Independent Plant

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BACKGROUND

Many people have the desire to grow plants in their homes and offices. But some people have the tendency to forget to water their plant resulting in the death of the plant. Or, even if the person remembers to water the plant, they may overwater it. And, some homes/ apartments or office spaces don't have access to natural light. This causes many plants to not grow at the same rate as outdoor plants. Our product offers solutions to both of these problems by offering a moisture control feature and a growth light feature.

Figure 1

"You say 'dead.' I say 'low maintenance.'"

PROPOSED SOLUTION

Our proposed solution consists of two features a moisture control feature (Figure 2) and a growth light feature (Figure 3). These features can be set to the consumers desired percentage of moisture and light for their plant. When the product has a set percentage for both features, then the display can be set to stage 3. Stage 3 will display the set moisture percentage, the current moisture percentage, the set light percentage, and the current light percentage. This allows for the consumer to see the results and process of the product solving the problem.

If the current moisture percentage is less than the set amount, then the water pump will turn on. Once, the current moisture percentage is the same as the set moisture, the Arduino Uno will turn off the water pump. If the current light percentage is less than the set amount, then the growth light will turn on. Once, the current light percentage is same as the set amount, the growth light will shut off.

Figure 2
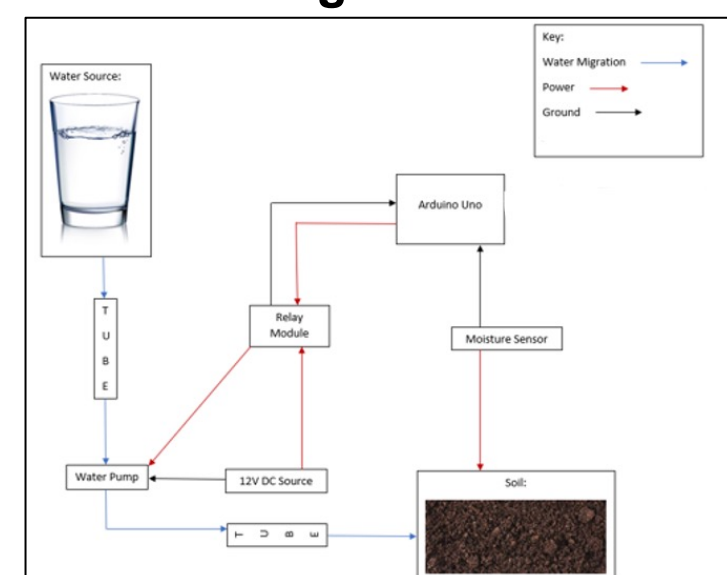
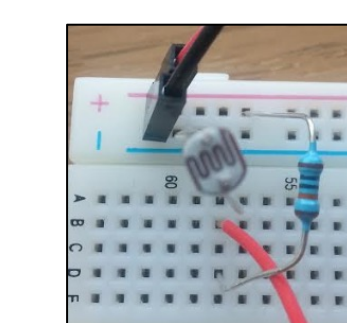**Moisture Control Feature Block Diagram**

Figure 3
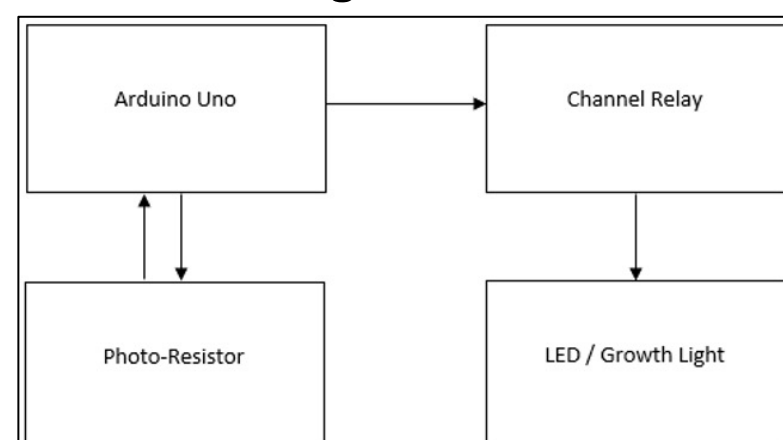
Growth Light Feature Block Diagram

SYSTEM DESIGN

Growth Light -
The growth light we used has a mixture of red and blue LEDs (72 LEDs in total). This light compensates for lack of natural light.

Photoresistor/ LDR -
The LDR works by sensing the amount of light that touches the surface of the sensor and depending on the intensity it will produce a value that will be converted to a percentage based on the max and min.

Channel Relay -
The Channel Relay allows for easy switch control of the growth light and water pump when using our Independent Plant System. The Channel Relay when sent a command of either HIGH or LOW will then either give the device access to voltage or shut off the access to voltage.

Moisture Sensor -
The Moisture Sensor works by measuring the amount of capacitance between the two probes. The value produced by this is then converted into a percentage.

Water Pump -
This water pump requires 12V and moves the water from the water source to the plant being measured.
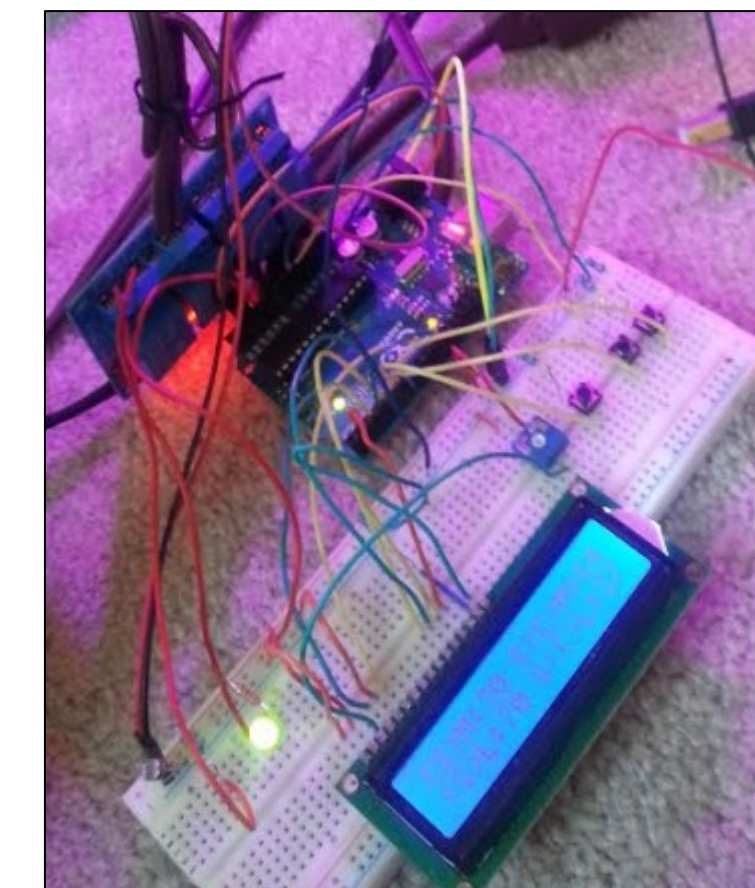

Figures 4-7

Plant Movement/ Growth

Figure 8

Device Board

Arduino Uno Processor -
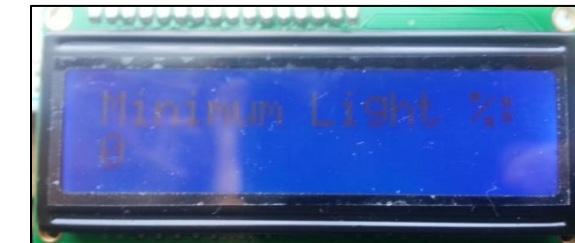Arduino Uno has many open source options and information on programming sensors.

LCD Display & Stages –
The LCD used came with the Arduino Uno Starter Kit. And, it provides a display of two lines with 16 character for each line.
Stage 1 -
Requests users desired water percentage. This can be entered with push buttons Tens & Ones.
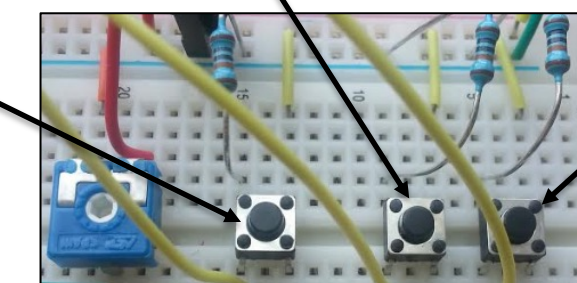
Stage 2 -
Requests users desired light percentage. This can be entered with push buttons Tens & Ones.

Stage 3 -
Displays the set and current percentages. (S)M – set moisture %, (C)M – current moisture %, (S)L – set light %, and (C)L – current light %.

Push Buttons -
Stage Button   Tens Button   Ones Button

Stage Button – Changes the Stages/ Display, Tens Button (only active on stages 1 & 2) – increments the percentage by 10's, Ones Button (only active on stages 1 & 2) – increments the percentage by 1's. Note: the percentage can't go over 99%.

FUTURE DIRECTION

- Packaging – To hold all the components of this project in a desirable way for transportation.
- Smart Phone Application – To offer more diversity/ accessibility involving the settings of this project.
- Add Additional Features – Involving plant disease detection and more.

REFERENCES

Veley, Bradford. Dead Plant Cartoon. Digital image. *www.cartoonstock.com*. N.p., n.d. Web. 13 Nov. 2017.

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CONTACT INFORMATION

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