IT 5502 Embedded Robotics

Developing Sensors to Communicate with Plants

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Introduction

Plants are rupture with movement. They are rich in sensation and respond to the stimulation of the surrounding world every moment of their active lives. They can send messages to one another about overcrowding or an endangered attack by a new pest. Within each plant there is continual, activity as purposive as that in an animal. Many of them share hormones that are remarkably similar to our own. Their senses are sophisticated: some can detect the lightest touch (better than the sensitivity of the human fingertips) and they all have a sense of vision.

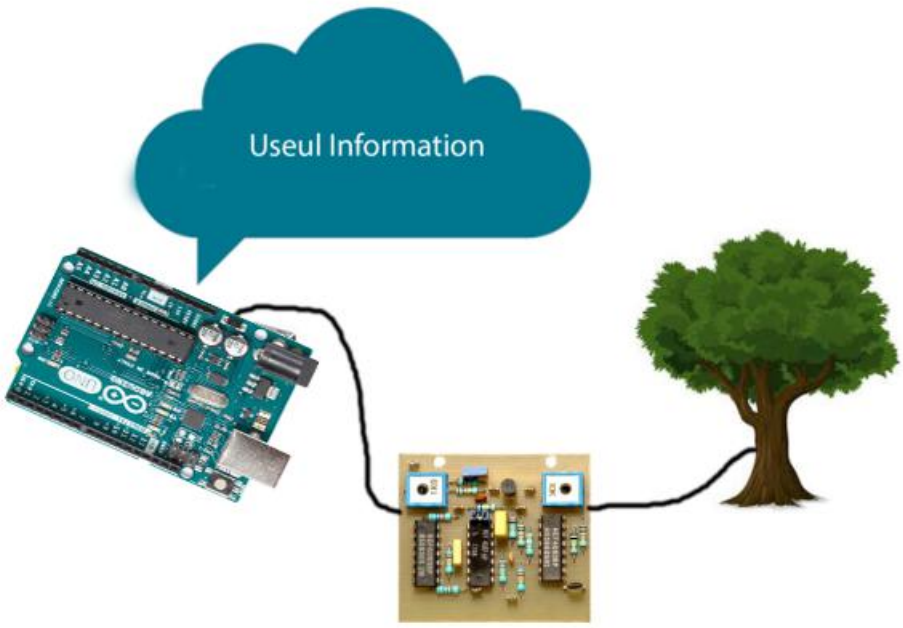
These physical feeling will generate signals within a plant and these signals indicated through relatively very low voltage differences within a plant and also varied form plant to plant. With the use of this we can identify plants through making different sounds by the different voltage differences it creates.

Objective

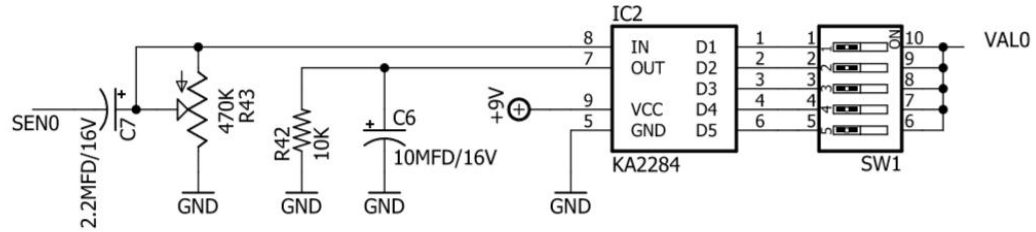
The objective of this project is to develop a sensor which have ability to sense plant response for different environmental inputs.

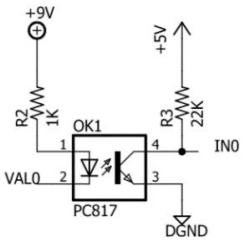
Description of the design

This system is made of three components–the circuit board that amplifies the current caused by human touch, the Arduino which encodes this current as raw data.



Sensor Design





Sen0 – Input from tree

KA2284 IC – Voltage level detector

SW1 – Dip switch (Voltage gain/Sensitivity controller)

PC817 – Voltage controlling for microcontroller

IN0 – Output to microcontroller

We initially give small voltage to tree. When someone touch the plant, there will be very small voltage drop because voltage is distributed or grounded. We can detect that using small cap. Then we need to amplify that voltage difference and give to any micro controller as an analog reading and process.

voltage difference will depend on tree. But it gives enough voltage difference for small trees. most of the time, when someone touch the tree, there will create a new path through body. Then the system will ground. So new voltage of the tree is almost close to zero. Main thing is here that new path is created when someone touch the tree.

When environmental fact changes, there will be really small voltage difference. But when human or animal touch plants, it creates power full new path rather than environmental fact changes. so, this sensor work with different environment without any problem.

Contribution

R.M.W.Rajapakshe - 168291J

- Project coordinate
- Arduino programming

D.S.Hewawitharana - 168284P

- Project concept and lead the project
- Sensor development

T.Priyadharshana - 168290F

- Choosing relevant trees for project
- Sensor tuning for different tree
- Connect speaker to Arduino and sound generating

Result and conclusion

This sensor can identify human/animal touch of the plant and it can differentiate (individually identify different trees) each tree separately.