

CHAPTER 5

PROJECT IMPLEMENTATION

5.1 TITLE: SMART IRRIGATION SYSTEM

5.2 OBJECTIVE

To design a smart irrigation facility for indoor or outdoor plants with manual and auto mode control.

5.3 HARDWARE REQUIREMENT

- Arduino Uno R3
- 16*2 LCD Display
- Moisture Sensor
- HC-05 Bluetooth
- DC Motor and Relay
- switch array
- Regulated Power Supply

5.4 SOFTWARE REQUIREMENT

- Arduino IDE
- Bluetooth application

5.5 BLOCK DIAGRAM

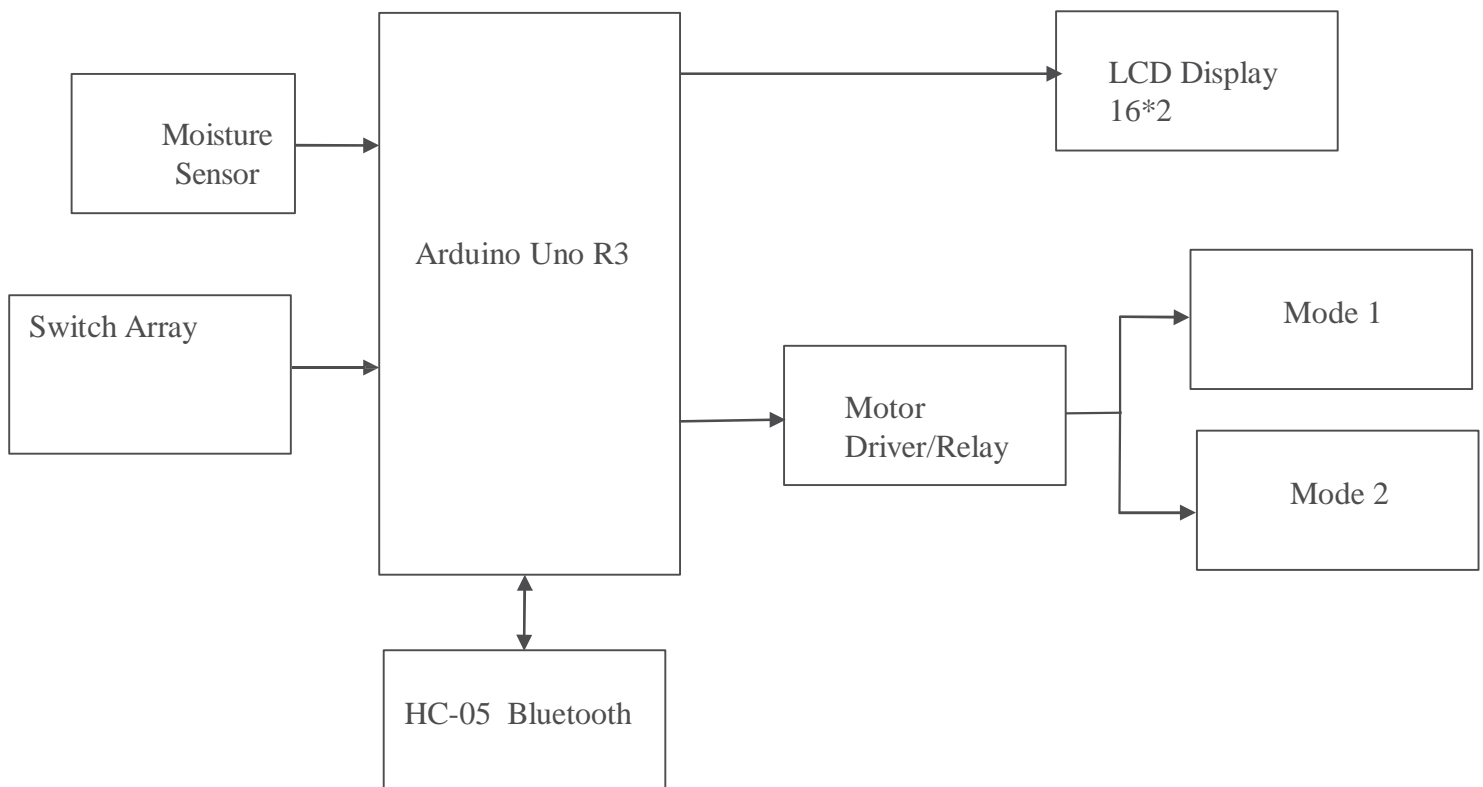


Fig 5.5 Block Diagram of smart irrigation system

5.6 WORKING

- A smart irrigation system integrates multiple components such as a switch for mode selection, a moisture sensor, a relay, and a Bluetooth module to ensure efficient and flexible water management.
- The system operates in two modes: automatic and manual, with the switch allowing the user to toggle between these modes.

- In automatic mode, the system relies on the moisture sensor to monitor soil moisture levels continuously.
- If the sensor detects dry soil, it signals the microcontroller to activate the relay, which turns on the water pump.
- Once the soil reaches the desired moisture level, the sensor informs the microcontroller to deactivate the relay and stop the pump.
- In manual mode, the Bluetooth module is activated, allowing the user to control the system via a smartphone or Bluetooth-enabled device.
- Users can send commands like "\$1" to start the pump or "\$2" to stop it, which are processed by the microcontroller to control the relay.
- The system dynamically adapts to the selected mode based on the switch's position, ensuring seamless operation
- The relay acts as the primary switch to control the water pump, enabling reliable and efficient irrigation.
- The combination of automatic moisture monitoring and manual override ensures user-friendly operation while conserving water and meeting soil requirements.

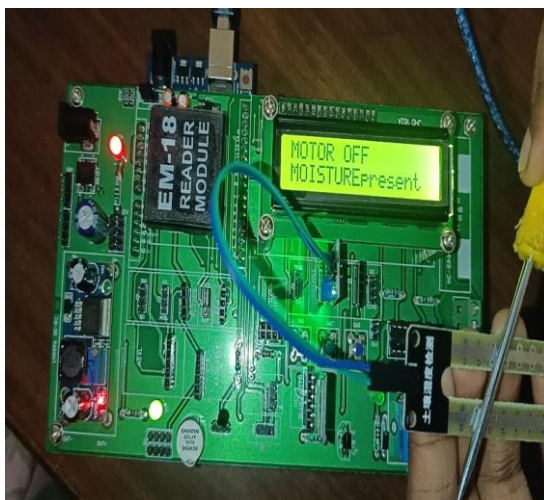
5.7 WORKING MODEL



(a) MODE to Select



(b) Motor is ON when there is no moisture



(c) Motor is OFF when there is moisture



(d) Display in Bluetooth Application

Fig 5.7 Working Model for AUTO MODE

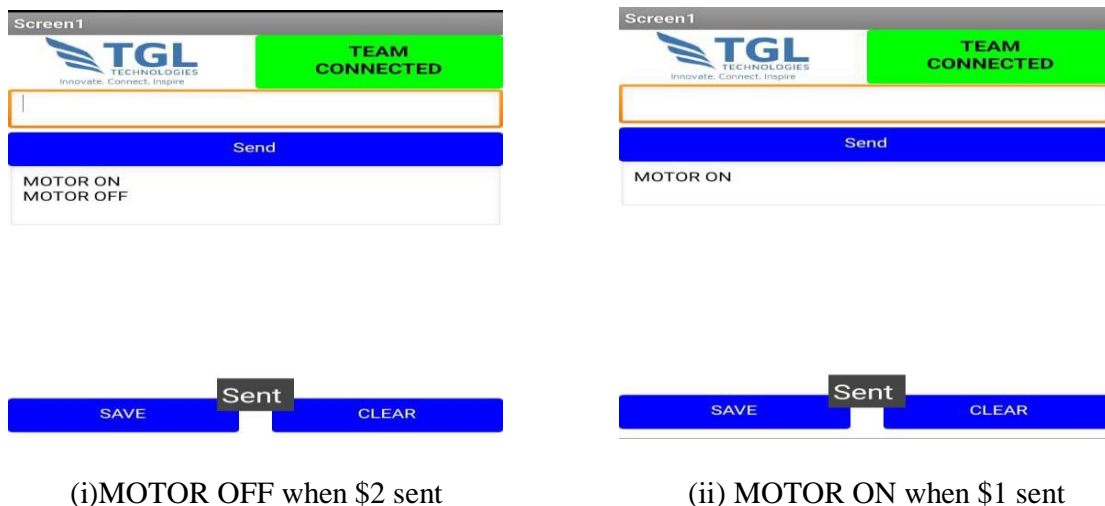


Fig 5.7 Working Model for MANUAL MODE

5.8 APPLICATION

- **Precision Farming:** Tailors irrigation based on soil type, crop needs, and weather conditions.
- **Drought Management:** Provides efficient water usage during periods of limited water availability.
- **Greenhouse Automation:** Controls watering schedules and amounts for optimal growth in controlled environments.
- **Nurseries:** Ensures consistent moisture levels for delicate plants and seedlings.
- **Flower Farms:** Prevents overwatering or underwatering, ensuring quality blooms
- **Rooftop Gardens:** Minimizes manual effort in urban settings by automating irrigation needs