



PROJECT PRESENTATION

**AUTOMATED PLANT
MONITORING SYSTEM**

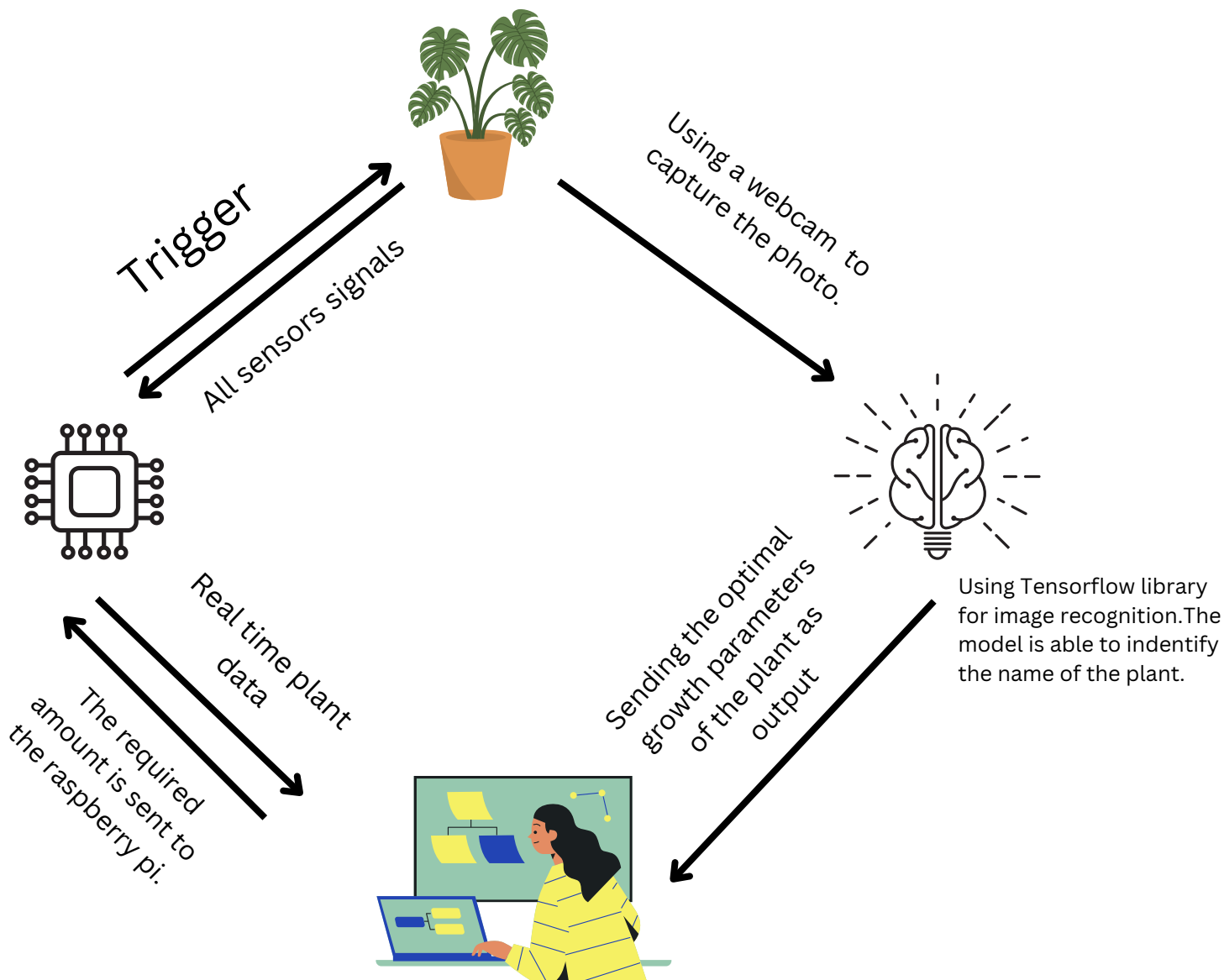


TO:
MARVEL UVCE

ABOUT OUR PROJECT

An IoT project based on a smart pot can be a great way to monitor and care for indoor plants. The smart pot is equipped with sensors that allow you to monitor environmental parameters such as soil moisture and light levels. This information can be used to automate the care of houseplants by providing automatic water pumping into plant soil in the right amount, providing adequate Light in dark surroundings, keeping a log of watered days.

PROJECT FLOW



The name,optimal parameters,real time sensor values and adjustment values are displayed.

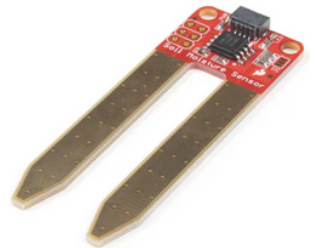
SENSORS

1. Relative Humidity and Temperature Module-

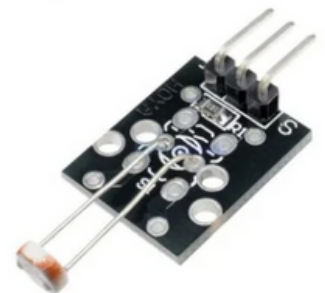
This sensor utilizes humidity sensitive capacitor and a thermistor to measure both Humidity and Temperature.



2. Moisture Sensor:- The probe is inserted into the soil, probe varies its capacitance when change in moisture is observed. An amplifier IC amplifies the analog reading and sends it to the microcontroller.



3. PhotoSensitive Resistor :- It is used to determine luminous intensity of the incident light it makes use of a Light Dependent Resistor (LDR) whose resistance varies with intensity of light ,higher the intensity lower the resistance of LDR.



4. Digital PH sensor:- This sensor generates voltage roughly proportional to the H^+ concentration of the mud.

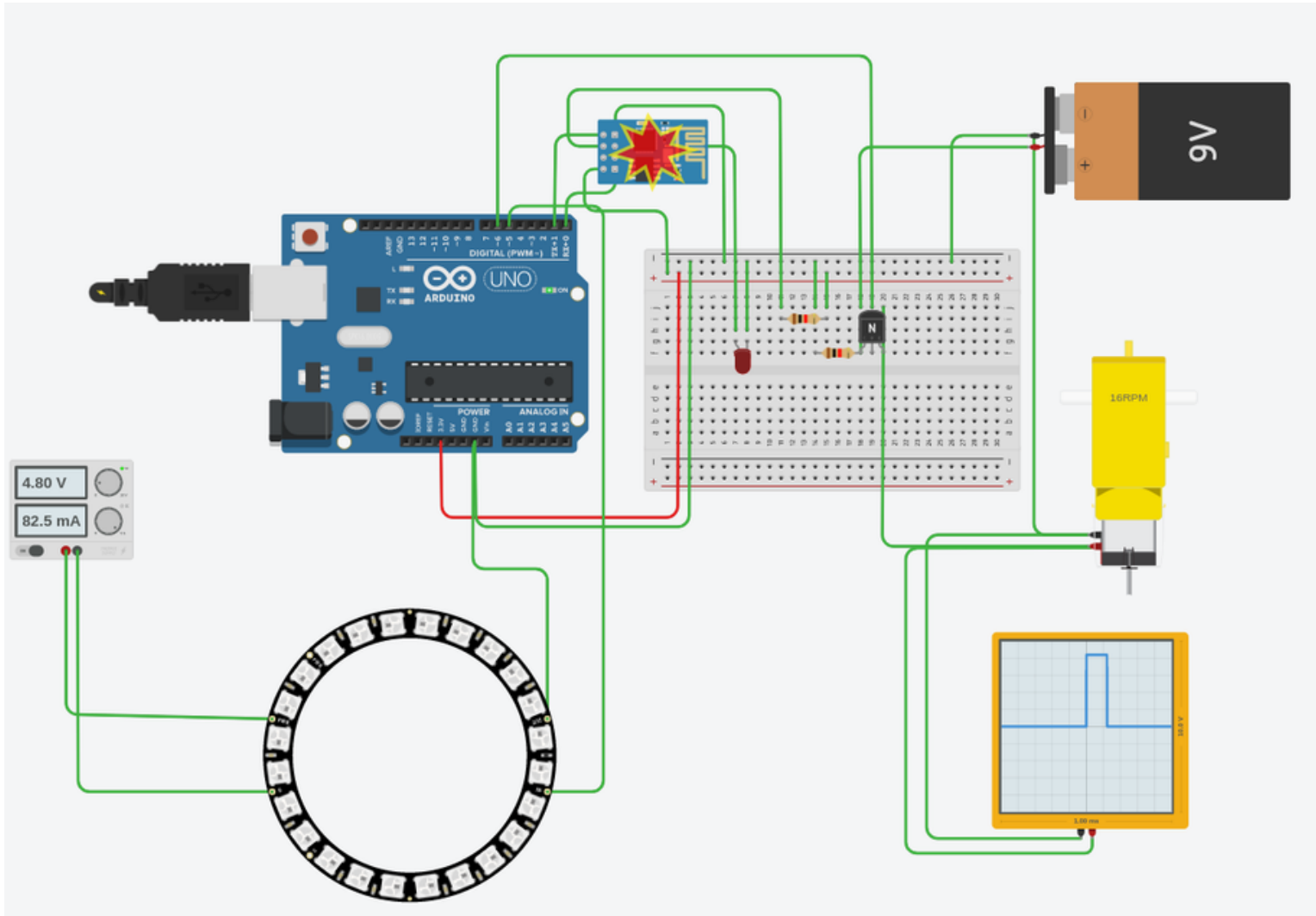


Actuators



- Led Grow Light :- This device emits radiation in the red and blue spectrum. This wavelength promotes photosynthesis and is essential for a healthy plant.
- Water Pump :- It works by creating suction to move water from lower height to the plant.

ROUGH CIRCUIT DIAGRAM



- The water pump is powered by a battery and its intensity can be controlled by feeding a pulse width modulated signal from board.(As shown in Oscilloscope above).
- Led grow Light will be powered by wall adapter and controlled directly through digital pins input pins.

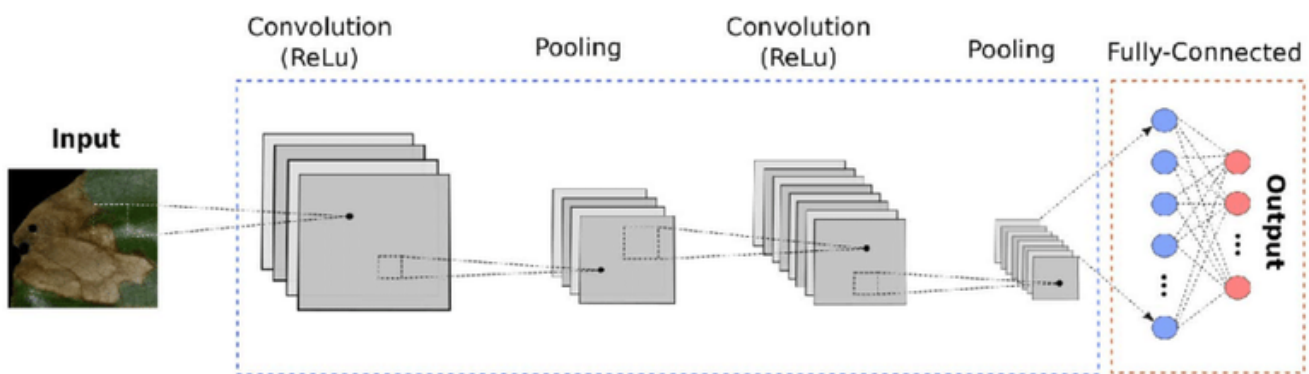
ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is a computer science field that studies and develops intelligent machines.

AI can perform complex tasks that humans have historically been able to do, such as solving problems, making decisions, and reasoning. Some applications of AI include:

- Machine learning
 - Deep learning
 - Neural networks etc.,
-
- In our self growth monitoring plant project we use AI for the plant recognition .
 - We recognize a plant based on its leaf pattern.
 - We use camera module to capture the leaf image.
 - The captured image is sent to the model for pre processing of the image for the proper recognition.
 - Then after the preprocessing of that image, it is send to the trained AI model.
 - The input image undergoes convulation using Conv2D followed by max pooling using Maxpool2D, then we flatten it.
 - The flattened data is then fed into the neural networks.

- The input image is compared with the trained model.
- The AI Gives us the prediction and we store it in a variable.
- The recognized image is sent to the UI for further operation.
- We use tensorflow in a conda environment for image recognition.
- We build a CNN in tensorflow for the recognition of the plant.



The way how tensorflow process image

The packages that we import for the image processing are:

- Keras(provides a high-level neural networks API,)
- Numpy(for image cropping, masking, or manipulation of pixel values.)
- SciPy(for Reading Images, Convolution, Feature Extraction and so on.)
- Matplotlib

The source code for training AI model:

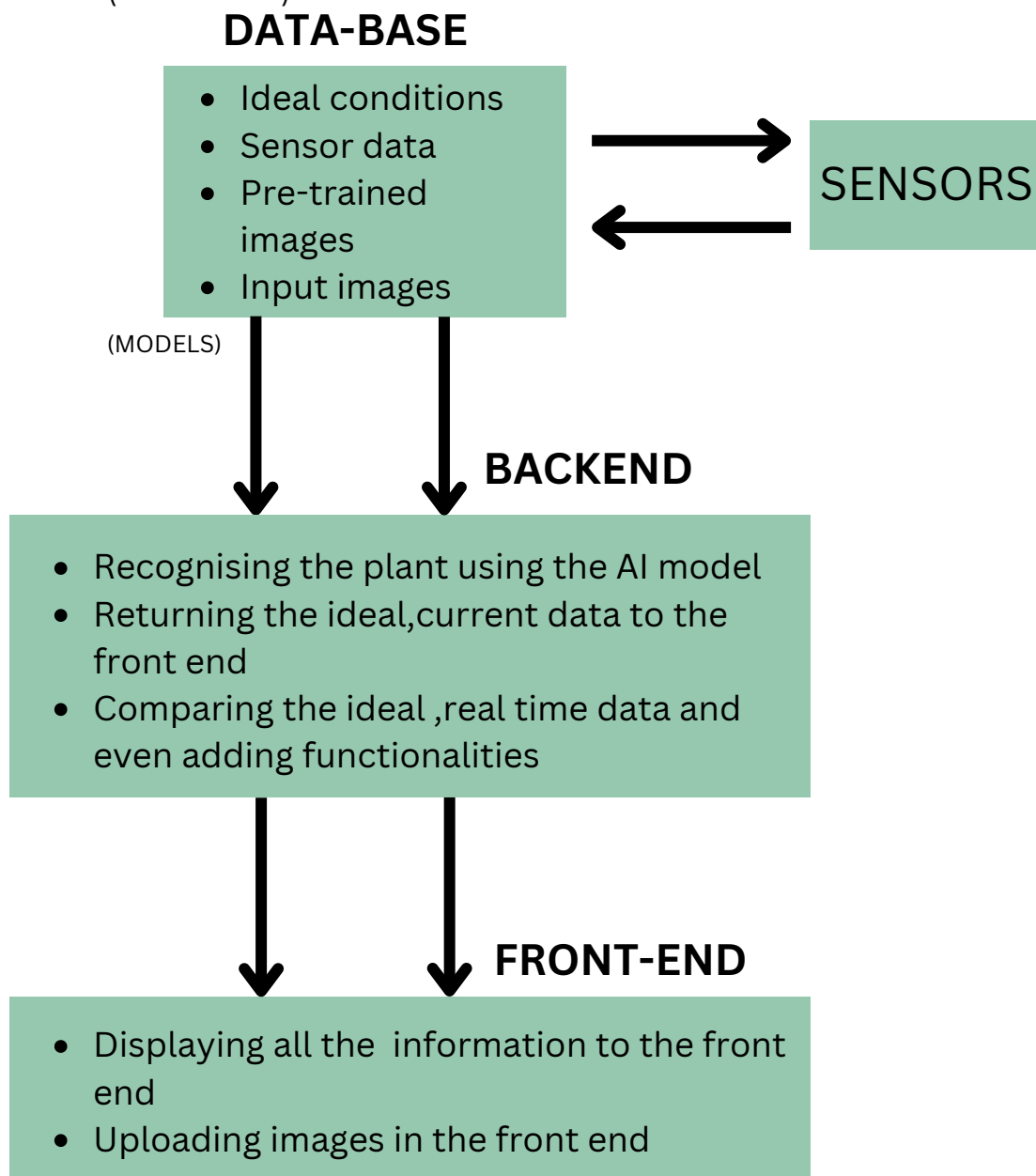
https://github.com/animesh1012/machineLearning/blob/main/Plant_Disease_Prediction/Train_plant_disease.ipynb

The source code for the Image Recognition :

https://github.com/animesh1012/machineLearning/blob/main/Plant_Disease_Prediction/Test_plant_disease.ipynb

USER INTERFACE

- We use Streamlit to create the web application for our project.
- Using streamlit we create both front and backend framework.
- where in backend framework, we integrate AI model and using firebase database we store plants information.
- The firebase database is going to store the ideal conditions, the current condition of the plants (sensors data) in models.
- In the frontend framework we are going to display the information of the plant after the recognition of the plant done by the AI.
- Next it displays the ideal growth conditions for the plant also display the sensors data.
- Using multiple functionalities in the backend, we compare the data of current and ideal data and send the required command for the pump, light, fertilizers(additional).



Tools required (from Marvel): -

1. Oscilloscope: - To probe Ph sensor .
2. Variable Power Supply: - To power and test LED grow Light and water pump.
3. 3D printer :- To print the pot and housing for the sensors.

[Note: - More tools might be required.]

BOM:-

Name	Quantity	price()	Shopping link
1. Raspberry pi 4	1	3500	https://robu.in/product/raspberry-pi-4-model-b-with-1-gb-ram/
2. 3.3v -> 5v logic converter.	2	2 x23=46	https://www.electronicscomp.com/i2c-4-channel-3.3v-to-5v-bidirectional-logic-level-converter?gad_source=1&gclid=CjwKCAIAq4KuBhA6EiwArMAw1EiFcUpyxckjsadhawhil3scwsD3tOr3uxrpcGYj1CfA3Znc1-BpIRoCiUIQAvD_BwE
3. Soil Moisture Sensor	2	39 x 2=78	https://robu.in/product/soil-moisture-meter-soil-humidity-sensor-water-sensor-soil-hygrometer-arduino/
4. Photosensitive resistor sensor	3	25 x 3=75	https://robu.in/product/photosensitive-resistor-sensor-module-for-arduino/

Name	Quantity	Price(Rs.)	Links
5. Water pump	1	159	https://robocraze.com/products/r385-dc-pump
6. PH meter sensor	1	279	https://robu.in/product/yellow-0-1-resolution-digital-ph-meter-tester-instruments-with-atc-0-0-14-0ph-without-battery/
7. Humidity Sensor and Temperature Sensor	1	390	https://robu.in/product/gy-bme280-5v-temperature-and-humidity-sensor/?gad_source=1&gclid=Cj0KCQjwqdqvBhCPARIsANrmZhOEYaaZkj3YEkaf1kZNF9bVpbyoW7lxBO5VK1tEbaFOhHk4rYZwTQaAo_5EALw_wcBt
8. 4 channel Relay	1	140	https://robu.in/product/5v-4-channel-relay-module/
9. Led Grow light	1	1745	https://www.amazon.in/dp/B09235ZYPR?starsLeft=1&ref=cm_sw_r_cs_o_wa_apan_dp_JVKJECFZSC4V152T447S
10. Water tubes	1	40	https://robu.in/product/1m-long-water-pipe/

Name	Quantity	Price(Rs.)	Links
11. Wires(jumper wire, 22AWG)	1	200	=
12. 3D printing filament	1	898	https://www.amazon.in/idea-Imagine-Create-Print-Filament/dp/B07P7QTWQK/ref=sr_1_1?crid=XAXAFZLH6219&dib=eyJ2ljo_iMSJ9.yX0yEMaYGkqGgHna793dW4o9BD0WBL3lpVJWlKpeCc3kq:ofax8J33n5VpHHIZYbLaIzgzkVyV-V0-Rw7kzPEHeNf_6JkvFeRWsJ-RGFHh1qdk0LIRb7H-&th=1
13. Webcam	1	1995	https://www.amazon.in/Logitech-Widescreen-Correction-Noise-Reducing-FaceTime/dp/B008QS926Y/ref=sr_1_1?crid=IEBD97NP2UM02&dib=eyJ2ljo_iMSJ9.6PqDdhuk13iWQs92iV56pCuWqg52f241BDMk:uIqQVgZF3zA0B4UVI38XmbOPBcc93zoziXU6--KqTl8g4cHya9KndXiQwMlI4RyoP-trviHxnkd9wo0Ns7Wd9Ggb9xZH-QWLOT6h9uiZisQP7FAhOIEFk_PhZ0T-vHQ9OmAr9VhPr44AsP89o2Ws_k7snHIYT4zJfCmWVVY3TlJ5S0NOZOkm95FZ3chZkjI4fpw_4cNZkaC:QPKEZ5wtYth57bDUlUaUJGLUkX3egs8g_xDDqGUmonPYBAz-6k-VZwngyUJ.gahrsinTyk2xYuxPnXQPm0WKtt6ZMqnpe04BnvVlJTU&dib_tag=se&keywords=c270&qid=T710689427&s=computers&prefix=c270%2Ccomputers%2C415&sr=1-1
14. Organic Fertilizers	1	165	https://www.amazon.in/TrustBasket-Powder-Organic-Fertilizer-Repellent/dp/B07XP8993Z/ref=sr_1_16?crid=1Q6PL69BRXFYJ3&dib=eyJ2ljo_iMSJ9.CTb6bbRwliaxxdCXNHMMpxfihFfd8VBIDbtV4Dq8NKgpUgZ0mx5rxFls:eQtiOykjVciSiFEZtQHl3FU8RzhZEL_J0zdugabXABZKVNfnYIHlIAP-V_ZyfkewGX-dptUkYh3plwvBfn4Z2fyJHOFLh0wxtpsziS_MkIe2j_SwbvoHBloFtWDhzY:ETXlFKGQ9TJw3cTrZ3fPpXjAHYid5lpx-VBr4GlujJ2Fv:PpgsoXs7sxPKIsnRII3ZPu6Ha_aluS4hq:tegFHdJf5020Qu:XivK7NR_kgp1c5QtESy_LDkS6KAN2YF4WWe8vSsMj7Jl6bncNEYKpQF0dC:SMfA&dib_tag=se&keywords=fertilizer&qid=1710690575&s=garden&prefix=fert%2Clawngarden%2C27&sr=1-16
15. Pot Mix 1 kg(Organic soil)	1	119	https://www.potandbloom.com/products/pot-mix-1-kg?variant=41985333133491&_xycy=INR&utm_medium=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic&gad_source=1&gclid=Cj0KCQjwqdqvBhCPARIsANrmZhNjgtrFLM5m_L7NVIOoffl36Z0cMKGS40u4qK2Ejg6BeKUqJi6cTm7gaAlUqEALw_wcB
TOTAL		9829	

Through this project, we aim on designing a fully “sustainable automated plant system with AI”. We hope for getting a good exposure to hands on electronics and professional tools. We thank “MARVEL UVCE” for giving us an opportunity.

Team members:-

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From team-

PLANTICIA

