



SOIL TEST KIT

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BACKGROUND

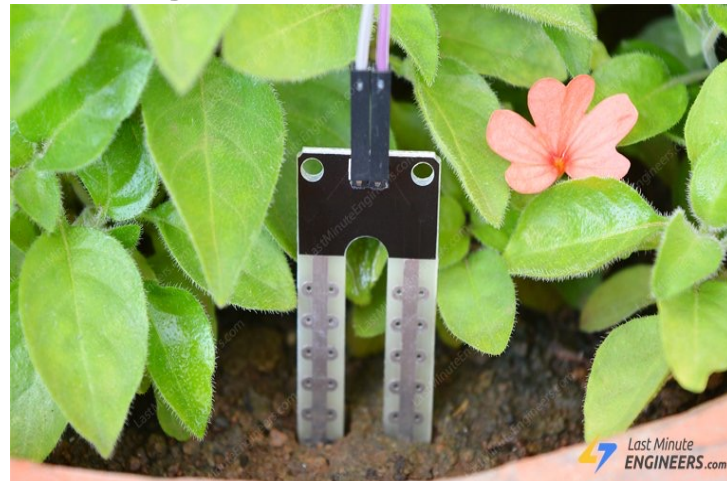
We encountered some issue about plant not growing properly and wanted to do something about it. As we got further, we have found the proper cause of plant not growing properly is soil. Therefore, we decided to create a soil testing kit that can test the soil. Moreover, the soil moisture, Temperature and Ph levels.

Figure 1



Temperature

Figure 2



Moisture

The need to maintain proper soil water content and pH level is a fundamental requirement for plant growers at any scale of production. One of the factors is the balance of nature in unstable or unfertile soil that inhibits plant growth and plant root development. Without suitable soil monitoring systems, soil moisture and pH can shift to unfavorable values, resulting in eventual deterioration of plant health.

Our goal is to create a soil test kit while using the temperature sensor, soil moisture sensor, Bluetooth module and Ph sensor integrated to the Arduino Uno Mega 2560 microcontroller. The system block diagram attached below shows the relationship between each critical components of the soil test kit.



PROPOSED SOLUTION

Our proposed solution (Figure 3) consists of four components: (1) the soil moisture device (Figure 5), (2) the Ph level test kit(Figure 6), App (figure 8) and (3) the Temperature Sensors.(figure 7). All four components work together to provide reliable data information needed by any individuals. All of these devices will give the data by either the app or the manual test kits by it sel.

Figure 3



SYSTEM DESIGN

SOIL TEST KIT
Soil kit is a low- cost option hat allows the way of getting the moisture, temperature, and PH level of the soil at very low power.

Power Management
Response teams have easiest access to 9V batteries.¹ To extend the life of the device, the wireless transmission is activated only when transmitting, extending longer battery life

LED DISPLAY
The kit is attached to a led display where it will display the data for the Temperature, Ph, and moisture

Soil Moisture kit
This device is being linked to the Arduino in a unique way where it enable users to get the moisture of the soil by using the meter stick.

PH Level Test Kit
The PH sensors allows each users to get the PH levels of the soil by putting the tube in the soil

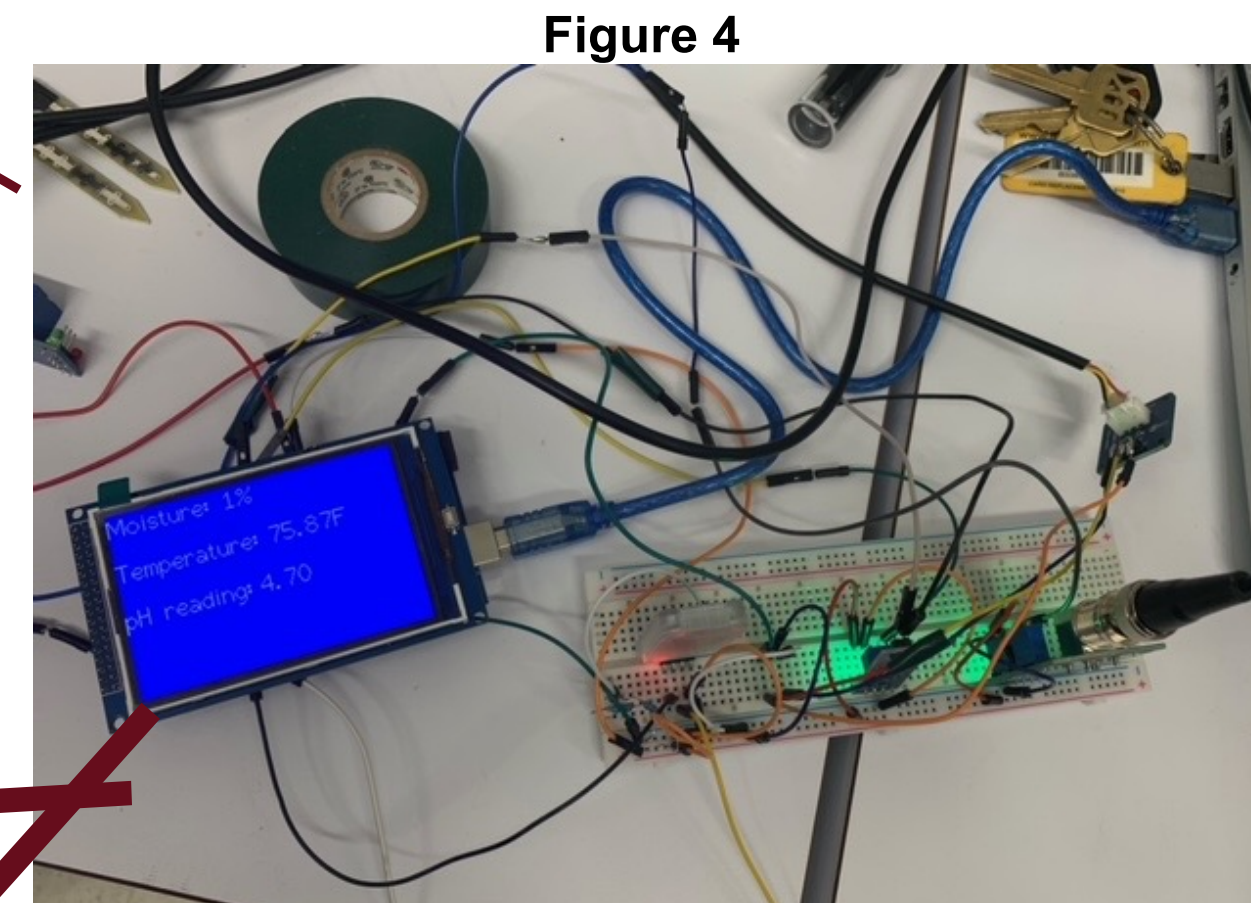
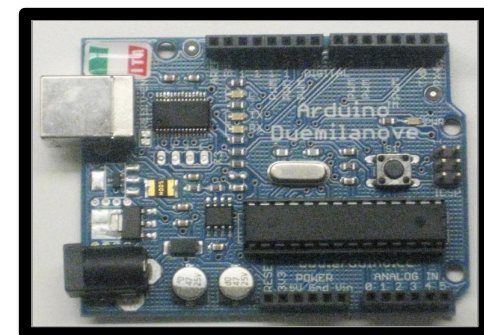


Figure 4

Arduino Processor
Arduino provides a flexible source hardware configuration. Its open software and widespread availability are additional advantages for a system operating on a large scale.



Temperature Sensor
This sensor will allow the user to get the temperature of the soil. Users will be able to get the temperature either in Celsius or in prehnite.

Soil testing Devices

Figure 5

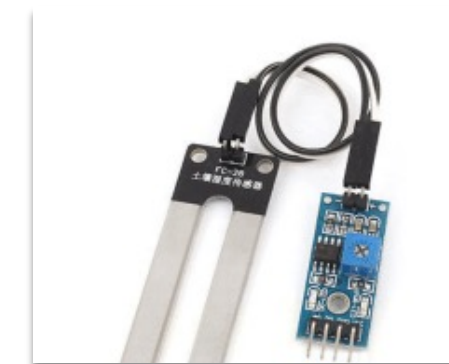


Figure 7

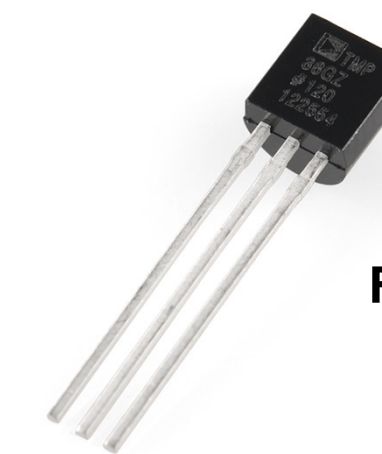
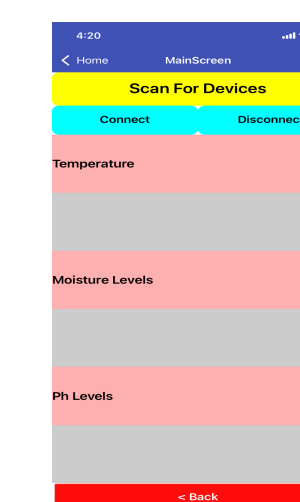


Figure 6



Figure 8



APP
Any users will be able to use the app that we build to get the corresponding data. The app always user to search for the Bluetooth he/she is using. Once connected, he/she will be able to get corresponding data.

Data
Collecting or gathering the data is easy. Users will be able to get data either from the app or from the LED display.

FUTURE DIRECTION

- Wi-Fi connectivity
- Reads and provide the data everyday using the app
- All in one sensors
- Reduced size

ACKNOWLEDGEMENTS

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REFERENCES

- *Temperature sensor types for temperature measurement*
- *Measure soil nutrient using Arduino & soil NPK sensor*
- *Arduino ph sensor for Soil*

CONTACT INFORMATION

Feel free to contact us at student1@mnsu.edu, student2@mnsu.edu and student2@mnsu.edu with any questions or comments.