VANYA - Detection of Needs of Plants

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Abstract – *It is no longer a secret that plant talk to each other via fungi network with help of soluble chemicals in Rhizosphere. Plant being a child when kept at home many people misapprehend their signals which results in drying up or reduces air pockets in soil if there is too much water. To maintain good consistency for growth of plant we propose this paper where user can nourish plants in proper way. By combining Botany with IoT, plants can be grown in best possible way. With the introduction of specialized sensors and a ubiquitous communication environment, plants, not only can give the world their needs but also take actions for themselves. By this, humans can take care of plants more efficiently and able to provide better treatment for their healthy growth.*

Key Words: Internet of Things, Botany, Sensors, Android App.

1. INTRODUCTION

It is no longer a secret that plant talk to each other via fungi network with help of soluble chemicals in Rhizosphere. When plants are kept in home or office under supervision of people, they end up drying because in most cases people misinterpret their signals. Each time plants try to communicate but we fail to understand their feelings.

To build this bridge we have developed a prototype where people can understand their feelings. An Android app provides interface where you can connect to your plants (the reason you brought them). Android app gives a platform where you feel connected to your plants as they express their feelings and you are able to understand them.

Vision of this project to is to bring ambient intelligent concept into new level by introducing it into living organisms – plants.
Mission is to intensify the affection towards plants and promote healthy growth.

To communicate with plants (or people), you have to be able to regard them as equals. However, it's easier to communicate with plants than it is to communicate with people because plants don't have defenses and self-importance agendas in place which engage our defenses and self-importance agendas.

2. SYSTEM DESCRIPTION

To promote healthy growth of plants their needs should be acquired. Sensors are embedded into soil depending on growth of its roots; structure of roots depends whether it is

herb, shrub, trailer or crawler. Sensors used is soil moisture sensor which detect the moisture level present in soil at current time and temperature sensor. It recognizes the need of water and send analog signal to Node MCU. This signal is sent and stored in cloud and processed for further execution. This signal further is sent to android application as notification which indicates the need of water to user. In application notification is sent and this text is further converted into speech. When plant needs water then user receives a message which says *"I need water"* and when the need is satisfied it says *"I am full now"*. If user is available around plant then user nourish its plants by watering it manually. If not, then user needs to click a button which starts drip irrigation system. Drip irrigation system is attached to main supply of water in particular area to reduce risk of unavailability of water.
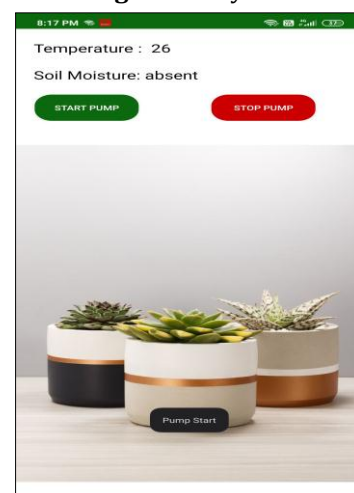

Fig. 01- Vanya Kit

Fig. 02 -Android app

Fig. 03 – Pump watering plants

Android application being a third-party communicator plays important role here. Plants are able to express needs clearly, when they need water or when they are full. In this application, user must register their details in application. To register a plant on application, user should scan provided QR code to establish communication. User can add as many plants he/she wishes to add.

Another activity in app provides current temperature around plant and tells whether water is present or absent plus also has button to on or off drip irrigation system. User can also see history of plant, when plant was watered last time. This intensify the affection towards plants as user can now understand plant more clearly and nourish accordingly.

User can also nourish their plants using articles provided in the app. List of articles are provided and every common question regarding plant health is answered in the application. From best way to grow plants to best fertilizer needed for plant is listed.

Also Uses of medicinal plants are included. User have to search the plant and all medicinal uses is given. Calendula, Thyme, Aloe Vera and many other plants are listed with their medicinal uses.

All information about plants can be acquired from one app only. Fig 2.4 shows sample of some articles in the application.
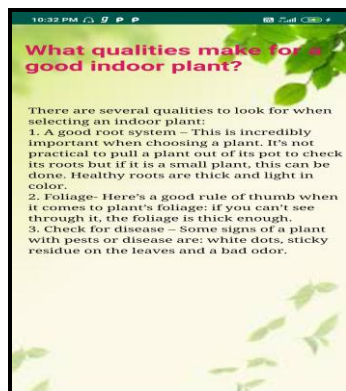

Fig. 04 – Article in Android app

3. HARDWARE SYSTEM

1. **NodeMCU 8266**
    Node MicroController Unit is an open source and hardware development environment that is built around system-on-a-chip called ESP8266. Its memory is 128 Bytes and has storage capacity up to 4 Mbytes. We have used NodeMCU to establish human-plant communication channel where sensors sense the current data and further transfers it to cloud.

2. **Soil moisture sensor**
    The soil moisture sensor uses capacitance to measure dielectric permittivity of the surrounding medium. In soil, permittivity is a function of the water content. Sensor averages the water content over the entire length of sensor. It indicates current status of water i.e. present or absent. Its voltage is from 3V to 5V. Part code is LM393.

3. **Temperature sensor**
    The temperature sensor measures the amount of heat energy or even coldness that is generated around any object. In this, it used to measure temperature around the plant. Its voltage is 5V and part code is DS18B20. Temperature range is from -10 C to +85 C.

4. **Other requirements**
    1. Relay driver (ULN 2803)- Voltage: 5V
    2. Pump
    3. Adapter
    4. PCB
    5. MPS
    6. Connecting Wires

4. BLOCK DIAGRAM

A Block diagram is diagrams of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationships of the blocks. According to the above scenario of the block diagram, first of all, we are connecting some sensors like soil moisture sensor for detecting the moisture level of the soil, temperature sensor to detect the temperature around your plant and pump for the drip irrigation to water your plant.
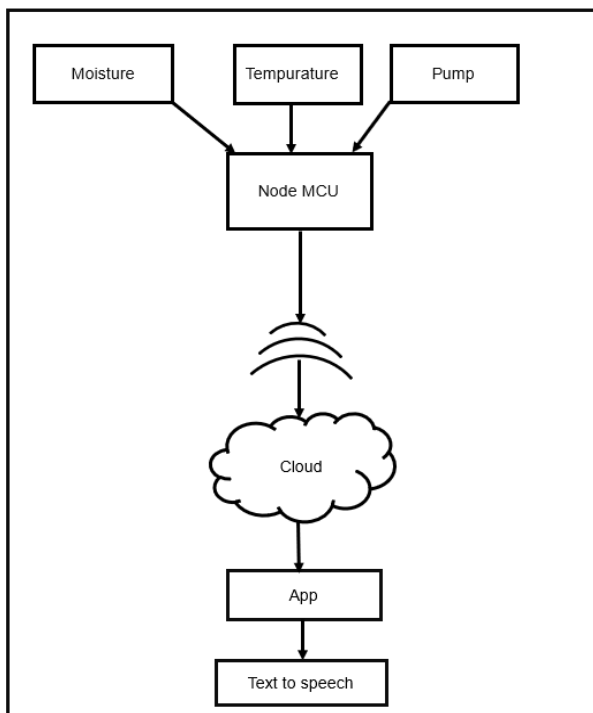
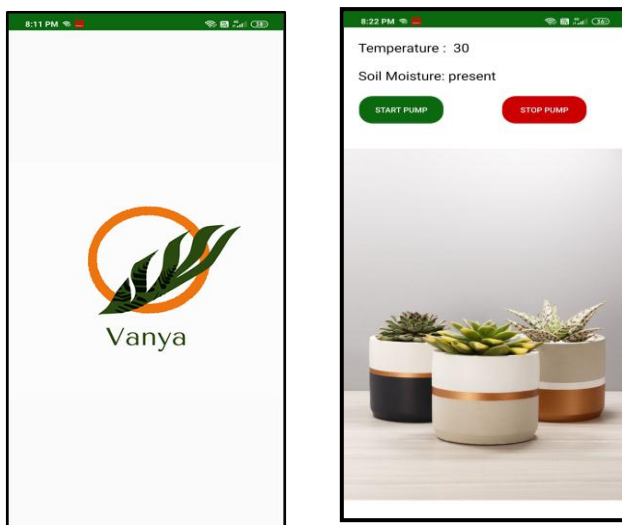**Block diagram**

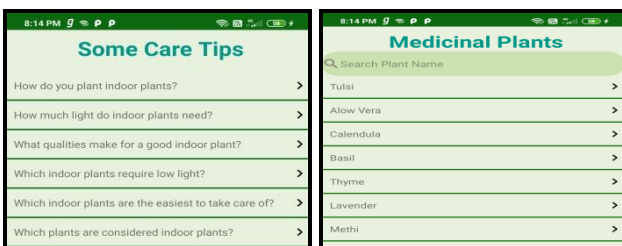## 5. ANDROID APPLICATION

Fig. 05 – Android app

Fig. 06 – Features in Android app

6. CONCLUSION

Based on the myth, people might want to chat with their plants more often. This technique allows the plant to grow more rapidly. Studying this new realm of plant interaction, despite not having eyes, ears, or a nervous system, plants are anything but uncommunicative. This project will enable plants to let its owner understand how it feels. The goal is to encourage a happy relationship between plants and people.

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BIOGRAPHIES

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