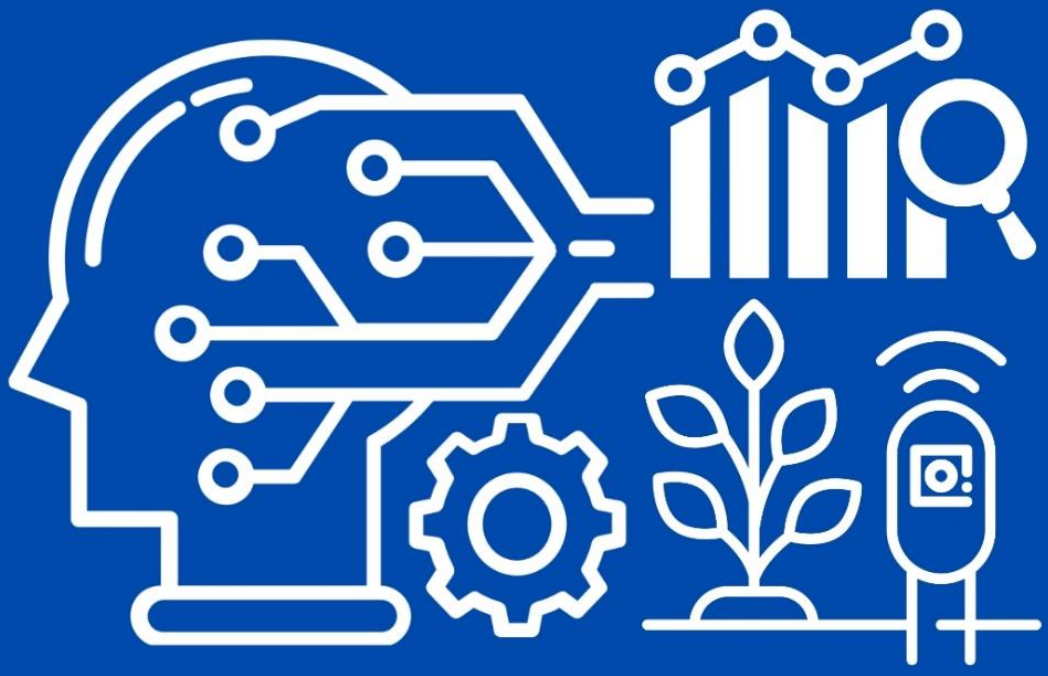
STI College Muñoz-EDSA

MCU-BASED SOIL SCANNER WITH MACHINE LEARNING APPLICATION FOR IDENTIFYING LOCATION SUITABLE FOR PLANTING NARA TREES



USER MANUAL

User's Manual

Welcome to the User Manual, this section of our research will provide you with the step-by-step guide on how to use the MCU-Based Soil Scanner with Machine Learning Application for Identifying Locations Suitable for Planting Narra Trees. This research is designed to gather information (i.e. Parameter Levels) from different types and/or kinds of soils, determining whether those soils are suitable or is a viable option for Narra to be planted on. The system is ideal for people that is fond of plants such as gardeners, botanists, plant farmers, and conservationists.

I. Components of the System

There are 4 main components found in the MCU-Based Soil Scanner with Machine Learning Application for Identifying Locations Suitable for Planting Narra Trees;

a) Arduino Nano
   The main Micro-Controller Unit (MCU) we used for our device, serving as the central processing unit for the collection and analyzation of data coming from the sensors.
b) Soil Sensor Module, which is our main component that is actively and physically placed on the soil during operations. These sensors include pH sensors, moisture sensors, temperature sensors, and nutrient analyzers to gather soil parameters.
c) Power Supply, this provides power to the entire device and is also rechargeable and is compact for long and extended testing and contributes to its portability.
d) Raspberry Pi 4, this helps us in building hardware projects such as the soil scanner by providing wireless connection from the scanner to the mobile application we have also created.
e) Enclosure, this provides cover to the entire device so that the wired components included in it is safe and undamaged when used.

II. Precautions

To ensure the safety and optimal use of the scanner, make sure that the scanner is plunged into the soil firmly in order for the scanner to gather data more accurately. However, if you feel that the scanner is being plunged into hard surface, immediately stop the process, as this will damage the soil scanner itself thus preventing it from gathering data properly, worst case scenario is that it will break and will need to replace. Make sure that all the connections are properly connected to each respective spots in the device.

III. Installation and Mobile Application Guidelines for using the Scanner

1. Place the Soil Scanner in any soft surfaces that can be installed on.

2. Position the Soil Scanner in an open area where you can look over if the device is working properly.
3. Turn the device on, and then connect a specific device (your smartphone) to the corresponding Wi-Fi of the Raspberry Pi 4 in order for the Application to work.
4. Once the device is installed, make sure to check the mobile application and see if the connection status of the device is either Connected, Disconnected, or Error. If the device is connected, then you now can gather data using the mobile application.
5. If the wireless connection is successful, the mobile app will automatically gather data provided by the soil scanner, you can then save the data gathered by clicking the “save” button.

IV. Device Maintenance

Perform the following tasks on a regular basis in order for the device to remain efficiency and accuracy:

a) Clean the scanner after every use, that way when it is used the next time, the scanner will provide accurate information, preventing the idea of detecting data from past soils used.

b) Ensure that the mobile app is still relaying reliable information.

WEEKLY

c) Ensure that all the wirings and connection of the device is still stable and connected.

MONTHLY

d) Check the enclosure for damages, this way we can see if the scanner has been damaged or if the enclosure can still maintain a stable cover for the device.

SEASONAL

e) Calibration of the scanner is a must, in order for it to keep its accuracy and reliability. This includes going through the mobile app by testing the device for malfunctions.

V. Troubleshooting

Use this checklist to diagnose and fix issues:

When the mobile application does not respond to the sensor connection:

- turn off the device
- make sure that all the wirings and needed ports of the device are plugged in
- then restart the device

When there is no data showing in the sensor dashboard of the mobile application:

- first and foremost, make sure you have installed the application correctly and with the

right version
- restart the app
- make sure the statues of the device connection is “connected”

When the data failed to save or if the data produces an incorrect reading:

- reinsert the device to the ground, make sure that it has a firm grip before scanning

VI. Contact and Support

For further assistance regarding the device and the mobile application, you may contact the development team:

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