LED Growth Lamp for Plant Growth (LKM1b-15)

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1. BACKGROUND & OBJECTIVES

There is a health connection found that is nourishing high along the rapid development of interest. Between the years 1991 and 2012, the number of people who harvested or have access to health-related apps doubled [1]. The industry is expected to reach US$100 billion by 2018. These trends reflect the growing desire of consumers to lead healthier lives. There is a need to monitor daily for any products that improve the quality of life.

Indoor plants, which have been in a concept ever since the Romans and Romans began to bring plants inside from the outdoors, provide many benefits to the quality of life in ways we commonly know:

1. They increase indoor humidity, which helps to decrease the transmission of the disease.
2. They remove toxic vapors in closed, building environments and clean the air; they have been proven to reduce anxiety and poor health and decrease recovery time in hospitals.
3. They can improve clean and natural health.

Unfortunately, people with immunologically low fibres can control the time or duration to care for the plants, and who are aware of how to propagate the houseplants, are not able to benefit from the many health advantages of keeping indoor plants.

This project aims to create an automated plant watering system that controls the amount and frequency of water supply to the plant, as well as creates an optimal lighting environment for the plant based on soil moisture levels, temperature, humidity, and air pressure in the plant’s environment. The five objectives of the project are to:

1. Determine the ideal time to water the plant.
2. Be compatible with any existing plants and water reservoir volume.
3. Require easy set-up and training.
4. Condition a water and light sensor control system for the houseplant.
5. Teach users about their plants and how it responds to the environment.

2. METHODOLOGY

In order to set up the project, three essential steps were required:

1. Building a plant enclosure (frame, frame, etc).
2. Hardware & Software setup.
3. Developing an Algorithm.

Algorithm Design

Plant Growth Algorithm

C = h 

N = A + B

W = C

ND = A + B

Light Algorithm

C = h 

N = A + B

W = C

ND = A + B

The watering and lighting algorithm work identically. A critical level (30°C) is chosen to determine when the system should begin (on rains or rains). If 8 hours after the rain has ended, 90% or above (30°C) or temperature has ended, 90% or above, the system will take a second reading. If it is observed that moisture or temperature has remained, the plant will be watered (3 seconds) or the light will be turned off (4 hours).

3. RESULTS

As the project aims to create a self-watering plant terrarium household is, it was an objective to determine the optimum or best practices of continuous moisture levels can affect the growth of the plants. Therefore, two plants (Plant A and Plant B) of type Podocarpus macrophyllus were used and inundated under different types of lighting:

A: LED light bulb, 60W (Light on Plant A)
B: Incandescent light bulb, 60W (Light on Plant B)
C: Standard (BR30, D4, S1200)
D: LED Moisture sensor
E: Water reservoir
F: Pipe for water delivery

4. CONCLUSIONS

After implementing both algorithms for 12 days, collected data showed that the plant’s moisture level never exceeded 80% (2°C) for more than 3 hours, and turning off the light source helps to successfully increase the temperature in the plant environment. Both plants grow to the around 15% and increased physical symptoms indicating good health. The data also corresponded with a diblock (effective-volumetric) water reservoir could sustain plant growth for around 15% days without needing to be refilled.