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| (A plant growth monitoring device)  Plantocare  Project Report |
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*Abstract*

The given report is about a prototype developed by my team to tackle the issue of death of many saplings after mass plantation drives. The given report talks about the details of our product, the mention of the sensors it involves and what all can be the target audience of this product. This report gives an overview of the seriousness of the problem and high scope of this product in the market. It includes details of the working of the sensors, and the explanation of other parts involved in the circuit. This report gives us a gist regarding the outer body of our prototype. Apart from that, it includes how we faced the task which were beyond our level of knowledge now and the learning we made through it. At last, we have explained how vast this business can be, our present evaluation of the product, our plans regarding current advertising and selling of product, a very vast both present and future market and what value it can add to the environment and the human society. This report covers the procedure we followed; difficulties faced along with the mention and due credit to the human resource we used.

*Introduction*

There are several occasions, events, or any other thing when the government, or an NGO or we do mass plantation drives. But a dark side of this mass plantation is, after few years even less than 15% of them survive and the remaining sapling planted dies.

No one cares about them and it is due to, no one is there to look after them and no one is there to monitor their growth. Aiming a solution this issue, our team ‘Evengers’ has built a product or prototype named ‘Plantocare,’ which is a many-in-one sensor device to determine environmental conditions currently available for the plant and tell to human if it is optimum or not.

*Methodology and parts involved*

So, what we exactly did was, we bought different sensors from various shops. We bought:  
1) The NPK sensor – NPK stands for Nitrogen-Phosphorus-Potassium sensor, which is a 3-pin sensor to determine respective elemental contents in the soil in mg per Kg of soil. Readings of this sensor will let us know if need to add some extra manure or fertilizer or what we have put is optimum.

2) The DHT11 sensor – It is a small sensor which determines the external temperature and humidity in atmosphere in the surrounding of the lant and let us know if it is too humid or dry or warm for the plant outside so we can change the location of our plant accordingly in case it is in a pot and a farmer may think to build a greenhouse to save the plant.

3) Moisture sensor – It is a 2-pin sensor which is first inserted into the soil and then we get readings of the moisture content in soil. It works on the principal of how much conduction takes place. It uses capacitance to measure dielectric permittivity of the surrounding medium. This tells us if we need to give some water to the plant or its already overwatered.

4) pH sensor – In this sensor, we must take some sample of the soil, add it into the water resent inside the tube of the sensor, and close it. We need to be cautious of the marking level of water before adding and after adding the soil sample. This sensor then calculates the pH value of the soil and determine if the soil is too acidic or basic that we need to add something to stabilize it.

Apart from this, we also bought a Esp8266 sensor which acts as a microcontroller and contains the code. This is indirectly connected to all the sensors, take the readings, comprehend them and it is the one through which the Wi-Fi signals are sent to the mobile phone app which then displays the reading. Other than that, our circuit involves other basic parts like the Arduino, breadboard, jumper wires, etc. which were all issued from the electrical lab.

The battery we have used is a 9V power bank as a source of power to this setup.

*Result and Discussion*

We built up this circuit and put it in a box designed of the MDF board using the Mehta laser cutting machine. We had a discussion on several aspects, like to what extent should we proceed to purchase the sensors, that how many sensors should we include. We also had a discussion on what microcontroller is suitable for this level of working. We had a discussion on what pre-designed software should we use to build the desired app. Aart from this we took the code of various sensors from various sources online but had to do vigorous editing to match it exactly with what we were wanting. But all this was worthy and less hectic than writing down the entire code. We also learnt about the connections to be made through the breadboard online. It was a much learning project. For all this, we would like to give due credits to the Tinkerers Lab, course instructor, seniors, Maker Bhavan and CCL and our TA for the guidance.

*Conclusion and Future Work*

With this prototype we aim to solve the several environmental crisis the entire globe is facing as we believe that the building block and the developers of this entire world are the plants and helping them can only help us. We have made up this entire prototype at the cost of ₹ 11,000 and would like to sell it at ₹ 15,000. As far as we researched, we did not find any similar products. We have products in the market which include lesser sensors or some products include one sensor and has an automated system of addressing a particular need like moisture content in the soil. So, we think we have good scope of growing further. Having a look into the audience, primarily we target the plant lovers, people who do garden in their homes. At first, we facilitate them with the product on a paid service basis so that they can know about our product and its quality and if satisfied can even purchase it as we believe we will be covering lesser number of customers if we directly go for selling due to lack of awareness and reliability of our product. Other than that, we can target the industry which monitors growth of medicinal plants and the scholars who study the development of plants in their labs. Going about the future prospects, we aim for what was the motivation for us, mass plantation in which we may hold contracts with the government or the NGOs, or any other organization which takes the measure to protect these plants under some scheme, action plan or any treaty. Our prototype can also be designed specifically for farmer purposes, to add to his production every year. We are willing to add more features to our app like it can retrieve the data from the product in some time whenever the product is in range and need not take real-time data. Other than that, the user can choose the plant for which it wants to compare the readings. We also built our prototype into a bot which can move through the land in case of mass plantation and agriculture farmland to save human energy. Our prototype can also be helpful in growing plants in terrains with typical and unfavorable climatic conditions. Also, doing mass production of our product, going to contracts with the vendors, or some day building our own sensors can save a lot of the cost and make a huge profit to us.

*Team:*

