SMART PLANTING

Team Members:

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INTRODUCTION (1/3)

- Egypt is considered as one of the largest tomatoes' producers in the world; but unfortunately more than 50% of the tomatoes are being wasted. So the production of the tomatoes decrease.[1]
- Presently smart greenhouses has been developed to increase countries economy, as it make agriculturist more comfortable.[2]

References:
[1] El-Sherif, M. “Egypt", Food and Agriculture Organization of the United Nations, http://www.fao.org/3/v9978e/v9978e0e.htm#targetText=Tomatoes are grown in three,and late blight, and nematodes.
[2] Limprasitwong, Pirapong, and Chaiyapon Thongchaisuratkrul. “ Plant Growth Using Automatic Control System under LED, Grow, and Natural Light." 2018 5th International Conference on Advanced Informatics: Concept Theory and Applications (ICAICTA). IEEE, 2018.

INTRODUCTION (2/3)

- LED lights showed to grow seedlings of plants by consuming up to 40% less electricity[3].
- LEDs have been used to confirm the role and importance of light quality and the ability to strategically manipulate plant growth and development.

References:
[3] Treder, Jadwiga, et al. "The effects of LEDs on growth and morphogenesis of vegetable seedlings cultivated in growth chambers." 2016 IEEE Lighting Conference of the Visegrad Countries (Lumen V4). IEEE, 2016.

INTRODUCTION (3/3)

Why LED lights? [4]

1. Small in size.
2. Produce light in the part of spectrum that drives photosynthesis without producing infra-red radiation.
3. Energy consumption.

References:
[4] Watson, Richard T., Marie-Claude Boudreau, and Marc W. van Iersel. "Simulation of greenhouse energy use: An application of energy informatics." Energy Informatics 1.1 (2018): 1.

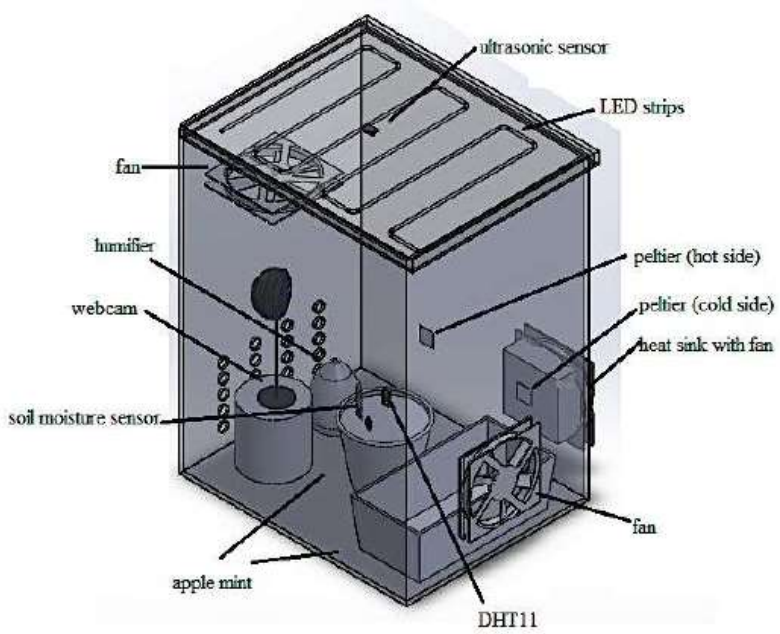
RELATED WORK(1/4) - IOT BASED GREENHOUSE ENVIRONMENT MONITORING AND CONTROLLING SYSTEM USING ARDUINO PLATFORM

1. Arduino micro-controller was used to receive readings from the needed sensors.
2. Sensors used are DHT11, LDR, Soil moisture and pH sensors.
3. GSM modem and Ethernet were used to send SMS to an android phone.

Vimal, P. V., and K. S. Shivaprakasha. "IOT based greenhouse environment monitoring and controlling system using Arduino platform." 2017 International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT). IEEE, 2017.

RELATED WORK(2/4) - DESIGN OF MULTICOLOR LED WITH CONTROL AND MONITORING SYSTEM FOR PLANT GROWTH

1. Sensors used are DHT11, Soil moisture and ultrasonic.
2. Python takes the sensors' reading and save it to MySQL and a website is developed so that users can view the condition of the plant.
3. They compared between the plant under the effect of LED light and the sunlight in respect of height , area and green color of the leaves.
4. The LED lights is more efficient than the sunlight.
5. The system was operated on Apple-mint



Ng, Wei Choon, Nurul Amziah Md Yunus, and Izhal Abdul Halin. "Design of Multicolour LED with Control and Monitoring System for Plant Growth." MATEC Web of Conferences. Vol. 215. EDP Sciences, 2018.

RELATED WORK(3/4) - LED LIGHTING WITH REMOTE MONITORING AND CONTROLLING SYSTEM FOR INDOOR GREENHOUSE

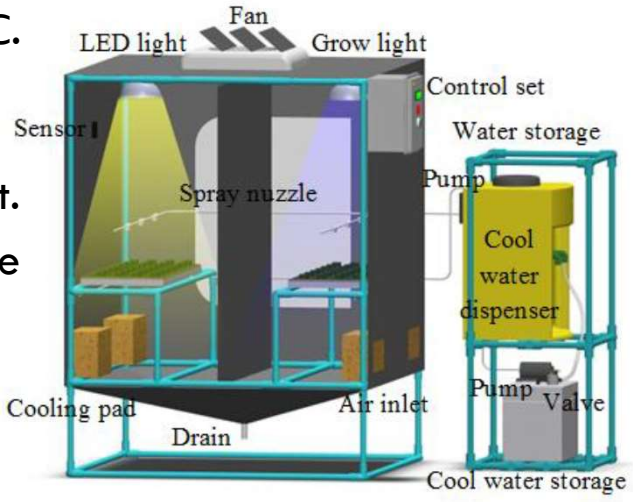
1. Sensors used are DHT11, ultrasonic and soil moisture.
2. The system were developed using python, and they saved the sensors readings in MySQL.
3. Their objective is to use LED as the artificial light, to develop an automated system to control the greenhouse.
4. The system was operated on Cuban oregano.

Fig. 8: Comparison of specimens under the LED light (two on right) and under sunlight (two on left). The plant name is Cuban oregano or known as daun bangun-bangun in Malay.

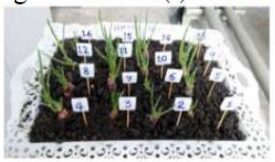
Khamis, Mohd Nazri, et al. "LED lighting with remote monitoring and controlling system for indoor greenhouse." 2017 IEEE Asia Pacific Conference on Postgraduate Research in Microelectronics and Electronics (PrimeAsia). IEEE, 2017.

RELATED WORK(4/4) - PLANT GROWTH USING AUTOMATIC CONTROL SYSTEM UNDER LED, GROW, AND NATURAL LIGHT

1. Sensors used are DHT11and RTC.
2. They compared between the plant under the effect of LED lights, grow-light and the sunlight.
3. The experiment admitted that the plant grows faster under artificial lights.
4. The system was operated on Shallot.



(c) LED light (e) Grow light



(a) Natural light

Limprasitwong, Pirapong, and Chaiyapon Thongchaisuratkrul. "Plant Growth Using Automatic Control System under LED, Grow, and Natural Light." 2018 5th International Conference on Advanced Informatics: Concept Theory and Applications (ICAICTA). IEEE, 2018

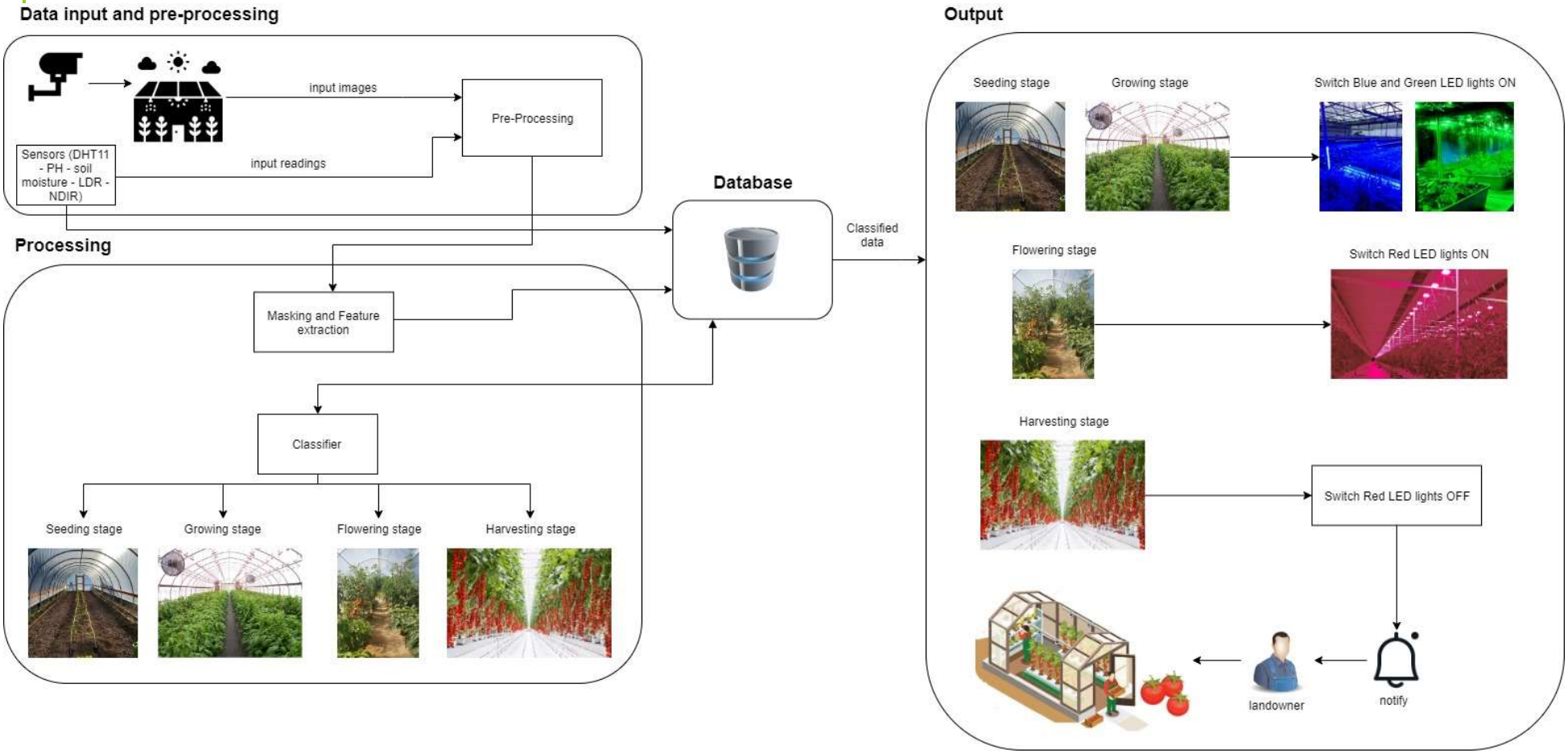
COMPARISON

Points of Comparison	Used language	User Interface	Sensors	Type of plant	System used for
Design of Multicolor LED with Control and Monitoring System for Plant Growth	python	GUI in pc , mobile application	DHT11,soil moisture, ultrasonic	apple mint	soil
IOT Based Greenhouse Environment Monitoring and Controlling System using Arduino Platform	Java	Android mobile application	DHT11,LDR,PH sensor, soil moisture	Not mentioned	Green house
LED lighting with remote monitoring and controlling system for indoor greenhouse	Python, HTML ,JS,CSS,PHP	Web-based gui	DHT11, ultrasonic, soil moisture	Cuban oregano	Green house
Plant Growth Using Automatic Control System under LED, Grow, and Natural Light	Not mentioned	Automatic system	DHT11,RTC	Shallot	Plantroom
Our proposed system	Python	Web based gui	DHT11, PH, soil moisture, NDIR, LDR	Tomatoes	Green house

PROBLEM STATEMENT

The agricultural sector in Egypt faces major challenges. Farmers and landowners wait for the crop to be harvested so it takes too much time, thus the production of the plants decrease, the economy of the country will be affected negatively.

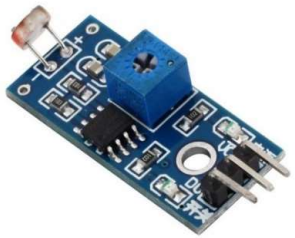
SYSTEM OVERVIEW (1/4)



SYSTEM OVERVIEW (2/4)

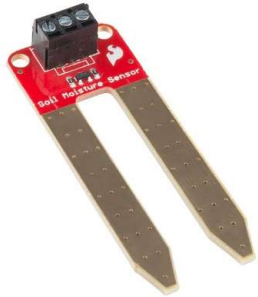
1. A greenhouse is supplied by video cameras and sensors. Sensors used are DHT11, PH, soil moisture, LDR and NDIR.
2. The camera's films are converted into picture frames which needs some enhancements to remove the image's noise.

LDR



DHT11

Soil Moisture



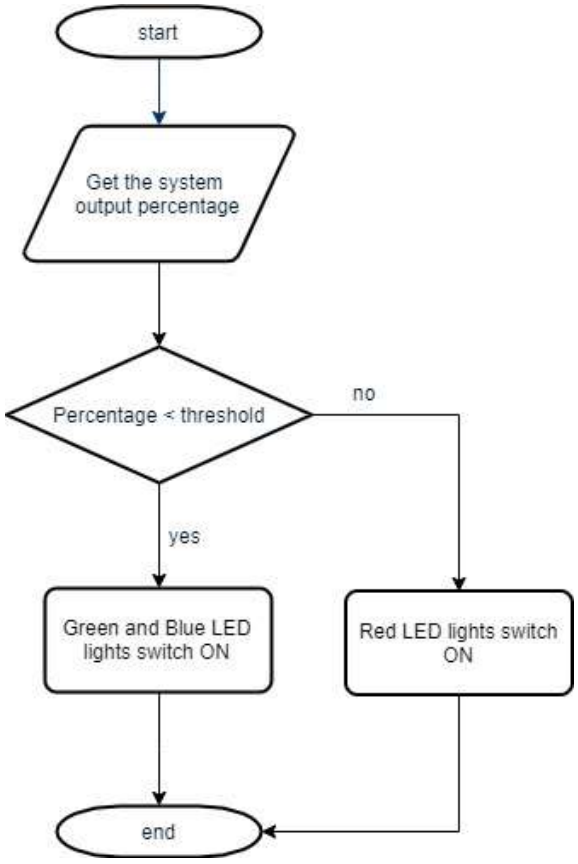
NDIR

PH

SYSTEM OVERVIEW (3/4)

1. Masking and feature extraction(ORB) on the picture's frames helped in detecting the accurate state of tomatoes in the greenhouse.
2. The images are classified into:
   a. Seeding stage
   b. Growing stage
   c. Flowering stage
   d. Harvesting stage

SYSTEM OVERVIEW (4/4)



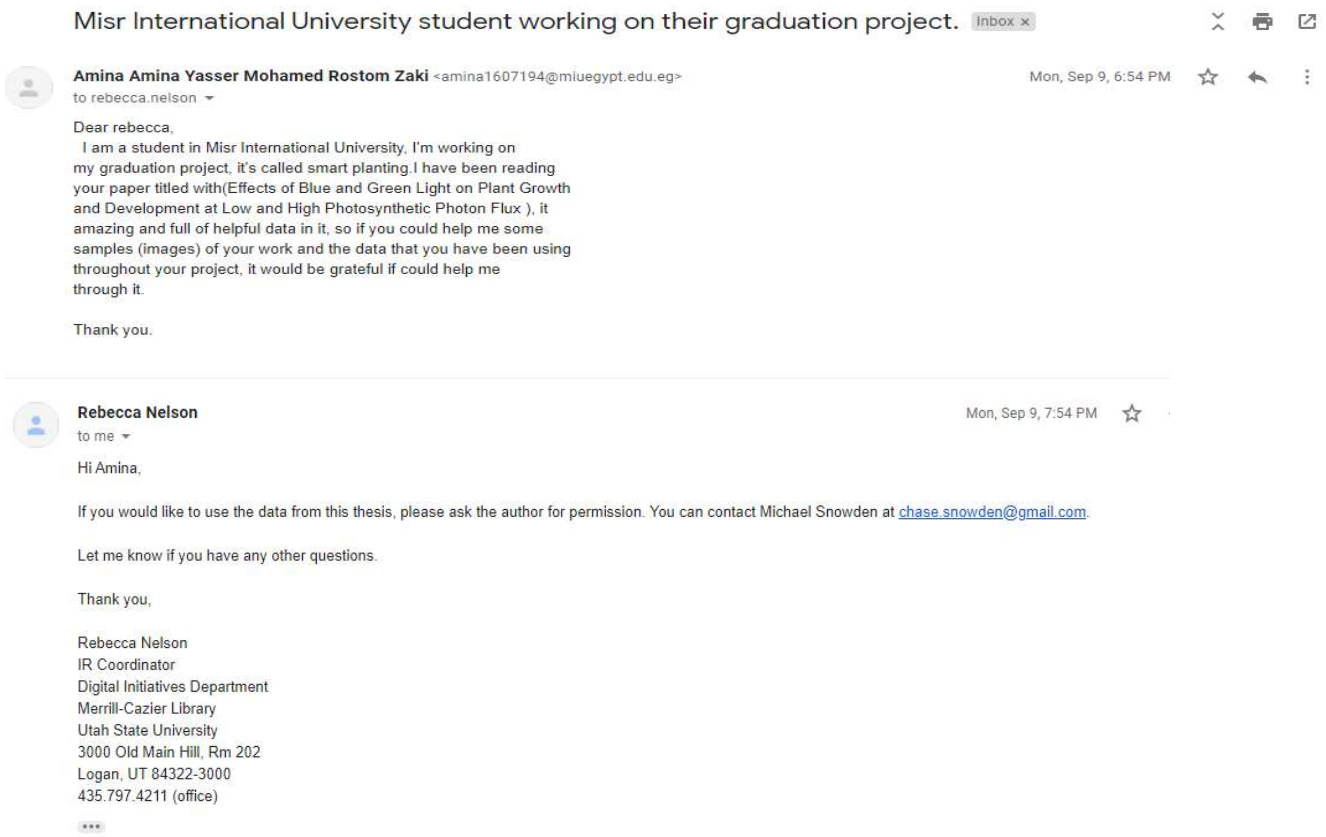
EXPECTED RESULTS

1. System will switch between the LED lights according to the growth stages of the tomatoes from seed to harvest time.
2. Alert to the landowner if there is any disease of the tomatoes.
3. Notify the landowner when the tomatoes are ready to harvest.

CHALLENGES

1. Automate the greenhouse system (lightening system, temperature control system, etc…) .
2. Collecting dataset.
3. Enhancing accuracy in detecting the threshold value.

SUPPORTIVE DOCUMENTS (1/3)



Misr International University student working on their graduation project. Inbox ×

Amina Amina Yasser Mohamed Rostom Zaki <amina1607194@miuegypt.edu.eg> Mon, Sep 9, 6:54 PM
to rebecca.nelson

Dear rebecca,
I am a student in Misr International University, I'm working on my graduation project, it's called smart planting.I have been reading your paper titled with(Effects of Blue and Green Light on Plant Growth and Development at Low and High Photosynthetic Photon Flux), it amazing and full of helpful data in it, so if you could help me some samples (images) of your work and the data that you have been using throughout your project, it would be grateful if could help me through it.

Thank you.

Rebecca Nelson Mon, Sep 9, 7:54 PM
to me

Hi Amina,

If you would like to use the data from this thesis, please ask the author for permission. You can contact Michael Snowden at chase.snowden@gmail.com.

Let me know if you have any other questions.

Thank you,

Rebecca Nelson
IR Coordinator
Digital Initiatives Department
Merrill-Cazier Library
Utah State University
3000 Old Main Hill, Rm 202
Logan, UT 84322-3000
435.797.4211 (office)

SUPPORTIVE DOCUMENTS (2/3)

IOT Based Greenhouse Environment Monitoring and Controlling System using Arduino Platform

Randa Osama <randaosama1999@gmail.com> Thu, 29 Aug, 14:24

to vimalpv00

Hello, I'm Randa Osama a senior student at the faculty of Computer Science at Misr International University in Egypt.
My graduation project idea is similar to the idea of your paper, so can you please help me by sending me your database?
Thanks in advance.

Reply Forward

LED lighting with remote monitoring and controlling system for indoor greenhouse

Randa Osama <randaosama1999@gmail.com> Thu, 29 Aug, 14:28

to amziah

Hello, I'm Randa Osama a senior student at the faculty of Computer Science at Misr International University in Egypt. My graduation project idea is similar to the idea of your paper, so can you please help me by sending me your database? Thanks in advance.

Reply Forward

SUPPORTIVE DOCUMENTS (3/3)

Effects of light quality on the accumulation of phytochemicals in vegetables produced in controlled environments

Report message · Block user

Randa Rashad Aug 29, 2019

Hello, I'm Randa Osama a senior student at the faculty of Computer Science at Misr International University in Egypt. My graduation project idea is similar to the idea of your paper, so can you please help me by sending me your database? Thanks in advance.

Reply | Mark as unread | Archive conversation

Efficient Lighting System for Greenhouses

Report message · Block user

Randa Rashad Aug 29, 2019

Hello, I'm Randa Osama a senior student at the faculty of Computer Science at Misr International University in Egypt. My graduation project idea is similar to the idea of your paper, so can you please help me by sending me your database? Thanks in advance.

Reply | Mark as unread | Archive conversation

LIVE DEMO

ANY QUESTIONS?

THANK YOU!