

Project Proposal: PLENT (Pet Plant)

Background

Plants play a crucial role in our ecosystem as the lungs of the world. Human ignorance and their inconsistency of taking care of plants have resulted in the deterioration of the environment through depletion of resources such as air, water, and soil. Most developed industrial countries with the optimal weather and environment for plant growth have low plant mortality.

In this digital era, there are tons of alternatives in taking care of plants which includes utilizing machines that are programmable and consistent unlike humans. With this opportunity we plan to create an innovative way to change traditional agriculture with advanced technology; FPGA implementation to solve this issue.

Objectives

Since the world has become more developed, we would like to utilize the technology to change the traditional ways of cultivating agriculture. Using this opportunity, we propose a plant pot which has an indicator that provides the current condition of a plant. Humans can make mistakes, but a machine will do as programmed. Our invention can recognize whether a plant needs to be watered and find the optimal temperature. As we have named this as a pet plant, PLENT has a system combined with sensors and robotic drives which allows the machine to walk around autonomously without human controls. When the plant needs to be exposed to the sun, this machine will use its sensors to move around to areas that have light.

Many people nowadays have indoor plants. Taking care of it might be troublesome as humans have their own activities and schedules. Therefore, PLENT will solve all those problems and can be a new pet that can bond with humans. We can treat them as a pet as the word 'pet' is not only for animals, a plant can be one too.

Scope

Optimizing an irrigation system by observing the temperature, and light around the plant and also the humidity of the soil where the plant roots. We would like to automate the plant to move towards places with optimal light, just like a pet.

There will be a user interface where the user can regulate several variables to suit the plant. Where the user can input the humidity, temperature and light intensity desired. The user must also fill in the water tank when necessary. A signal will show the condition of the plant, whether it is in a place that is too cold or hot, and can detect whether or not the plant is dehydrated and needs to be watered. There will also be a water tank indicator to tell if the tank is empty or not.

Timeframe

	Task	Dates
1	Check if all the sensors work right and accordingly. Plant a mini plant.	2021/12/18
2	Learn how to connect arduino to FPGA only to translate analog signal to digital. Also create a mini water tank to water the plant automatically.	2021/12/19
3	Create a submodule to check the humidity of soil	2021/12/21
4	Create a submodule to check temperature of surrounding	2021/12/23
5	Create a submodule to check the light intensity of the surrounding.	2021/12/25
6	Combine all three submodules of humidity, temperature and light intensity into modules for plant condition.	2021/12/26
7	Create a module for the water pump to water automatically according to the plant health.	2021/12/28
8	Connect the programmable car to move according to the light sensor's intensity result.	2022/12/30
9	Observe plant growth and fix bugs	2021/1/12

Estimated Cost

Item	Quantity	Cost
Humidity Sensor	1	199 NT (IC shop)
Light Sensor	1	265 NT (IC shop)
Temperature Sensor	1	99 NT (IC shop)
Arduino UNO	1	Borrow from LAB
Bread board	1	Borrow from LAB
Mini Water Pump	1	90 NT (Shopee)
Rubber tube	30 cm	35 NT (Dollar store)
Mini water tank	1	40 NT (Dollar store)
Programmable car	1	(If possible, borrow from the LAB)
Mini plant pot	1	20 NT (Dollar store)
LED Display	1	99 NT (IC shop)
Jumper	11	25 NT
Resistor 220 V	3	(If possible, borrow from the LAB)

Approval Signatures

Kevin Richardson H. 林之耀,
Team 37 Member

Mary Madeline Nicole 徐美妮,
Team 37 Member

Chun-Yi Lee 李濬屹,
Professor