

Auto-generated, Generalizable, Remote, Actuation & Sensing of a Process

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- 1) Remotely control a system from a UI by setting the value of “Setpoints”
- 2) Setpoint gets sent over WiFi to IoT Device
- 3) Sensor outputs sent to server, displayed for user

-Balance of depth and breadth:

Breadth Application Areas: **Smart Homes/Home Automation** (remotely monitoring a water heater), **Industry 4.0** (remotely controlling a factory robot through manufacturing facility(Kobuki))

Depth Application Area: **Smart Gardening**

-**Class concepts:** Networking, Sensors and Actuators, I/O, Feedback control

Equipment

-Microcontrollers: ESP8266 for WiFi capability, Arduino Nano for misc. sensors

-Network protocol: MQTT over TCP

-Data format: JSON

-Device ID, Device Type, Array of Data (label and value), Array of Setpoints

Depth Use Case: Smart Gardening

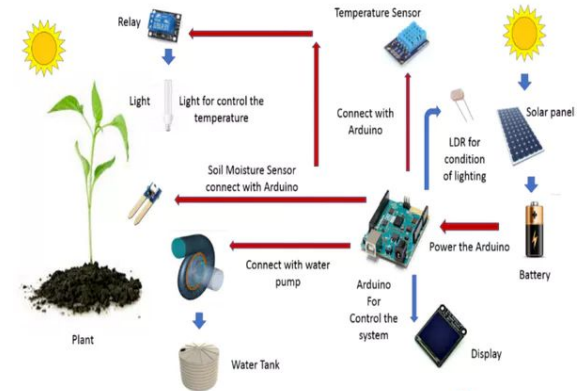
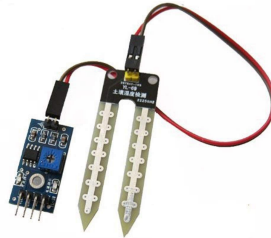
System: Two plants in a greenhouse style enclosure with a grow light, a heater, two water pumps, and various sensors to monitor the plant environment

Sensors:

- light sensor
- temperature
- soil moisture
- water level (in pump)

Actuators:

- grow light
- water pump
- heater



MADE BY KUNBAKU AND SHARAD

Current Progress

- MQTT Broker running on an Amazon EC2 instance
 - Water level sensor built
 - ESP8266 sending sensor data in JSON format to server
 - JSON schema for data out, validator
 - Script to convert JSON to CSV for server
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- Want website interface to control setpoints: no experience, out of scope?
 - Securing access to devices