

A decorative graphic on the left side of the slide. It features a large, light green circle at the top left, a smaller medium green circle at the top center, and three green leaf shapes arranged in a fan-like pattern below them. The leaves are detailed with visible veins. At the bottom left, there is another light green circle and a small green leaf shape.

Intelligent Hydroponic Farm

Yuval Schaal
Ido Michael
Siao-Ting Wang



Motivation

1. Global food crisis! By 2040 all of our food will run out/will be so expensive so we won't be able to afford it.
2. There's high awareness to healthy organic food without any chemicals and high quality.
3. Gardening hobbies can be more intuitive and simple with our automation and information.



Our Idea

1. Automated farm which changes the plant conditions to optimal conditions.
2. Absolute control over growing conditions with hydro.
3. Connected IOT devices and sensors to allow remote notifications and control.
4. Application for the users to receive notifications alerts and check the status of their farm.



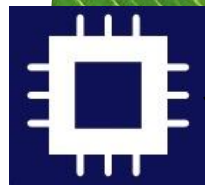
Goals

1. Having a system with sensors to measure a plant's living conditions
2. Observing the system parameters remotely.
3. Controlling the system remotely.
4. Logging history of system parameters for future analysis and automated optimization
5. User can get notifications while system go wrong.

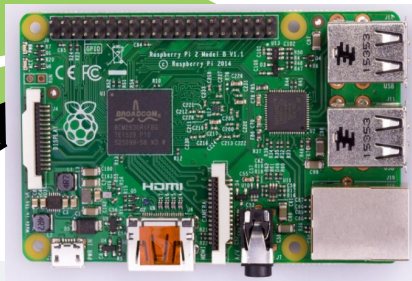


Our system

1. Connected micro-sensors to collect the data.
2. A server to change/control optimal conditions.
Responsible to collect the information to the DB
3. Front-end with user management to present the information, tips, alerts and remote control.
4. Back-end provides REST API and DB management.



Block Diagram



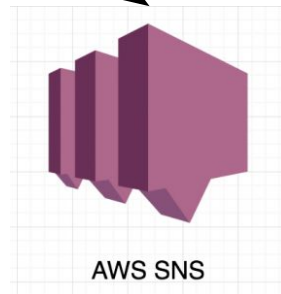
Raspberry Pi



SQLITE DATABASE



Amazon EC2



AWS SNS



Challenges

1. Both PH and light sensor were analog. The pi does not have analog inputs, so ADC had to be used.
2. Different unit measurement & scaling.
3. Pi and EC2 were on different networks and needed a way to communicate.
4. Not familiar with Django but use it to build a back-end and front-end system.



Demo

1. Data being updated to frontend.
2. Live stream of the farm.
3. Collecting the data points and history.
4. Controlling ph and water levels.



References

- Control of PH and nutrients in hydroponics:
<https://www.sciencedirect.com/science/article/pii/S0168169912000361>
- Ion electrodes to change nutrients through IOT
<https://www.sciencedirect.com/science/article/pii/S0168169913000264>
- A company that sells similar kits which is over priced:
<https://cloudponics.com/>
- An automated farm built with arduino:
<http://www.instructables.com/id/Hyduino-Automated-Hydroponics-with-an-Arduino/>

Thanks!

ANY QUESTIONS?

You can find us at
[im2492/ys3055/sw3092](#)
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