SMART WEED ROBOT

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ABSTRACT—Smart Weed Robot: ***Agricultural weeds remain an important production constraint, with labor shortages and a lack of new herbicide options in recent decades making the problem even more acute. In Agriculture land for removing weed, introducing smart weed robot. This was design by machine learning. It will monitoring weather weed or crops by using camera, then it analysis weather it is weed or crops. If it is a weed it will destroyed by using stepper motors connected with raspberry pi. The robot works without being controlled by a human operator. It covers the ground just by getting its bearing and positioning itself with the help of its camera and sensor. Its system of vision enables it to crop rows, and to detect the presence and position of weeds in and between of rows. We have setup in tensor flow module it will detect automatically weed or plant with 90% accuracies. It reduces man power in agriculture filed.***

Keywords — Machine learning, Raspberry Pi, camera, Tensor Flow.

I.INTRODUCTION:

Weed control is important in agriculture. Weeds compete with productive crops or pasture. Weeds compete with crops for space, nutrients, water and light. Smaller, slower growing seedlings are more susceptible than those that are larger and more vigorous. Weed management is an important aspect for increasing vegetable crop production. A recent estimate shows that weeds cause annual loss of Rs. 1980 crores to Indian Agricultural industry which is more than the combined losses caused by insects, pests and disease**.**

Machine learning is a method of data analysis that automates analytical model building. It is a branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention. At its most basic machine learning use programmed algorithms that receive and analyses input data to predict output values within an acceptable range as new data is fed to these algorithms, they learn and optimize their operations to improve performance, developing 'intelligence' over time.

II.DRAWBACK OF EXISTING SYSTEM

Weed-killing robot named "Tertill". This robot recognizes the difference between weeds and crops based on size. So anything that's short enough to go under the robot is considered a weed, and anything taller is considered a plant. Identification of weed is difficult.

III.PROPOSED SYSTEM

The 'Tertill Robot' size based weed detection can't perform well. Instead Machine learning based introducing 'smart Weed Robot'. The Robot is trained with the training dataset and a machine learning model is to be generated. Based on the model, it can detect weed or plant efficiently

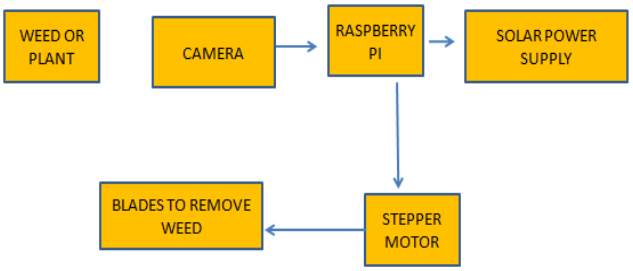


Figure (1) BLOCK DIAGRAM

First placing in the Robot at the agriculture felid. Then camera is monitoring on the Robot .It will monitor weather it is plant or weed by the help of raspberry Pi process. It's setup by the Tensor Flow module. It will check automatically detecting weed or plant with 90% accuracies. The captured image is plant it will move away from it or if it's weed with the help of stepper motor it will cut the weed.

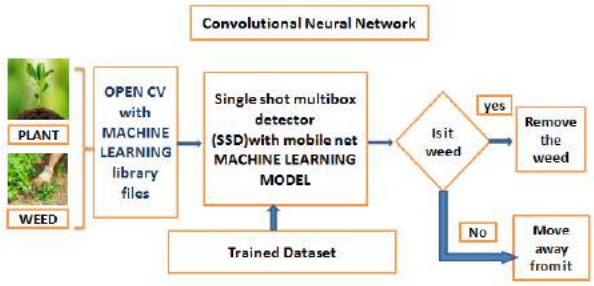


Figure (2) ALGORITHAM

From the above figure (2). The output from the camera is given as input to the open CV. Basic Operations on Images. Accessing and Modifying pixel values. Accessing Image Properties. Image ROI. Splitting and Merging Image channels. Making Borders for Image (PADDING) Arithmetic Operations on Images. Performance Measurement and Improvement Techniques. Mathematical Tools in OpenCV. Then single multibox detector (SSD) is a Machine learning module. The Robot is trained with the training dataset and a machine learning model is to be generated. Based on the model, it can detect weed or plant efficiently

IV. COMPONENTS USED:

HARDWARE COMPONENTS: Raspberry pi 4model B , Raspberry pi 8MP camera modulV2 , Memory card , Stepper motor , Blades , Solar power supply , Power bank , Wheel driver

SOFTWARE COMPONENTS: Tensor Flow, Python Program, Raspbian OS , SSD , Open CV

V.HARDWARE AND SOFTWARE SYSTEMS

HARDWARE SYSTEMS:

Raspberry pii8MP camera modulV2: it is a Hardware interface units. The first of a new generation of raspberry pi 4modal B computer supporting more RAM and with siginficantly enhanced CPU, GPU and I/O performance; all within a similar form ,power envelope and cost as the previous generation raspberry pi 3B+ it is a Brain of the Robot interface with Hardware and software implements. The overall circuit is controlled by using raspberry pi 4model B

- Raspberry pi 8MP camera modulV2: It is Camera is connected with Raspberry pi to monitoring the Plants and weed in agriculture land
- Memory card **:** It is used to store and install the Raspberry pi OS
- Stepper motor: The stepper motor used to drive and control the Blades. It rotate front and back side
- Blades: Blades are connected with stepper motor for the purpose of cut the unwanted weed.
- Solar power supply: Its setup in upper part of the Robot. It receive the sun light and Generate power to store in power bank and the Power bank is connected to raspberry pi for the purpose of giving power supply
- Wheel driver: It's used to moving purpose of the robot. Its act as leg of the robot.

SOFTWARE SYSTEMS:

Raspberry pi OS: It's is a free source operating system based on Debian and optimized and installed for the Raspberry pi OS comes with over 35,000 packages, or pre-compiled software bundled in a nice format for easy installation on a raspberry pi

Tensor Flow: It's created by the Google Brain team; Tensor Flow is an open source library function for numerical computation and large-scale machine learning. It bundles together a slew of machine learning and deep learning models and algorithms and makes them useful by way of a common metaphor.

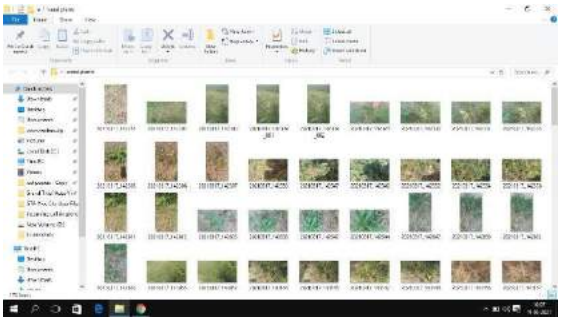
SSD: Single Shot Multibox Detector. Its Machine learning model.SSD model the image using a divided into 6 grid and Each 6 divided grid cell responsible for detecting objects in the region of the image . Its camper the monitoring image into setup image and select the 90% accuracies image detection.

Open CV: Open Source Computer Vision is a cross-platform library using which we can develop real-time computer vision applications. It mainly focuses on image processing; video capture and analysis including features like face detection and

object detection. It's developed by Intel. Open CV is used to Real Time function convert into Numbers

VI. HARDWARE IMPLEMENTATION:

VII. SOFTWARE IMPLEMENTATION:



VIII. ADVANTAGE

- Agricultural robots may have cameras and bb sensors which detect weeds and other forms of stress.
- Sustain domestic agriculture
- Facilitates 24 hr operations
- Improves safety
- Reduces labour needs
- Reduces chemical usage
- Robot can do the right thing, in the right place, at the right time in the right way

XI. APPLICATION

Used in agriculture felid

X. CONCLUSION

Agriculture robots can reduce the cost of cultivation by controlling the high cost of labour, efficient use of fertilizers, pesticides. The jobs in agriculture are a drag, dangerous, require intelligence and quick, though highly repetitive decisions hence robots can be rightly substituted with human operator .Workload on farmers minimized by using these types of robots, and it has to complete fields operation at the time.

XII. Future scope:

In future in order to increase the efficiency of the battery, we could implement solar panels with our system. Our robot there is no need of charging of the robot and it can work day and night. By increasing the size of robot in future, it can be implemented in all type of agricultural field.

XI. REFERENCE:

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