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Original paper



Venus Fly Trap: Robo Plants

Shaifali¹, Dr. Manish Bakshi² and Dr. Princy Thakur³

¹PhD Scholar, ^{2,3}Assistant Professor Department of Horticulture^{1,2}, Department of Soil Science and Agricultural Chemistry³,

Lovely Professional University, Phagwara 144411, Punjab.

Corresponding author: shifnanda@gmail.com

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Introduction

Although plants are mostly categorized as autotrophs still there are a lot of species that draw their nutrition from the organic living sources. One such example is the Venus Fly Trap plant that traps the small insects for the purpose of absorbing nutrients. The trapping of insects in the specifically designed leaves is mediated by turgor movements which result in closure of the leaf. Due to this automated movements, the plant is called as Robo plant.

Robo Plant Technology

Robo Plants technology which is being called a fusion of nature and technology, the scientists of Singapore are working upon this (Wenlong Li *et. al.*, 2021). By using thermo gel, they attached film like and soft electrodes on the surface of Venus flytrap. At low temperature the thermo gel acts as liquid and at room temperature it gets turned into gel (Yifei Luo *et. al.*, 2021).

Robo Venus flytrap:

The diameter of this device is 3 mm in size and is totally harmless to plant. The ability of plant for performing the photosynthesis is not affected by any mean at the time of successfully monitoring the electrical signals from the plants.



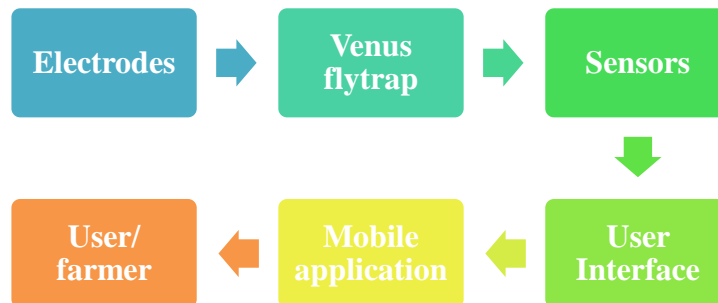
The team induced the Venus flytrap for closing its leaves in 1.3 seconds on demand by using the smartphone for transmitting the electric pulses to device at a specific frequency (Wenlong Li *et. al.*, 2021).



The Venus flytrap have also been attached to a robotic arm by the scientist and through the smartphone as well as the communication device, encouraged its leaf to compact and pick up a part of the wire half with the diameter of a millimetre.



Mechanism: The electrodes, attached to the Venus flytrap are able to monitor the weak electrical pulses which are naturally emitted by the plants this will aid to detect the diseases of the crops in early stages as well as their health in terms of future (Wenlong Li *et. al.*, 2021).



The remote controlled Venus flytrap “Robo Plants” and other crops which tell farmers when they get hit by diseases could become the reality once the scientists developed the high tech system to communicate with vegetation.

Challenge for Venus flytrap:

To electrically interfere with a plant’s electrophysiology, two key challenges exist.

1. To create a physical interface allowing communication with the plant. Such an interface should be integrated on the plant surface without affecting the plant movement or physiology.
2. To achieve effective communication with the plant. Currently, no standardized electrical communication methods with plants exist. Electrostimulation-induced flytrap closure has been achieved, but the mechanism remains unclear, and accurate modulation has not been possible.
3. This technology is in its initial stages. (Wenlong Li *et. al.*, 2021).

Advantages

1. The researchers believe that it could ultimately be used to make advance ‘plant based robots’ by which the host of a fragile objects can be picked which is too delicate for rigid, robotic arms.
2. To make hybrid systems these types of nature robots can be interfaced with other artificial robots. The team have immersed the carbon nanotubes that emit a type of signal when plant roots do detect the nitro-aromatics compounds often found in explosives. An infrared camera then reads the signal, which later sends out the message to scientists (www.ntu.edu.sg).

Conclusion

Robo plants can stand as the solution for the farmers to detect diseases in plants at one time for the larger area. The device is harmless to the plants and can be used for longer period of time. It acknowledges that plants are capable to respond to gravity,

temperature, chemical, light, levels of oxygen, humidity and parasitic infections also touch along with sound. Hence forward, 'Robo- plants' technology can be used to allow farmers for detecting the diseases in plants by using smart phone applications.

References

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