**Plant Monitoring and Protection System (PMPS)**

**Introduction**

The Plant Monitoring and Protection System is designed to provide comprehensive surveillance and environmental monitoring to safeguard plant health. This system integrates various sensors to measure environmental parameters such as temperature, humidity, soil moisture, and ambient light, while also offering motion detection and proximity sensing. These features help ensure optimal conditions for plant growth and security.

**Components and Their Functions**

1. **Main Switch**
   * **It** Controls the power to the entire circuit.
   * Turning off the main switch powers down the entire system.
2. **DHT11 Sensor**
   * **It** Measures temperature and humidity.
3. **RCWL-0516 Motion Sensor**
   * It Detects motion.
   * That is When motion is detected, the LED blinks and the buzzer beeps. This sensor can be turned on or off using a switch.
4. **HC-SR04 Ultrasonic Sensor**
   * **It is** Attached to a servo motor for dynamic surveillance. If an object is detected within a specified range, the LED blinks and the buzzer beeps. Also it Measures distance to an object approaching it.The ultrasonic sensor and servo motor can be controlled using two separate switches.
5. **Soil Moisture Sensor**
   * It Monitors soil moisture levels.
   * If the moisture level drops below a threshold, the LED glows and the buzzer beeps.
6. **LDR (Light Dependent Resistor)**
   * LDR Detects ambient light levels. So it is used to Lights up the environment at night by automatically turning on an LED for visual aid.

**Conclusion**

The Plant Monitoring and Protection System effectively integrates multiple sensors and actuators to provide comprehensive environmental monitoring and security features tailored for plant protection. Its modular design allows for flexibility and adaptation to various plant care scenarios, ensuring optimal growing conditions and security.

**Future Improvements**

* **Wireless Communication:** Adding Wi-Fi or Bluetooth modules for remote monitoring and control.
* **Data Logging:** Implementing storage solutions such as SD cards or cloud-based logging for historical data analysis.
* **User Interface:** Incorporating a display module for local data visualization.
* **Advanced Sensors:** Expanding the system with additional sensors for broader environmental monitoring capabilities.

