

Smart Planter

The project and the world

What is this project? What are its features?

- This project is a smart planter system. [1]
- It is a mini version of a smart farming system and a controlled-environment agriculture system.
- The planter has an Arduino Uno, a water pump, and a lighting system built in.
- Using sensors around the planter, the Arduino measures variables of air humidity, air temperature, soil moisture, and water flow rate.
- Using a clock, the Arduino knows time of day.
- With the Arduino, the user can control the range of safe values of soil moisture, air humidity, and air temperature. The user can also control the active hours of lighting operation.
- The Arduino can detect if the variables are out of range and display a warning, water the plant, or ask the user to refill the water reservoir.
- The Arduino can turn the lighting on and off based on the active hours entered.

[1] Build your own smart planter



What were ambitions vs the final result?

- One concept was a mobile app. The user would connect their phone to the Arduino through Wi-Fi, and the Arduino would send the user the conditions in the planter through the app and tell the user to refill the water reservoir.
- The project was originally going to be a “climate in a box”, where the combination of soil moisture, air temperature, air humidity, and lighting could replicate farming environment conditions in other parts of the world.
- A dome would have been added to isolate the planter interior from the outside to retain the specified growing environment.

Relation to smart farming:

- Smart farming is where a farmer uses data generated by Internet of Things technology to increase the quality and quantity of crop yield [2].
- A cycle is created with the use of smart farming technology. Sensors around the farm collect data. Servers process that data, identify problems, and send the data to a farmer who decides what happens next. The cycle repeats.
- Smart farming can make farming more accurate. Data can tell a farmer which one plant or animal needs treatment and which treatment to give them. Additionally, pesticide and fertilizer use can be optimized and applied to a specific area of the farm.
- This project relates to smart farming through generated data. The planter generates data and shows it to the user, who decides what happens next. Although with smart farming, the scale is much more massive.

[2] Learn more about smart farming



What are its practical uses?

- The Arduino takes care of the planter automatically so the user doesn't have to.
- The only maintenance is refilling the reservoir.
- The Arduino can take care of the plant while the user is gone.
- Since the planter uses a light bulb, the plant can receive light in any weather.

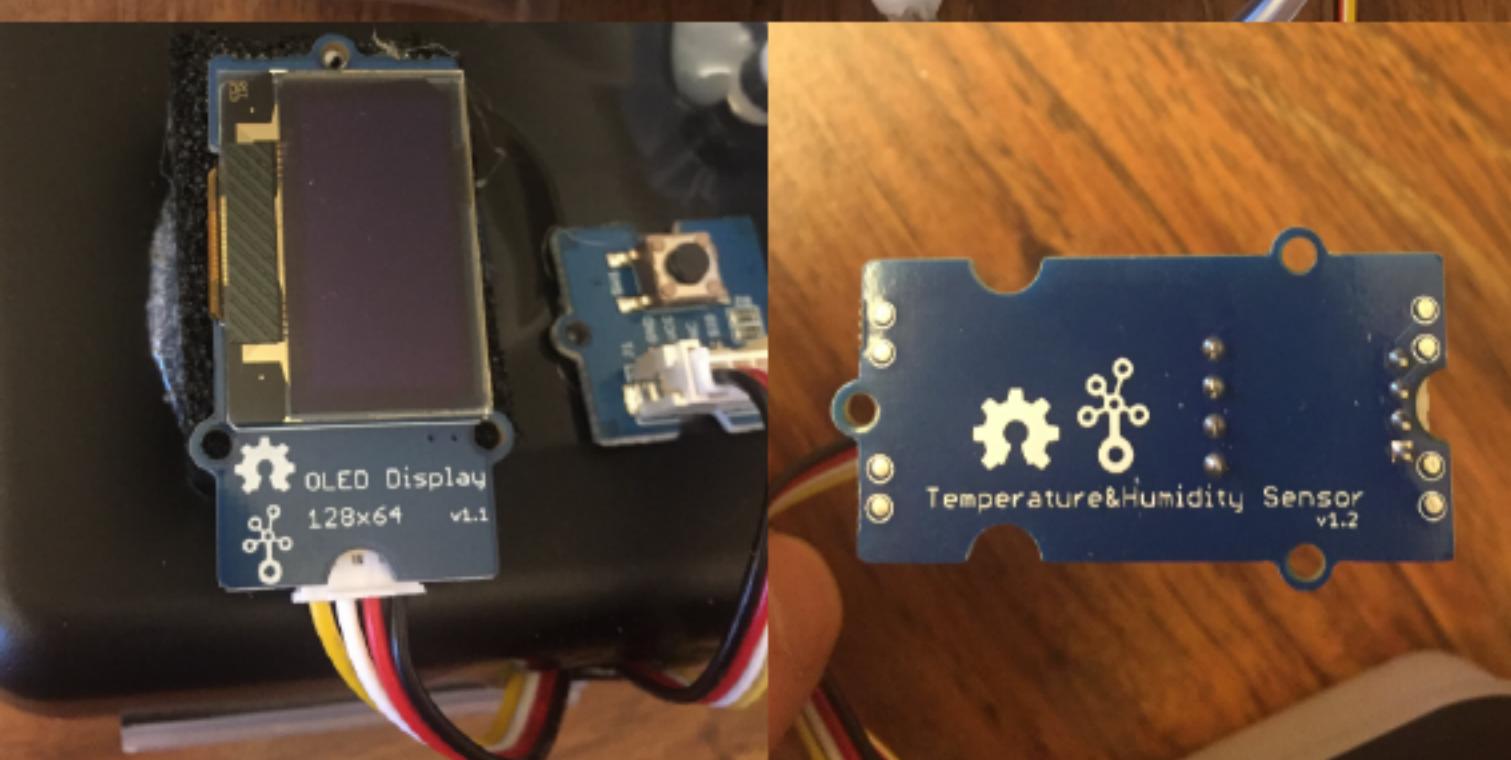
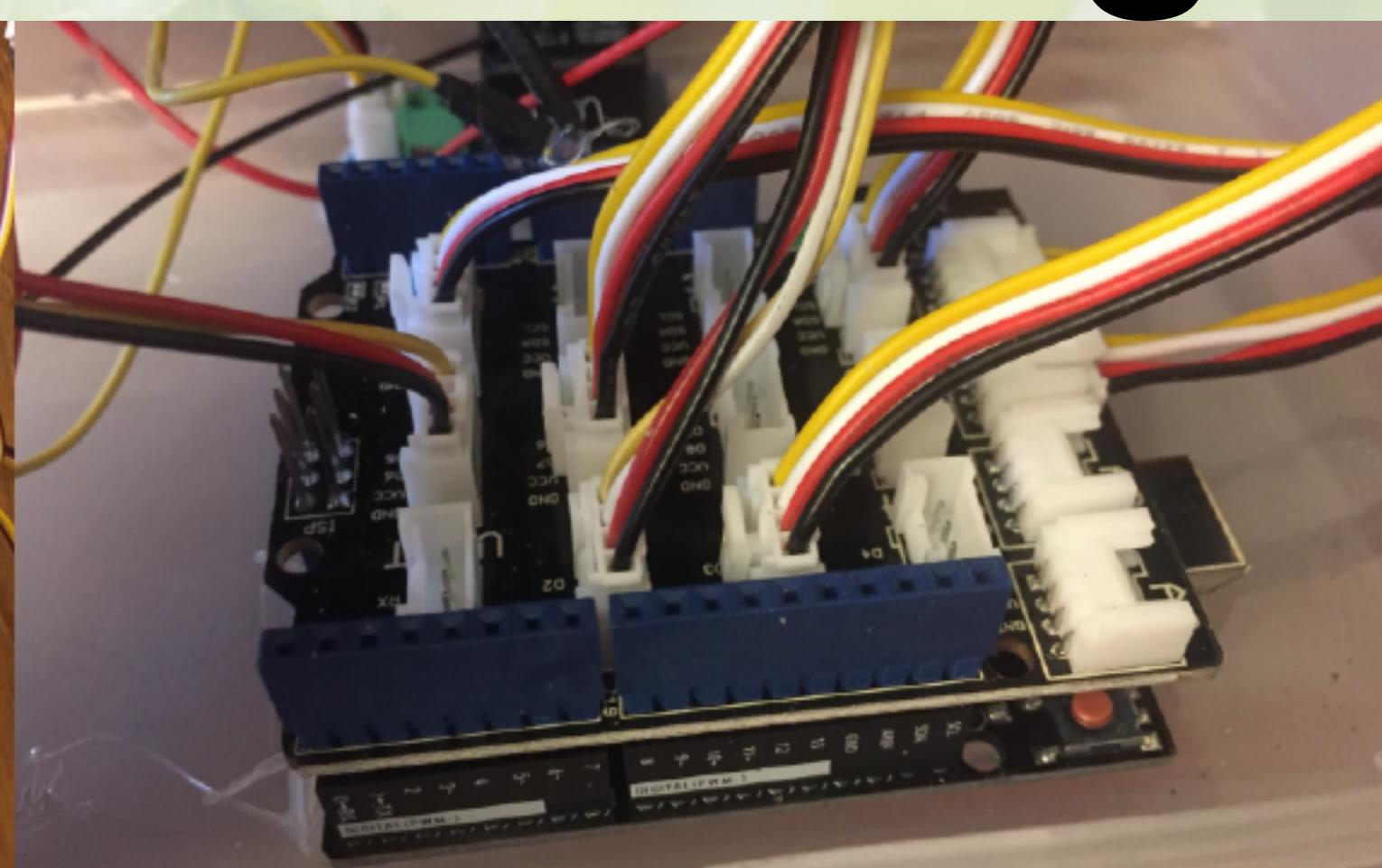
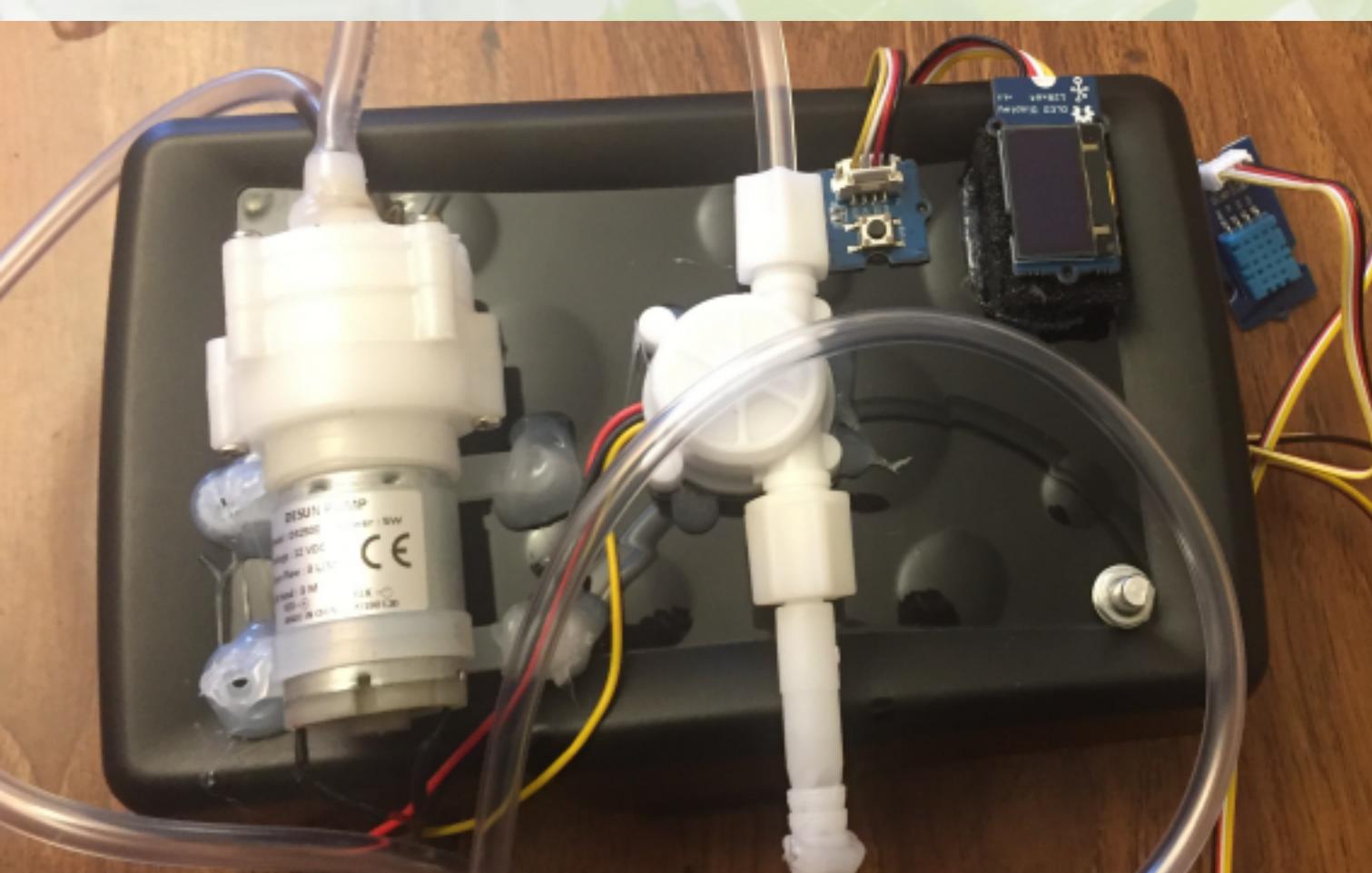
Relation to controlled environment agriculture:

- Controlled-environment agriculture is where plants are grown in an enclosed environment controlled by technology to optimize growing conditions [3].
- Can be done in any enclosed area because outside conditions (weather, pollution, landscape) don't affect inside conditions.
- Technology optimizes growing conditions by controlling temperature, humidity, carbon dioxide, light, nutrient concentration, and nutrient acidity.
- Technology includes sensors which measure the growing environment, machines which regulate the environment, and computers which control the sensors and machines.
- This project is an example of controlled-environment agriculture. Sensors (clock, soil moisture sensor) measure the growing environment, machines (lighting and pump) regulate the environment, and computers (Arduino) control the sensors and machines.

[3] Learn more about controlled-environment agriculture



Build images



Related topics

Most relevant to least relevant:

- Controlled-environment agriculture
- Smart farming
- Automated farming
- Vertical farming/indoor farming

Budget

- Arduino Uno - \$14
- Vinyl tubing - \$7
- Components for circuitry - \$80
- PVC piping - \$10
- Case, glue, and assembly materials - \$10
- Total - \$121