

# iPlant: Automatic Plant System

## SPCL-2012 - Project Proposal

**Jesper Sandberg**  
IT University of Copenhagen  
Rued Langgaardsvej Vej 7  
DK-2300 Copenhagen S  
jesan@itu.dk

**Thomas Kokholm**  
IT University of Copenhagen  
Rued Langgaardsvej Vej 7  
DK-2300 Copenhagen S  
tkok@itu.dk

### BACKGROUND AND MOTIVATION

For years we have enjoyed the beauty and benefit of green plants. Yet people often struggle to keep their plants alive and fit. Plants require much attention and regular watering & sunlight. Something that is easily forgotten in daily activities.

However plants are important for a healthy environment while they contribute to clean and natural air with the production of oxygen. They help convert CO<sub>2</sub> gasses and neutralize toxins in the air.[1]

Our automatic plant system: iPlant will help attend plant(s) and provide users with information on temperature, humidity and general air quality near their plant(s). Using iPlant people can engage in having many different plants with absolute minimum effort. Even plants that require much attention like i.e. orchidaceae which are otherwise difficult to keep.[1]

Furthermore users can combine multiple plants and monitor an entire villa or i.e. an office location with plants in different rooms connected to a local WiFi network. This ensure a natural work environment and provide all the information needed accessible from a simple web interface.

### IDEA

The main idea is to create a system that is capable of both watering and illuminate the plant(s). The system should be intelligent and capable of notifying the owner of the plant(s) with status information obtained through sensors placed directly within each plant.

Multiple plants can be connected to a local network using WiFi and monitored from a web interface.

Potting a plant combined with our solution provides the plant with the necessary attention for it to sustain on its own for

longer periods of time, even when located with no access to sunlight. Our solution will automatically water the plant regularly - keeping a fixed level of humidity in the soil.

### SCENARIO

A family leave their home for two weeks of much needed vacation. During their stay, their plants suffers from their absence.

In one room the curtains are close, and prevents the plants from getting sufficient sunlight - they stop growing and begin withering.

In another room plants are over-watered in the hope that they will survive during the absence. They unfortunately drown from the massive watering.

In a third room the family did not water their plants sufficiently and wither from regular exposure to sunlight without moist soil to drain from.

If only there was a system which could attend these plants, then the family would not only continue to have their plants upon return, they wouldn't ever have to worry when leaving home.

### PLAN

- Mockup prototype
- Video prototype
- Alpha prototype
  - Pumping system
  - WiFi communication
  - Solar detection
- Beta prototype
- Charlie prototype

### CURRENT TECHNOLOGIES

- Indoor house plant [3]
- Self Watering Probes [5]
- Methods watering indoor plants while on vacation [6]
- How to make gardening system [2]
- Micro-drip irrigation system [4]

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## PREVIOUS WORKS

- Patent US3758987 [7]
- Patent US4578897 [9]
- Patent US4996792 [8]

## REQUIREMENTS

- Arduino microprocessor
- Temperature Sensor
- Humidity Sensor
- Water Pump (Stepper motor)
- Dust Sensor
- Solar Panel / Sensor
- UV-Diodes

A prototype will be constructed and multiple tests will be performed and evaluate our solution. Exact specifications will follow along with a schedule project plan.

## SUPERVISOR

Sebastian Büttrich  
IT University of Copenhagen  
Rued Langgaardsvej Vej 7  
DK-2300 Copenhagen S  
sebastian@itu.dk

## REFERENCES

1. At Plante Okideer. <http://www.naturstyrelsen.dk/Naturbeskyttelse/Artsleksikon/Planter/Froeplanter/Blomsterplanter/orkideer.htm>.
2. How to Make a Gardening System. <http://www.make-digital.com/make/voll8/?pg=94#pg94>.
3. Indoor House Plants. <http://www.garden4less.co.uk/indoor-houseplant-watering-system.asp>.
4. Micro-drip Irrigation System. <http://www.gardena.com/uk/water-management/micro-drip-irrigation-system/>.
5. Self Watering Probes. <http://www.amazon.com/Self-Watering-Probes-Package-of-5/dp/B0002VAHXC>.
6. Watering Plants on Vacation. <http://voices.yahoo.com/methods-watering-indoor-plants-while-vacation-44386.html?cat=7>.
7. W. B. Crane. US Patent 3758987. <http://www.google.dk/patents?id=dA2AAAAEBAJ&zoom=4&dq=plant%20watering&pg=PA1#v=onepage&q=plant%20watering&f=false>.
8. R. Holtkamp. US Patent 4996792. <http://www.google.dk/patents?id=aGgbAAAAEBAJ&zoom=4&dq=plant%20watering&pg=PA3#v=onepage&q=plant%20watering&f=false>.
9. R. A. Pazer. US Patent 4578897. <http://www.google.dk/patents?id=ifU4AAAAEBAJ&zoom=4&dq=plant%20watering&pg=PA5#v=onepage&q=plant%20watering&f=false>.