SMART IRRIGATION SYSTEM WITH ENVIRONMENTAL MONITORING USING ARDUINO UNO BOARD.

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Aim: The aim of this project is to create an efficient and automated irrigation system that optimally waters plants based on soil moisture content and environmental conditions. The system integrates various sensors, including a DHT11 sensor, a Soil moisture sensor, a water level sensor, an LDR sensor, and an LCD display for real-time feedback.

Figure:
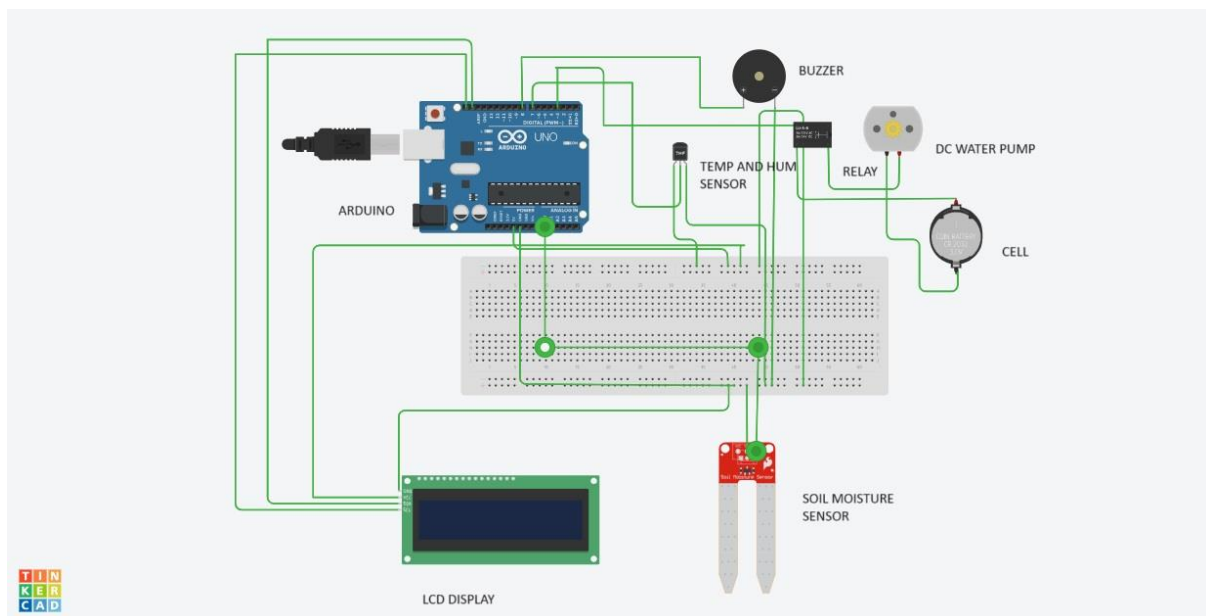
Methodology:

1. **Soil Moisture Monitoring:**

   • Utilize a Soil moisture sensor to measure the moisture content of the soil.

   • Implement a threshold-based system where irrigation is triggered only when soil moisture falls below a predetermined level.

2. **Environmental Monitoring:**

   • Employ a DHT11 sensor to monitor temperature and humidity levels.

   • Integrate an LDR sensor to detect ambient light conditions.

3. **Water Management:**

   • Use a water level sensor to monitor the water level in the tank.

   • Activate an irrigation pump only when the soil moisture is below the threshold, and there is sufficient water in the tank.

4. **Safety Feature:**

   • Implement a water level buzzer alert when the tank's water level exceeds a specified limit to prevent overflow.

5. **Lighting Control:**

   • Integrate an LDR sensor to control LED lighting based on ambient light conditions.

6. **User Interface:**

   • Display real-time data on an LCD (16 X 2) with an i2c board, showing temperature, humidity, soil moisture, and water tank levels.

7. **Hardware Setup:**

   • Establish connections using a breadboard and Arduino Uno board.

8. **Programming:**

   • Code the system logic using Arduino Uno IDE, ensuring efficient control and coordination among the sensors and actuators.

<u>Conclusion:</u> In conclusion, this project has successfully implemented a Smart Irrigation System with Environmental Monitoring, utilizing a combination of sensors and actuators. The system effectively manages irrigation based on soil moisture, monitors environmental conditions, prevents water overflow with a buzzer alert, and adjusts lighting based on ambient light levels. The user-friendly LCD display provides real-time information, contributing to water conservation and optimal plant care. The project demonstrates the potential for automated systems to enhance agriculture practices through efficient resource utilization.