1. **Introduction**

Have you ever gotten so busy that you forget to water your plants only to notice them dead a few days or weeks later? Not anymore! Smart Garden monitors your plants and sends critical alerts to your cell phone so you will never kill another plant again!

1. **Problem Description**

Design a smart garden that detects and displays moisture characteristics needed for a successful garden.

1. **Proposed Solution**

Our proposal is a solar charged device that sticks into a garden or a potted plant. A probe would detect the moisture level of the soil and send that to an app on the user’s cellphone. The user can also be alerted when moisture reaches desired levels that can be set manually by the user, for example, setting levels for sensitive plants like a cactus. As plants are added by the user a database can form for later use. The user can also access a camera to view the garden remotely. The app will also track UV exposure. This whole system will be powered by a solar cell and battery.

1. **Demonstrated Features**
* Moisture Detection
* Solar Charging
* Multi Plant Use (Unique IDs for the tags)
* UV Exposure Tracking
* Garden View (Snapshot of your Garden in-app)
* Communication to an App
* User Alerts at critical levels (Overwatered or Underwatered)
1. **Available Technologies**

**Moisture Sensor**

[Moisture Sensor](http://www.seeedstudio.com/depot/Grove-Moisture-Sensor-p-955.html) - $4.90

**Solar Battery Charger**

TBD ~ $1.95 - $30

**Small Camera**

[Camera](http://www.seeedstudio.com/depot/Grove-Serial-Camera-Kit-p-1608.htm) - $29.90

**Li Battery Charger**

[Li Battery Charger](http://www.browndoggadgets.com/products/lithium-battery-charge-controller) - $8.00

**UV Sensor**

[UV](http://www.seeedstudio.com/depot/Grove-UV-Sensor-p-1540.html) - $9.90

**Battery**

TBD ~ $30

**WiFi Module**

## [WiFi Module](https://www.sparkfun.com/products/13678) - ESP8266 - $6.95

**Overall Cost estimate at this point is under 200$**

1. **Engineering Content**

**Moisture Sensing**

* Interfacing our sensor to WiFi and the computer app
* Turning on and off (power conservation)
* Sending Critical Alerts
* Area that can be measured
* Accuracy of the measurements

**UV Sensor**

* Interfacing sensor to WiFi and app

**Camera**

* Sending photos to the app
* Powering the Camera
* Optimal Camera Placement

**Solar Power**

* How to charge using solar
* Which solar cell to use
* Size of battery needed
* How to monitor the battery level

**WiFi Connection**

* Connecting all the parts together
* Interfacing the information with the computer application
* Using the WiFi in outside application (not a problem for potted plant model)

**Phone App**

* Tracking different types of plants
* Reading the sensor values
* Receiving Alerts
* Receiving Photos
1. **Conclusions**

We think this is a useful IOT project. We believe that while there is a lot of work to be done and a lot of knowledge to be gained this project can be completed by the deadline. We hope to add more features if we get the core product working. Some of these potential additions are integration with sprinkler systems, nutrients sensor, “ready to harvest” detection, and a smart fertilizer dispenser.