

# iPlant: Automatic Plant System

## SPCL-2012 - Report Synopsis

**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

### ABSTRACT

Based on the amount of guides and articles written on the Internet [0] we assume that taking care of plants is a major issue for many humans. However most humans still enjoy and have benefits from plants in their homes [0]. Therefore we have developed a prototype, which could solve this problem, by being more self-sufficient, watering itself from a larger water tank when necessary and if it has not received enough sunlight, it will provide itself with UV light in order to survive, it even reports its current condition as well as when the water tank needs to be refilled to the plant owner. By developing this prototype, we hope that humans will increase the amount of plants in the average home and office environment, as they now require less attention and by that, also provides more benefits to the owner.

### AUTHOR KEYWORDS

Plant monitoring, Automatic watering, Artificial sunlight, WiFi communicative

### ACM CLASSIFICATION KEYWORDS

Arduino, RHT03, Drip irrigation, WiFi

### INTRODUCTION

For years people have enjoyed the beauty and benefit of green plants[0]. Yet people often struggle to keep their household plants alive and fit. This report documents an intelligent system denoted iPlant along with the development of a prototype solution - which helps users attend their plant(s). A concept based on automatic watering, artificial sunlight combined with sensors for monitoring. Inspired as a commercial product which could help or even replace ordinary plants in our everyday living. A system designed to minimize the efforts of holding plants, and inspire more people to hold plants in their household, in schools or at work - even plants that require much attention.

### RELATED WORK

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Explain the different existing systems and patents we have found, references them and explain how our system is different from theirs, where ours excel compared to existing commercial products.

### Previous Works

- Patent US3758987 [2]
- Patent US4578897 [4]
- Patent US4996792 [3]

### BACKGROUND AND RESEARCH METHOD

Explain why we want to develop this project and what we have done in order to succeed in doing it.

#### 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.

### **PLANT MANAGEMENT SYSTEM**

An intelligent plant system denoted iPlant, which helps users attend plant(s). A concept based on automatic watering, artificial sunlight combined and with sensors for monitoring. iPlant is a step towards more modern homes, automatic homes, which takes care of itself via many sensors and small computers. Thereby giving more time to the home owners for doing what they actually want to do. The iPlant system includes the option to disable the automatic part of the system and therefore only have the monitoring, this allows some humans, which prefer to take care of the plant on their own, to continue doing so, but with the benefit of getting messages from their plant about its current status.[0]

### **Relation Aspect**

It has been pointed out, that humans develop a kind of relationship with their plants, by having them being dependent of the human in order to survive, in a similar way to pets and babies.[0] Research has also shown that there is a link between taking care of plants as a child and how that child treats nature as an adult.[0] In order to try to compensate for some of these issues, we have developed a feedback feature to our plant management system, note that this feedback is customizable, so that users can receive e-mails from the plant, telling them about how they are doing. These message will not simply be "hard data", but be structured in a way

so that the plant is speaking and maybe even joking about its condition and what is currently going on "in its life".

As we have mentioned, the iPlant system will also have the ability to entirely disable the automatic part, so only the monitoring part is active, this will ensure maximum satisfaction for all users.

## **EVALUATION & RESULTS**

### **Test Settings**

#### *Strength Test*

Explain our basement (strength) test, which consists of testing out the watering and UV diode system in a dark basement over a time period of at least 3 weeks. Explain the challenges and results of this test, as well as why our various results are as they are.

#### *Human Test*

Write about our human test, which is testing our system in a real scenario in a home with humans not related to the project taking care of the iPlant. Explain the different challenges and results of this test, focus on the human aspect, how the plant is perceived, refer to interview(s) with the humans from our test scenario.

### **DISCUSSION**

Discuss the challenges of our system, with high regard to our evaluation and results. Also discuss and evaluate the future use, work and applications for our iPlant.

### **CONCLUSION**

Draw conclusions from what is written in the above sections.

### **ACKNOWLEDGEMENTS**

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#### **Supervisor**

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

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