PROJECT SYNOPSIS

Crop disease detection using Machine Learning and IoT

Submitted by

Vishal Gopal Naik (USN:4SU17EC094)

M Yastika Shetty (USN: 4SU17EC041)

Ajith Kumar S (USN: 4SU17EC004)

Namratha A G (USN: 4SU17EC048)

Under the guidance of

Mr Amith K Jain

Assistant Professor

Department of Electronics & Communication Engineering

SDM INSTITUTE OF TECHNOLOGY

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Abstract

Crop diseases are generally caused by pests, insects, pathogens, and have an adverse effect on the yield of the crop, amounting towards decrease in productivity of the crop. Farmers across the country are facing severe losses due to various crop diseases, and one of the main reasons preventing them from arriving at a solution is not being able to detect the disease at an early stage. To overcome this problem, we are proposing a Crop disease detect model using Machine Learning and IoT.

Farmers residing in remote places do not have the necessary resources/ and facilities so that they can consistently identify the disease in its early stage. The proposed project endeavours towards developing a product which reads a crop image and sends the image to cloud storage wherein an appropriate Machine Learning model is deployed for detection of disease. Results of the process will be sent back to the product, which then will be displayed to the farmer.

Introduction

The objective of the proposed project is to develop a product which detects crop disease even from a remote area. As of now, due to lack of proper knowledge, farmers in remote places face a lot of problems in **early detection** of plant diseases such as Powdery Mildew, Rusts etc which go unnoticed most of the time and cause severe problems. Herein we are planning to integrate Machine Learning and IoT to arrive at a solution for the identified problem and achieve our goal.

The proposed objective is being planned to be achieved using **Raspberry pi** along with **pi-cam** to assist in getting the image of the plant. The image captured will then be sent to cloud storage using IoT **protocols** such as **MQTT**, **IoT gateways** which are easily accessible in Google cloud **Firebase.** The programming language used will be **python**; upon sending the image to the cloud, the Machine learning algorithm will identify if the crop has a disease or not.

The proposed Machine Learning model works in two phases: the **first phase** deals with training data sets. This includes training both healthy as well as diseased data sets. The **second phase** deals with the monitoring of crops and identifying the disease using an optimal algorithm.

Once the output of the Machine Learning model is ready, the same will be sent back to Raspberry pi from the cloud storage. Later, the result will be displayed on **the screen** upon which the end-user will be able to know if the crop is healthy or diseased.

Proposed Block Diagram :

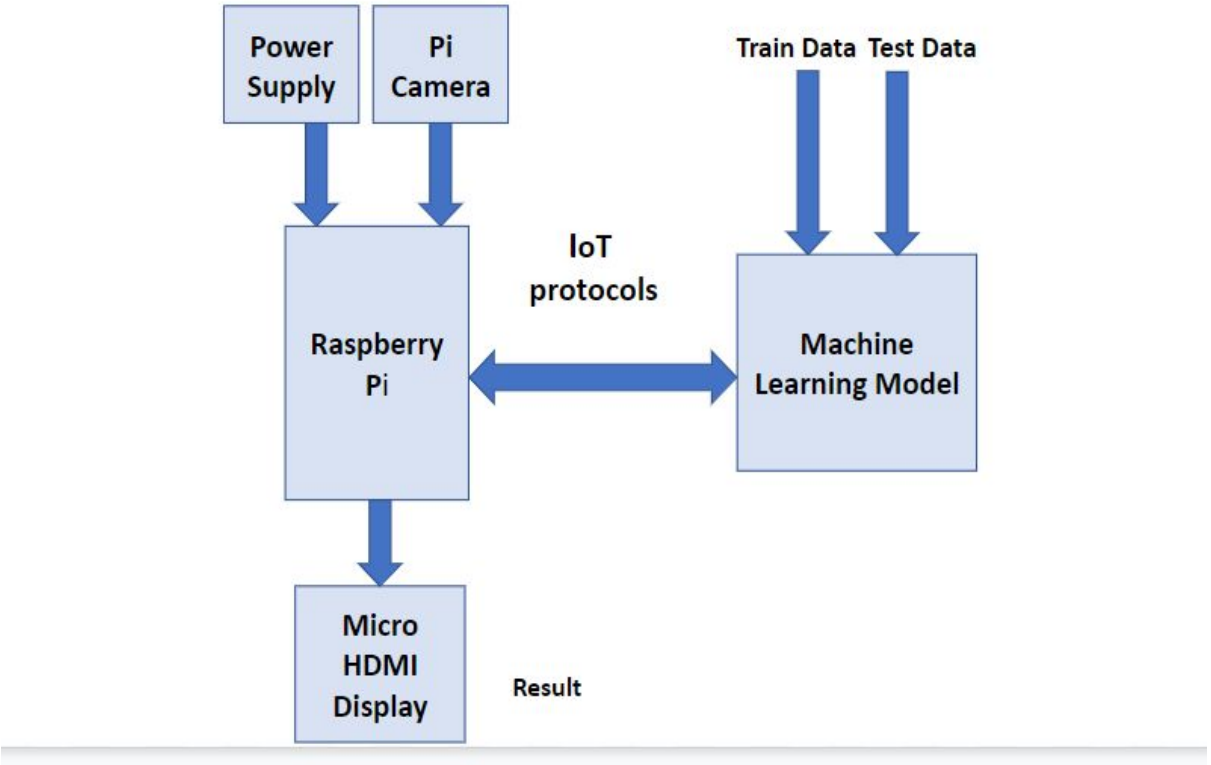

Fig 1: Proposed Crop disease detection model

Pi camera:

The camera module of raspberry clicks an image once the button is pressed. The circuit has to be designed in such a way that once the button is pressed, the image will be sent to the cloud storage where the Machine Learning model is being deployed.

Power supply:

The recommended input voltage is 5V, and the recommended input current is 2A. The proposed power supply design is 5.1 V and 2.5 A. The reason for increasing the voltage slightly is to negate any voltage drop caused by excessive current draw.

Raspberry-pi:

Raspberry-pi acts as a gateway between the user and Machine learning model which is deployed in the cloud storage. Raspberry-pi takes the image input from the user and sends it to the cloud where the proposed Machine Learning model performs crop disease detection and facilitates displaying the result to the end-user.

Machine Learning Model:

This includes training both healthy as well as diseased data sets. It monitors the crop by identifying the disease using an optimal algorithm from the image sent by the user.

Micro HDMI Display:

Micro HDMI display assists us in displaying the result of the crop image captured by the farmer and to also display the end result, i.e.., whether the crop is healthy or diseased