Report on Internet of things project

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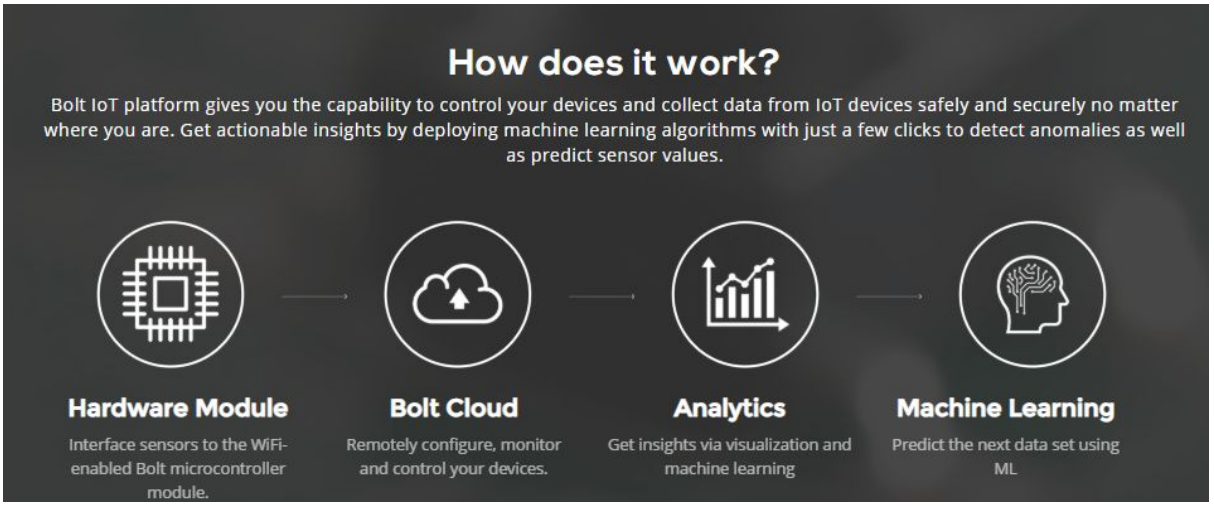
Description of project :

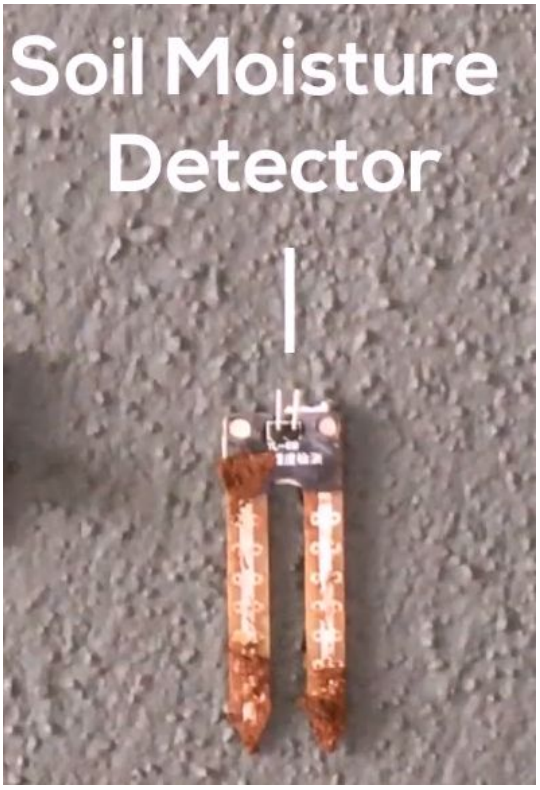
With the development of economy and technology nowadays, we sometimes don’t have enough time to tend our plants due to the quickening pace of life. Also, people with no experience may have a tendency to water plants at a wrong time or not sure about the amount of water they need. Therefore a need of smart & automatic gardener emerges.Our goal is to design a ‘gardener’ as such with soil moisture detection, Sunlight detection.Automatic watering function with smart device control or according to weather report,alarm set etc.

State-of-the-arts:

1.IoT platform and smart clips



An IoT platform enable you to connect the meters mentioned above to your smart device through IoT relay and programmed clips.Take BOLT platform as an example, with suitable hardware module applied offline.IoT projects such as our project can be easily set , collaboratively programmed and even analyzed etc.



2.Soil moisture meter

Soil moisture meters can tell the resistance of the soil then calculate the moisture index.

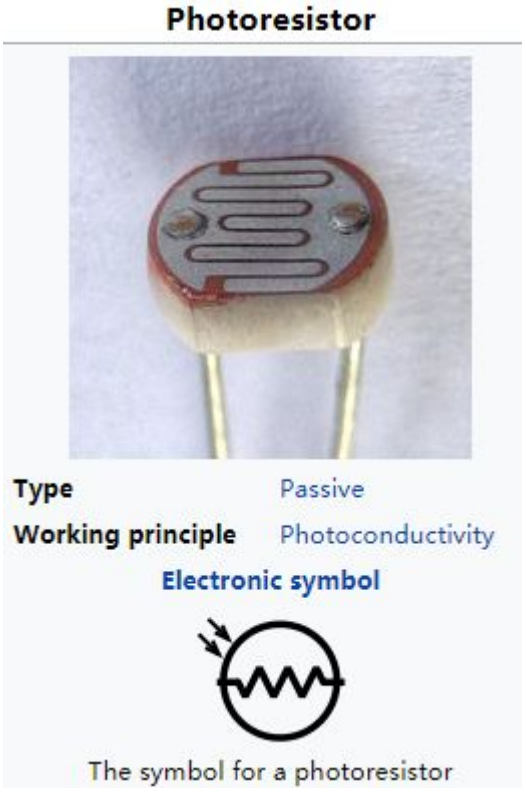
Nowadays moisture meters can be very accurate,A superb moisture meter can be accurate within 0.1% of the moisture content.

Although Lower-grade moisture meters aren't very accurate as numbers are misleading and changing.

3.Photodiode

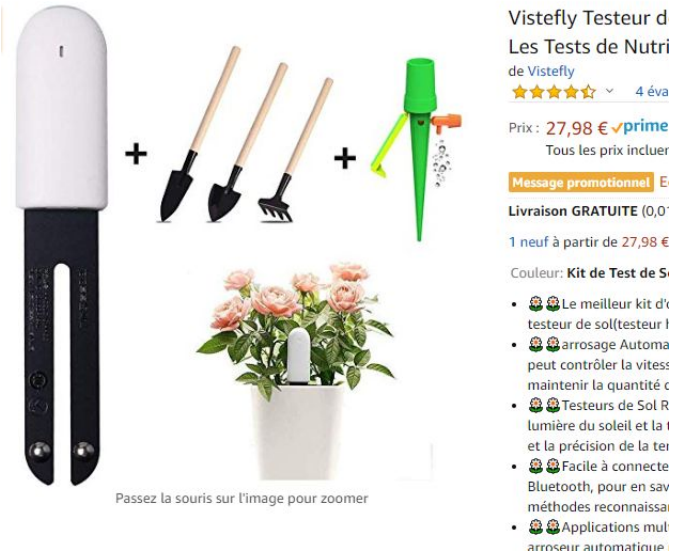
A photodiode is a semiconductor device that converts light into an electrical current. The current is generated when photons are absorbed in the photodiode.

Photo diodes and phototransistors are true semiconductor devices which use light to control the flow of electrons and holes across PN-junctions, while light dependent resistors are passive components, lacking a PN-junction. If the light intensity is kept constant, the resistance may still vary significantly due to temperature changes, so they are sensitive to temperature changes as well. This property makes LDRs unsuitable for precise light intensity measurements.



4. PH meter, alarm etc.

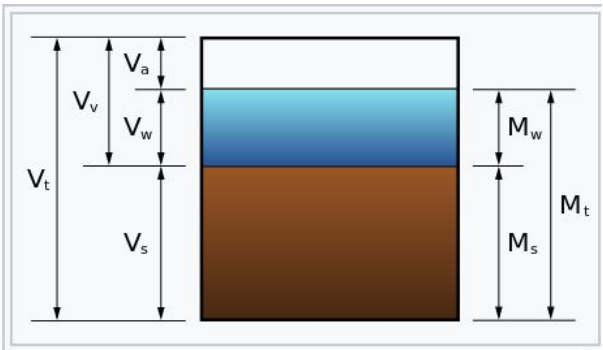
Our advantages



With some of the current apps /smart device checked on the appstore/amazon and ebay. We found that there is not an integrated device or app that combine status detecting , displaying with watering offline.
Take this best-selling soil tester as an example.Regardless of its 28€ price.There exist such drawbacks:
1. The volume of water stored is relatively small.In case of a long-holiday-outing, plants could easily get withered.
2.It doesn't have an smart device application displaying all the status.What if the clients actually want to keep track of the ,for instance, PH or moisture index of the soil?
With all those flaws exposed.Our ideal design is rather competitive in nowadays IoT gear market.

Our project is based on plant growth, so what we first need to know is the specific plant itself, like what kind of family it belongs to, the environment it prefer, the basic information about its growth, etc. Take prickly pear as an example, as the picture shows below, the amount of watering is different in different

seasons. In spring and autumn, it should be watered twice a month, with 100~200 ml each time, while in summer once a week will better because of the evaporation.



Soil composition by **V**olume and **M**ass, by phase: **a**ir, **w**ater, **v**oid (pores filled with water or air), **s**oil, and **t**otal.

In terms of hardware, we manipulate soil moisture meter and photodiode with our application to display the exact data about the growing environment. The regulations of soil moisture and Light intensity are as follows respectively.

$$V_w = \frac{m_w}{\rho_w} = \frac{m_{\text{wet}} - m_{\text{dry}}}{\rho_w}$$

When the luminous flux obtained on an area of 1 square meter is 1 lumen, its illuminance is 1 lux. The illumination for reading and sewing is about 500 lux.

Norms & Regulations

On norms and regulations, for the fact that we ask for users' location for weather forecast , Privacy protocol are required in prevention of users' information leak.Also norms on different detectors and safety requirement on operating circuit are ought to be followed as well.

TIME SCHEDULE

Gantt diagram are displayed above.