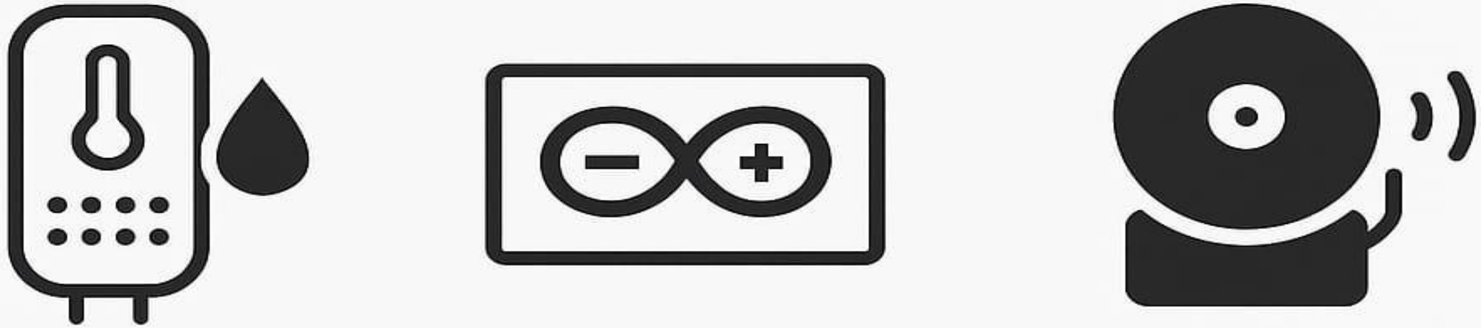
IoT-based Environment Monitorinring, Prevention and Alarming System

Project



Project Based Experimental Learning

Internet of Thing

Batch 1

Utkarsh Tripathi

B.Tech Cse (AI)
7TH semester

Problem Statement

Environment Monitoring

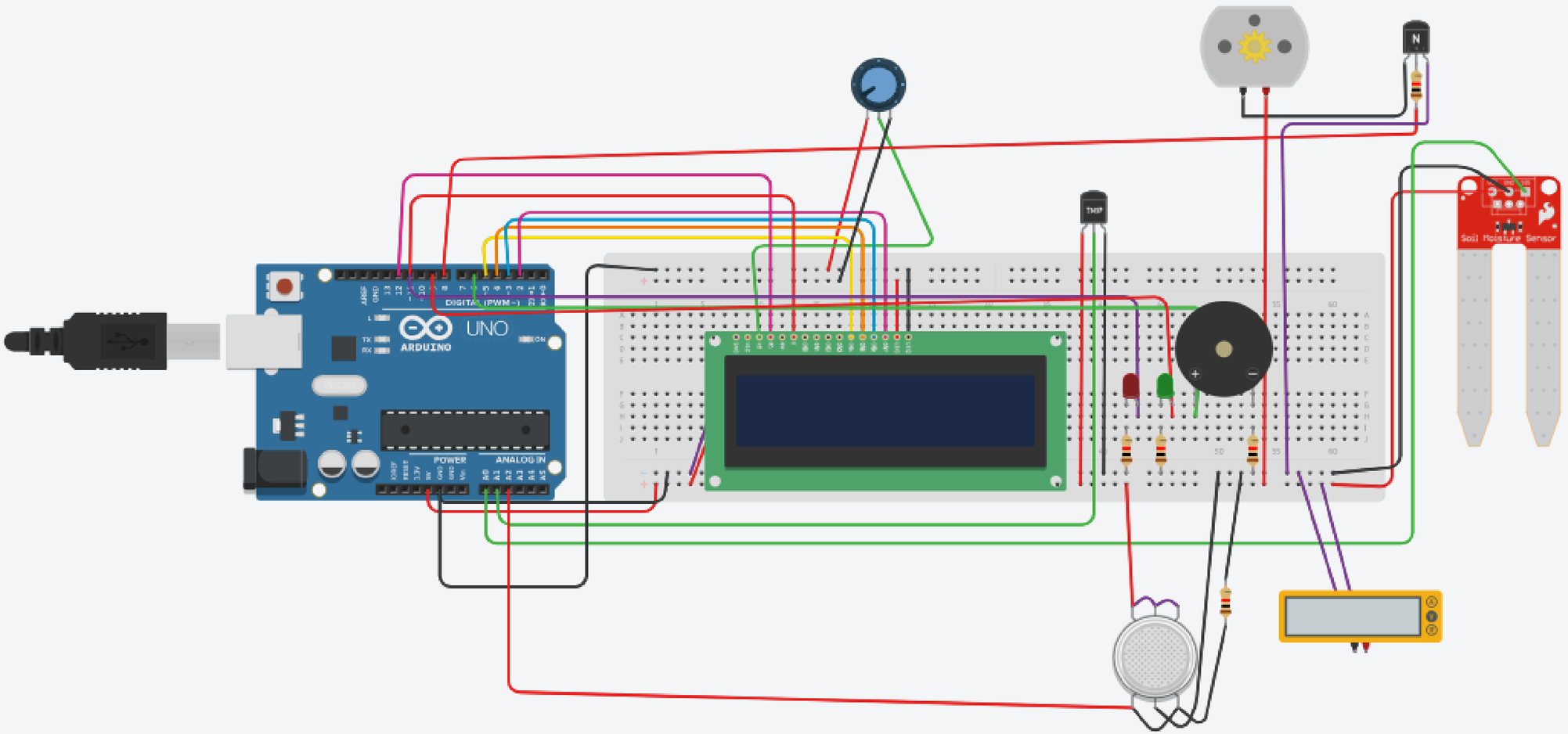
Goal

To design and implement an IoT-based system for environmental monitoring, with real-time prevention and alarming of critical situations such as fire hazards and low soil moisture levels.

Enable early detection and alerting to protect property, crops, and ensure safety

🎯 Hardwares:

- 👩‍🔧 Arduino UNO
- Soil Moisture Sensor
- Temperature Sensor
- Gas Sensor
- Buzzer
- LEDs
- NPN Transistor
- 16*2 LCD Display
- Motor


UNO
ARDUINO
POWER
ANALOG IN
TMP
Soil Moisture Sensor

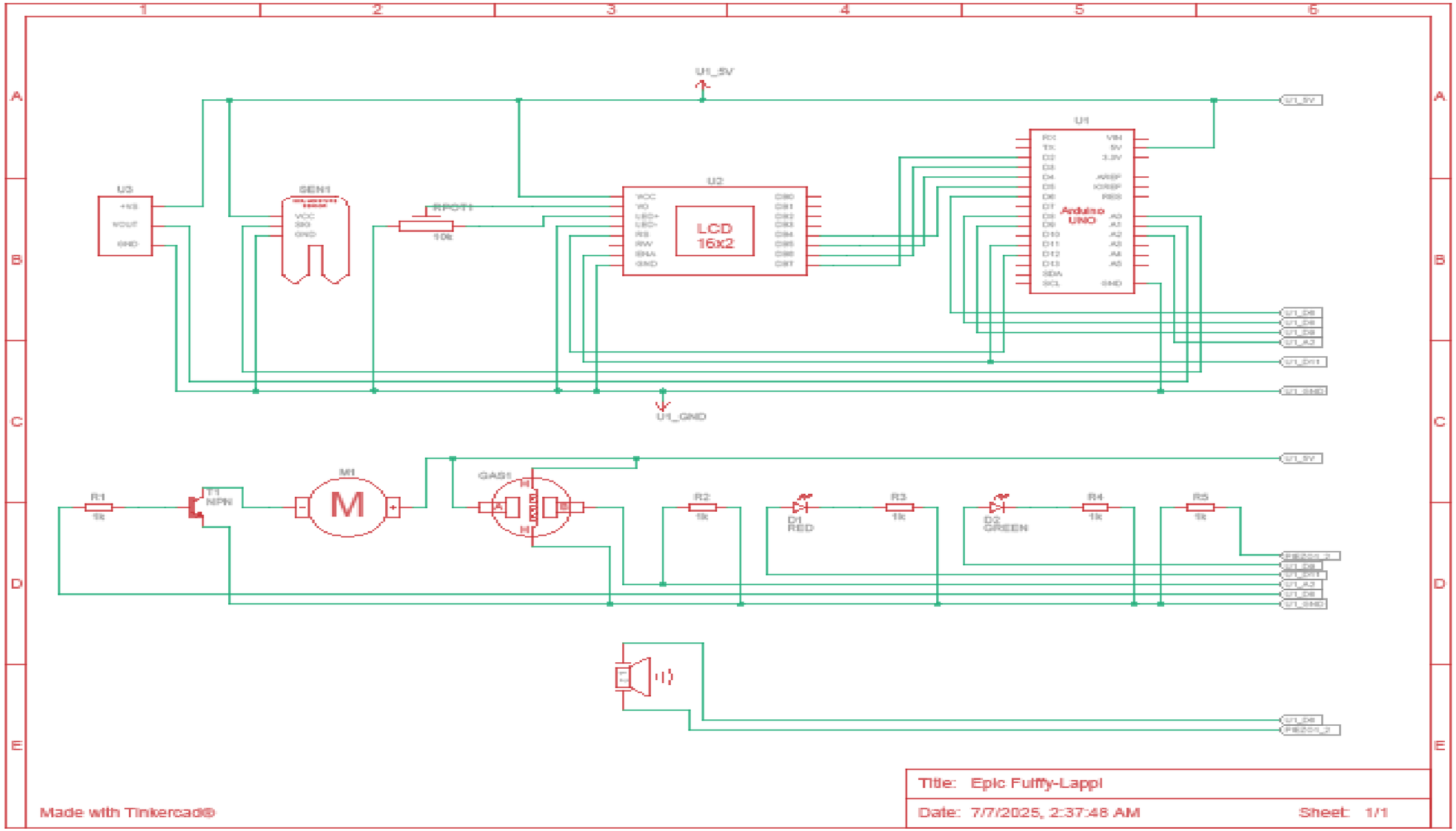
Working Principle

Continuous Monitoring: Sensors collect real-time data on temperature, humidity, soil moisture, and smoke/gas presence.

Data Processing: Arduino processes sensor inputs and checks if readings cross predefined thresholds (e.g., low moisture, high temperature, smoke detected).

Alert & Prevention:If a critical situation is detected (e.g., fire, drought), the system triggers alarms (buzzer, LEDs) and displays warnings on the LCD.

Optionally, actuators like a relay can activate preventive measures (e.g., turn on irrigation, exhaust fan).IoT Connectivity: Data can be transmitted to a cloud server or mobile app for remote monitoring and notifications (if integrated).


1
2
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6
A
B
C
D
E
U1_5V
U1_GND
U3
SEN1
RPOT1
10k
U2
LCD
16x2
U1
Arduino
UNO
M1
GAS1
R1
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RED
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Another Round

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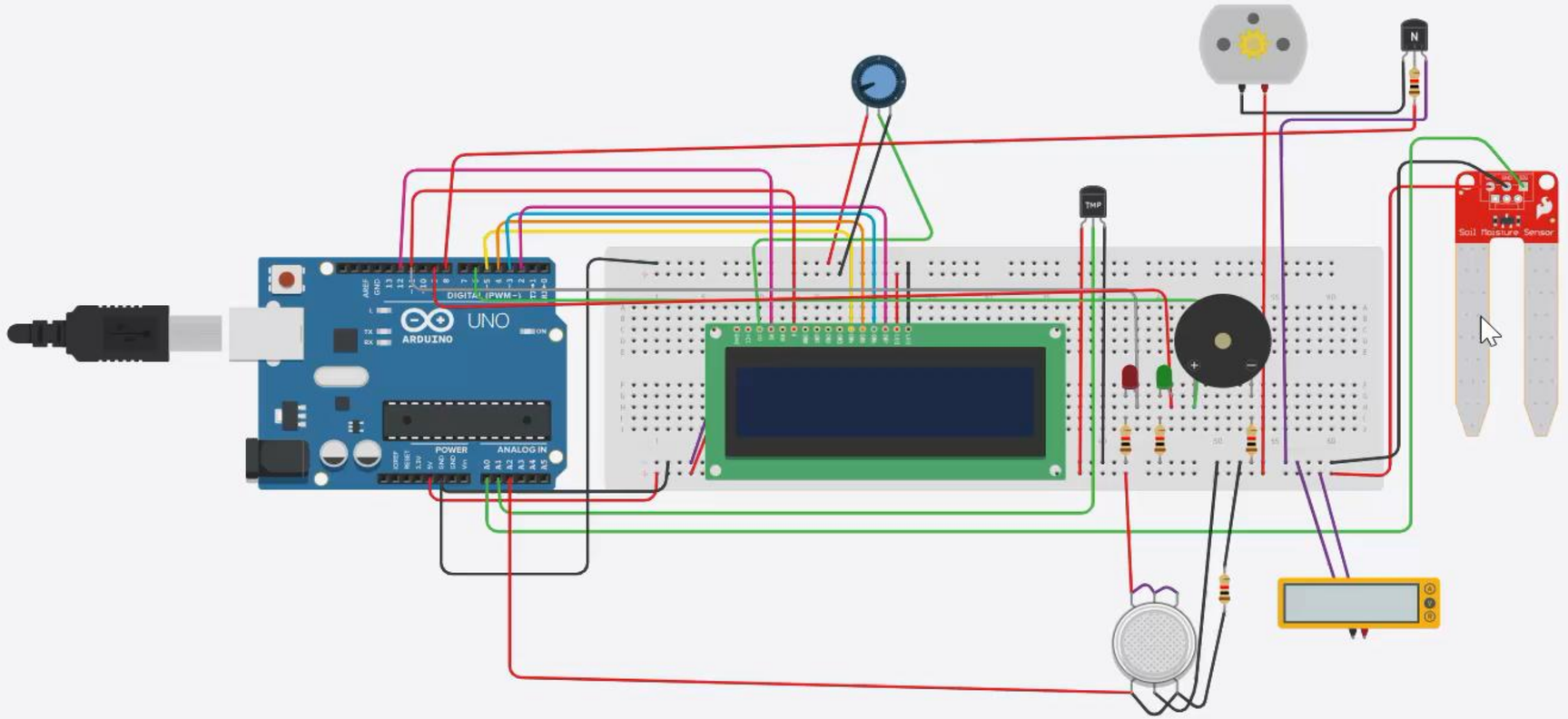
Code | Start Simulation | Send To



Components
Basic

Search

Resistor
LED
Pushbutton
Potentiomet...
Capacitor
Slideswitch
9V Battery
Coin Cell 3V Battery
1.5V Battery

🧪 Benefits

Real-Time Monitoring: Immediate detection of hazardous conditions.

Early Warning: Quick alerts help prevent damage and loss.
Resource Optimization: Automated irrigation based on soil moisture saves water and energy.

Remote Access: IoT connectivity enables monitoring from anywhere (if cloud/app integration is added).Data Logging: Historical data helps in analysis and decision-making.

Advantages and Disadvantages

Advantages	Disadvantages
Real-time monitoring and alerts [1] [2]	Sensor calibration/accuracy issues [4] [5]
Cost-effective and scalable [1] [2]	Data management complexity [1] [5]
Reduces manual labor and errors [1]	Connectivity limitations in remote areas [1] [5]
Enables predictive analytics [2] [5]	Security and privacy concerns [1] [5]
Improves safety and resource efficiency [1] [3]	Initial setup cost can be high [1]

Practical Implementation

Agriculture: Prevents crop loss by monitoring soil moisture and alerting for irrigation.

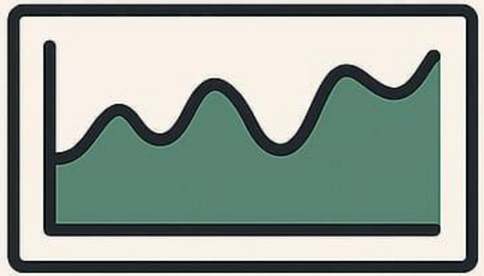
Home/Industry: Early fire detection reduces risk to life and property.

Greenhouses: Maintains optimal conditions for plant growth.

Smart Cities: Can be scaled for environmental monitoring in urban areas.

SMART FARMING

WITH IoT SENSORS IN FIELDS



ALRT SYSTEM

Challenges

Sensor Calibration: Sensors may drift over time, affecting accuracy.

Data Management: Large volumes of data require efficient storage and analysis.

Connectivity Issues: Remote locations may face network problems, impacting real-time alerts.

Power Supply: Continuous operation needs reliable power, especially in remote installations.

Security: IoT devices are vulnerable to cyber threats and data breaches.

Conclusion

An IoT-based environment monitoring and alarming system provides a robust solution for early detection and prevention of critical situations like fire and low soil moisture. While the system offers significant benefits in terms of safety, efficiency, and data-driven decision-making, attention must be given to challenges such as sensor calibration, data management, connectivity, and security for successful implementation.

Thank You