
- SoftwareSerial.h for Bluetooth communication

Bluetooth Terminal App (on Smartphone) – To receive water level updates from Arduino.
USB Driver for Arduino – To establish a connection between Arduino and computer.

Working Principle / Methodology :The Smart Water Level Indicator works by using an ultrasonic sensor to measure the distance between the sensor and the water surface. The Arduino calculates the water level based on this distance and displays it on the LCD screen. When the tank becomes full or empty, a buzzer gives an alert. The Bluetooth module sends the water level information to a smartphone for remote monitoring. This system helps in automatically monitoring and controlling the water level efficiently.

Results and Discussion / Output The Smart Water Level Indicator accurately measures the water level using an ultrasonic sensor and displays it on the LCD. The data is also sent to a smartphone through Bluetooth. When the tank becomes full or empty, the buzzer gives an alert. The system works efficiently, providing quick and reliable water level monitoring with less manual effort.

T Atharsan(III EEE)
S. Hariharan(II EEE)
Smart Water Level Indicator
Project guide: Mrs.M.G.Balambigai, AP/EEE

ALCOHOL DETECTION SENSOR AND AUTO CUTOFF ENGINE

Objective:

Design an alcohol-detection system that continuously monitors driver breath alcohol concentration using a reliable sensor.

Automatically cut off engine ignition when alcohol levels exceed a preset/legal threshold to prevent impaired driving

Provide immediate visual and audible alerts and a secure, limited manual override for emergency situations.

Implement a low-power, robust, cost-effective design suitable for on-board vehicle integration and user safety.

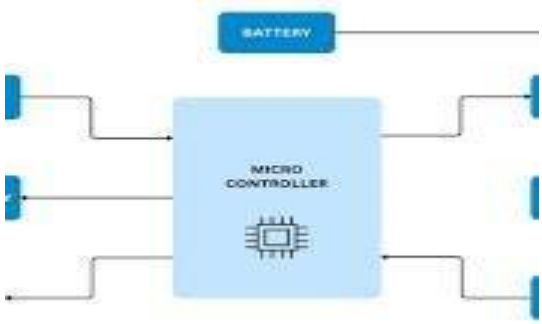
Abstract:

The **Alcohol Detection and Auto Engine Cutoff System** aims to enhance road safety by preventing drunk driving. The system uses an alcohol sensor to detect the presence of alcohol in the driver's breath. If alcohol concentration exceeds the permissible limit, the microcontroller automatically cuts off the vehicle's ignition to stop the engine from starting. This project helps reduce accidents caused by intoxicated driving and promotes responsible vehicle operation.

Block Diagram / System Overview

Power Supply: Vehicle-safe regulated supply (e.g., 12V → 5V/3.3V) with transient protection and backup for safe shutdown

Alcohol Sensor: Breath/volatile organic compound sensor (e.g., MQ-series or electrochemical) that outputs an electrical signal proportional to alcohol concentration.



Hardwar requirements

Core sensing & control

Ignition cut & switching

Power & protection

User interface & safety

Software Requirements

Programming Platform

firmware Dependencies
Functional Software Requirements
Operating System & Tools

Working Principle / Methodology

The system operates based on the detection of alcohol vapors in the driver's breath. The **alcohol sensor (e.g., MQ-3)** senses the concentration of alcohol and converts it into an analog voltage signal. This signal is read by the **microcontroller**, which compares the value with a preset threshold.

If the alcohol level exceeds the safe limit, the **microcontroller activates a relay** to cut off the ignition or fuel supply, preventing the vehicle from starting or running. Simultaneously, **LEDs and a buzzer** alert nearby individuals. If no alcohol is detected, the relay remains in the normal position, allowing the engine to start and operate normally.

This principle ensures that a vehicle cannot be driven by an intoxicated person, thereby promoting road safety and preventing accidents.

Results and Discussion / Output

The system successfully detects the presence of alcohol in the driver's breath and responds accordingly. When the alcohol level exceeds the set threshold, the microcontroller immediately triggers the relay to cut off the engine ignition and activates both visual (LED) and audible (buzzer) alerts. In the absence of alcohol, the engine operates normally. Thus, the project effectively prevents drunk driving and enhances vehicle safety by ensuring that only a sober driver can start or operate the vehicle.

Sri Harini S (III EEE)
G. Rama Sree**(II EEE)**
Alcohol Detection Sensor and Auto Cutoff Engine
Project guide: Mr.K.Sabareeshwaran, AP (Sl.G)/EEE

SMART BIN USING ARDUINO

Objective:

The objective of this project is to create a Smart Dustbin using Arduino that automatically opens its lid when a person approaches, using an ultrasonic sensor and a servo motor for hygienic and touchless waste disposal

Abstract:

This project aims to design and implement a Smart Dustbin system that functions automatically without the need for physical contact. The setup consists of an Arduino Uno microcontroller, an ultrasonic sensor (HC-SR04), and a servo motor. The ultrasonic sensor continuously monitors the distance in front of the bin. When it detects an object or a person within a predefined range, it sends the data to the Arduino. The Arduino then triggers the servo motor to open the bin lid automatically. After a few seconds, when no object is detected, the lid closes again. This smart mechanism helps promote hygiene, especially in public places, by minimizing direct contact with the dustbin surface. The system is low-cost, energy-efficient, and easy to implement, making it suitable for both domestic and commercial waste management applications.

Hardware Requirements:

1. Arduino UNO

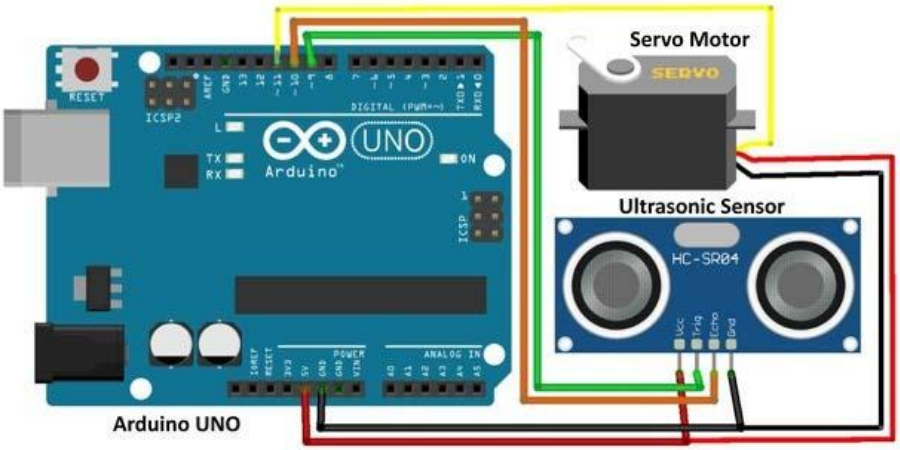
2. Ultrasonic Sensor (HC-SR04)

3. Servo Motor (SG90)

4. Breadboard

5. Jumper Wires

CIRCUIT DIAGRAM:



Working Principle:

The Smart Bin operates using an ultrasonic sensor that detects the distance of an object or a person's hand near the bin. When the sensor identifies an object within a predefined range, it sends a signal to the Arduino UNO. The Arduino then activates the servo motor, which automatically opens the lid of the bin. After a few seconds, once the object is disposed of and the sensor no longer detects any motion, the servo motor closes the lid again. This process ensures hygienic, touchless waste disposal and minimizes the spread
of germs.

Results / Output:

The Smart Bin successfully detects objects using the ultrasonic sensor and automatically opens and closes the lid through the servo motor, providing a fully automated and hygienic waste management solution**.**

R.Asvin kumar (III EEE)
R. Dinesh (II EEE)
Smart Bin Using Arduino
Project guide: Mr.M.Santhoshkumar, AP/EEE

CONTROL HOME LIGHTS WITH TOUCH USING TTP223 TOUCH SENSOR AND ARDUINO UNO

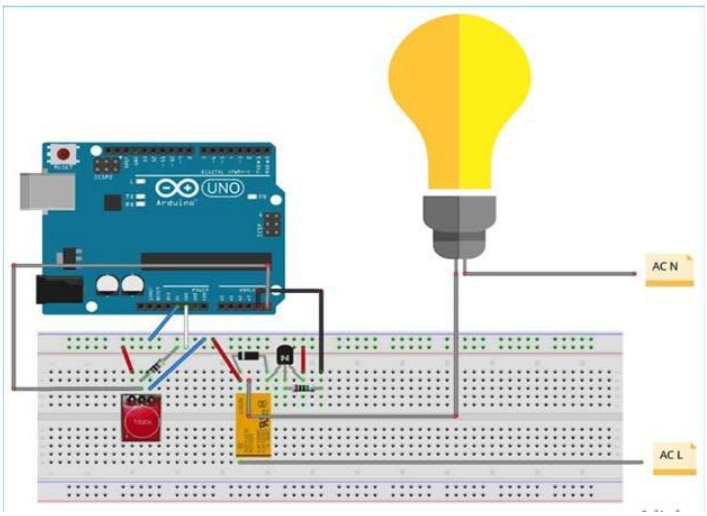
Objective:

The main objective of this project is to design a touch-sensitive control system for home lighting using an Arduino UNO and a TTP223 capacitive touch sensor. This system replaces traditional mechanical switches with a modern touch-based interface, allowing users to control lights effortlessly with a single touch. By using capacitive sensing technology, the project ensures a more durable, reliable, and aesthetic solution that reduces mechanical wear and enhances user convenience. Additionally, it aims to provide an energy-efficient and user-friendly home automation system while offering practical understanding of interfacing and working principles of the TTP223 touch sensor with a microcontroller.

Abstract:

This project presents a simple and efficient method to control home lighting systems using a touch-based interface. The system uses a TTP223 capacitive touch sensor module interfaced with an Arduino UNO to detect touch inputs. When a user touches the sensor surface, the Arduino interprets the signal and toggles the connected light (or any electrical appliance) ON or OFF through a relay module. The touch-based control system enhances convenience, reduces mechanical wear and tear associated with traditional switches, and adds a modern, aesthetic look to the home automation setup.

Block Diagram:



Hardware Requirements:

1. Arduino UNO
2. The USB cable for programming and power
3. Standard Cubic Relay - 5V
4. 2k resistor -1 pc
5. 4.7k resistor - 1 pc
6. BC549B transistor
7. TTP223 Sensor module
8. 1N4007 Diode 9. Light Bulb With Bulb Holder
10. A breadboard
11. A phone charger to connect the Arduino via USB cable.
12. Lots of hook up wires or berg wires.
13. Arduino programming platform.

Software Requirements ARDUINO SOFTWARE Working Principle:

The TTP223 is a capacitive touch sensor that senses the change in capacitance when a human finger comes near or touches its surface.

➢ In the idle state, the sensor output is LOW.

➢ When touched, the output pin of the sensor goes HIGH This output signal is fed to one of the Arduino digital input pins. The Arduino continuously monitors this input.

➢ On detecting a HIGH signal (touch), the Arduino toggles the state of a digital output pin connected to the relay module.

➢ The relay acts as an electronic switch that controls the AC light circuit.

➢ Each touch alternates between turning the light ON and OFF. Thus, the user can control the lighting system by simply touching the sensor pad.

Akash R (III EEE)
Harish (II EEE)

Control Home Lights with Touch using TTP223 Touch Sensor and Arduino UNO

Project guide: Mr.M.Santhoshkumar, AP/EEE

AUTOMATIC PLANT WATERING SYSTEM

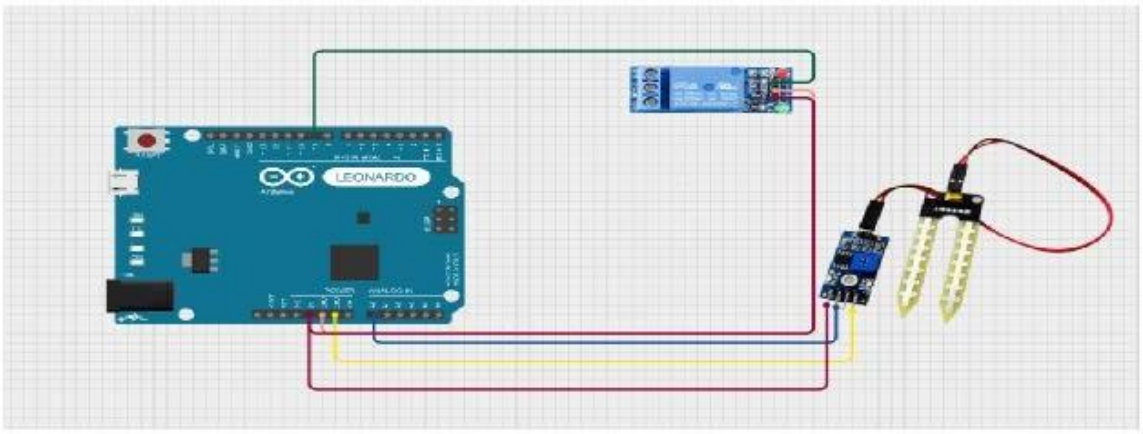
Objective:

The main objective of the Automatic Plant Watering System project is to automatically monitor the soil moisture level using a soil moisture sensor and control the water supply to plants accordingly through a water pump. This system aims to ensure optimal plant growth and prevent water wastage by supplying water only when the soil moisture falls below a predefined level. By using an Arduino microcontroller, the system provides efficient, reliable, and hands-free irrigation, making plant care more convenient and effective without the need for constant human intervention.

Abstract:

The Automatic Plant Watering System using Arduino, soil moisture sensor, relay module, and water pump is an efficient system designed to monitor and control the watering of plants automatically. The soil moisture sensor continuously measures the moisture level of the soil and sends this data to the Arduino microcontroller for processing. Based on the moisture level, the Arduino activates or deactivates the water pump through a relay module to supply the required amount of water to the plants. This system ensures that plants receive water only when needed, preventing overwatering and water wastage. The project promotes efficient irrigation, improves plant health, and provides a convenient, low-cost solution suitable for home gardens, agricultural fields, and greenhouse applications.

Block Diagram / System Overview



Hardware Requirements

Arduino UNO – Acts as the main controller to process data from the soil moisture sensor and control the watering system.
Soil Moisture Sensor – Detects the moisture level of the soil.
Water Pump – Supplies water to the plants when required.
Relay Module – Controls the operation of the water pump using the Arduino.
Power Supply – Provides necessary power to the Arduino and other components.
Jumper Wires – Used to connect the components together.
Water Pipe – Delivers water from the pump to the plants.

Software Requirements

Arduino Libraries –

LiquidCrystal.h or LiquidCrystal_I2C.h for LCD display

SoftwareSerial.h for Bluetooth communication

Bluetooth Terminal App (on Smartphone) – To receive water level updates from Arduino.

USB Driver for Arduino – To establish a connection between Arduino and computer.

Working Principle / Methodology:

The Automatic Plant Watering System works by using a soil moisture sensor to measure the moisture level of the soil. The sensor sends this data to the Arduino microcontroller, which compares the moisture value with a predefined threshold level. When the soil becomes dry, the Arduino activates the relay module to turn ON the water pump and supply water to the plants. Once the soil reaches the required moisture level, the Arduino turns OFF the water pump automatically. This system helps in efficiently monitoring and controlling plant watering without human intervention.

Results and Discussion / Output:

The Automatic Plant Watering System accurately monitors the soil moisture level using a soil moisture sensor and supplies water to the plants when required. The water pump turns ON automatically when the soil is dry and turns OFF once the desired moisture level is reached. The system works efficiently and reliably, ensuring proper watering of plants while reducing water wastage. This automatic operation minimizes manual effort and helps maintain healthy plant growth.

R .Nisha (III EEE)
K. Hajira(II EEE)

Automatic Plant Watering System

Project guide: Mrs.G.Balambigai, AP/EEE

GAS LEAKAGE DETECTOR USING ARDUINO

Objective:

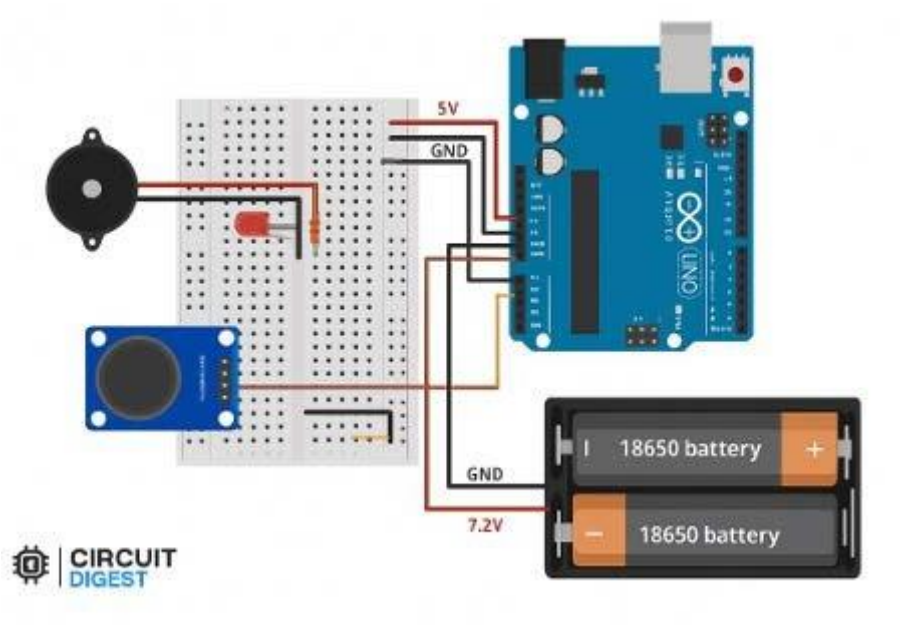
The objective of this project is to design a smart system using Arduino that integrates a gas sensor, buzzer, LED, and Bluetooth module to detect harmful gases and send real-time alerts to a connected mobile device for safety monitoring.

Abstract:

This project focuses on developing a smart gas leakage detection and alert system using an Arduino Uno microcontroller. The system continuously monitors the presence of flammable or toxic gases in the surrounding environment through a gas sensor. When the concentration of gas exceeds a predefined threshold, the sensor sends a signal to the Arduino, which immediately activates a buzzer and an LED to provide audible and visual warnings. Additionally, a Bluetooth module is integrated into the circuit to transmit real-time alert messages to a connected smartphone, allowing users to take quick preventive action even when they are not near the system. The setup is powered by a 7.2V battery, ensuring portability and continuous operation. This low cost, efficient, and user-friendly design is suitable for both domestic and industrial safety applications. By detecting gas leaks early, the system helps prevent fire hazards, property damage, and health risks. Furthermore, it can be easily upgraded by incorporating additional sensors for smoke, temperature, or flame detection, making it a versatile and reliable safety solution.

Hardware Requirements:

1. ARDUINO
2. MQ Gas Sensor (e.g., MQ-2 or MQ-135)
3. Buzzer
4. LED
5. Bluetooth Module (HC-05 / HC-06)
6. Resistors
7. Breadboard 8. BUZZER



Software Requirements: ARDUINO Software

Working Principle:

The smart gas leakage detection and alert system operates based on the sensing and communication capabilities of the Arduino Uno and its connected modules. The gas sensor (MQ series) continuously monitors the surrounding air for the presence of harmful gases such as LPG, methane, or carbon monoxide. When the gas concentration exceeds a safe threshold, the sensor output voltage changes, which is detected by the Arduino Uno. The microcontroller processes this signal and immediately triggers the buzzer and LED, providing audible and visual alerts to warn nearby individuals. Simultaneously, the Bluetooth module (HC-05) sends an alert notification to a paired smartphone, ensuring the user is informed even when away from the system. The entire setup is powered by two 18650 lithium-ion batteries, supplying stable power to all components. This combination of real-time gas detection, local alerting, and wireless communication ensures fast response and enhances safety in both home and industrial environments.

Results:

The system successfully detects gas leaks and provides instant alerts through a buzzer, LED, and Bluetooth notification. It ensures quick response and enhances safety in both home and industrial environments.

R. Vigneshwaran (III EEE)
R. Suthan(II EEE)
Gas Leakage Detector Using Arduino
Project guide: Mr.M.Santhoshkumar, AP/EEE

Prepared By HoD/EEE