Industrial Internship Report on

"Crop and Weed detection"

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Executive Summary
This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniCoverage Technologies Pvt Ltd (UCT).
This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks' time.
My project was (Crop and Weed detection using datascience and machine learning)
This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship.

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1   Preface:

Summary of the whole 6 weeks' work.

Crop and weed detection depends on the features of

their size and texture. Weed detection is based on image

processing which can be helpful to identify and separate

the weeds from affected areas in crops.

As I approach the end of my journey in the USC_TIA framework, the Internship journey has been a culmination of dedicated efforts and substantial progress in the Crop and Weed Detection project. This week encapsulated both challenges and invaluable learning experiences, marking the final stretch of my involvement in this transformative endeavor.

Thankful to all and Upskills for giving this Internship Opportunity.

I think we have to curious about learning new technologies to enhance the development of any projects , and go through hardwork also smart work also be a part of our life.
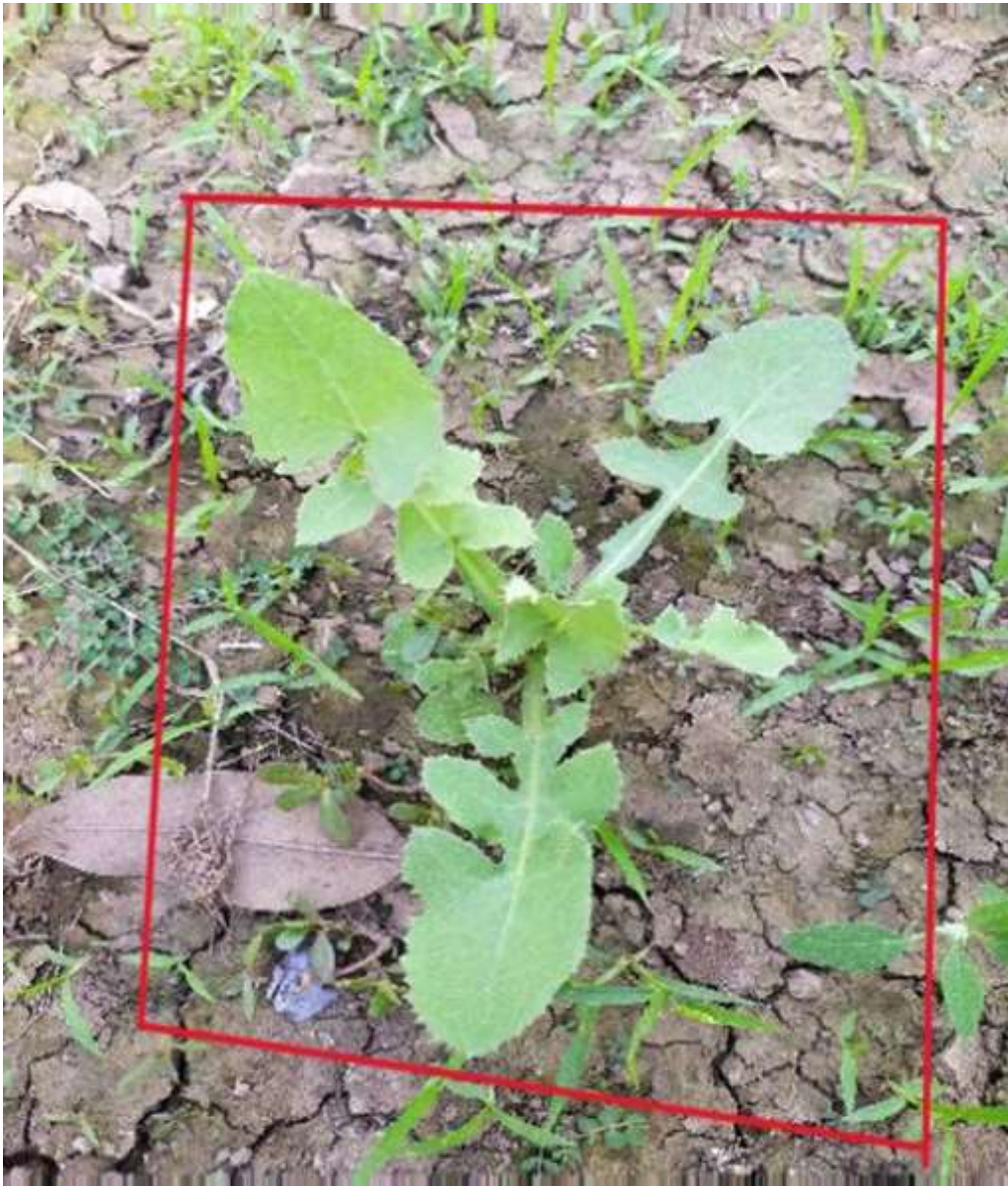
2 Introduction

2.1 About Crop and weed detection

The main objective has been to obtain a formula so that a weed detection system is the detection of green plants in order to eliminate all the soil in the image, reducing information that is not necessary.

Crop and weed detection depends on the features of their size and texture. Weed detection is based on image processing which can be helpful to identify and separate the weeds from affected areas in crops. After removing the weeds from affected areas, the place can further be useful for seeding.

ii. Smart Factory Platform (**FACTORY WATCH**)

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

•with a scalable solution for their Production and asset monitoring

•OEE and predictive maintenance solution scaling up to digital twin for your assets.

•to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.

•A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.
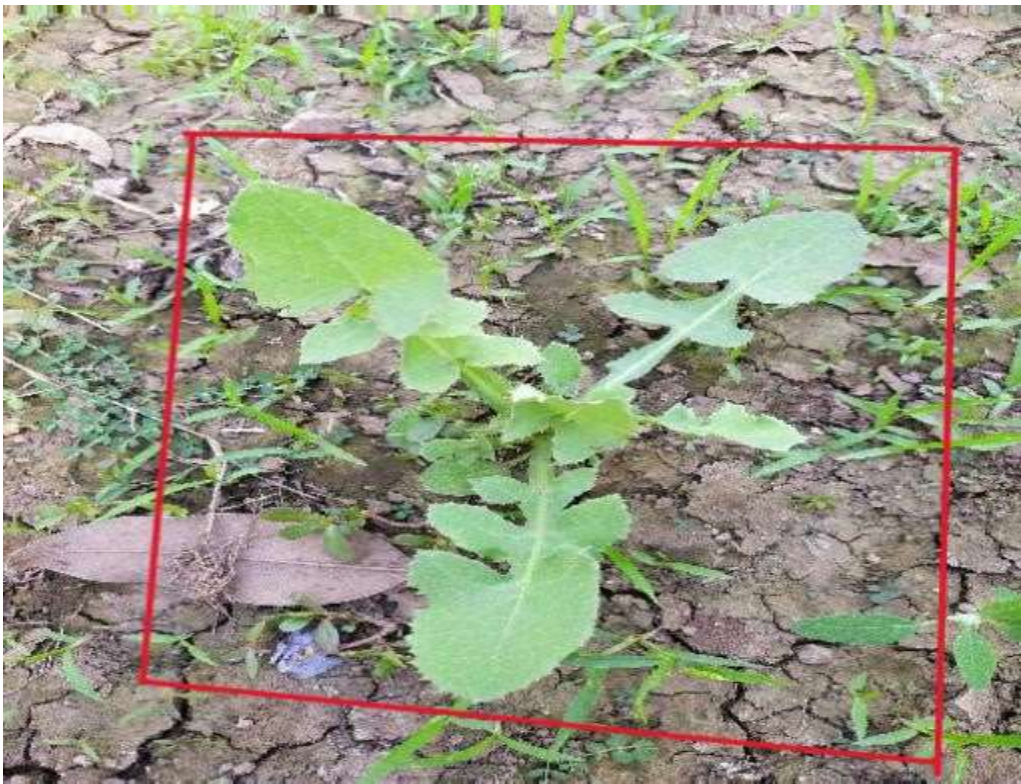
Objectives of Crop and weed Detection:

Data Preparation

STEPS:

1. First of we have to collect dataset for it.For that we have to capture photos of weeds and crops. We collected total 589 images

2. After collection of photos we have to clean the dataset. This step is very important because if any bed photo is remain in dataset it causes worse effect in detection model. After cleaning we have 546 images.

3. Now time for image processing. Our photo size is 4000X3000 color which is very large and model will take very long time for training so we convert all images to 512X512X3 size.

4. 546 image is not enough for training, so we have done some magic to convert 546 image into 1300 images.

3 Problem Statement

Weed is an unwanted thing in agriculture. Weed use the nutrients, water, land and many more things that might have gone to crops. Which results in less production of the required crop. The farmer often uses pesticides to remove weed which is also effective but some pesticides may stick with crop and may causes problems for humans

4.1 Code submission (Github link https://github.com/RevathiGummadiraju/UpSkills.git)

4.2 Report submission (Github link) **:** first make placeholder, copy the link.
https://github.com/RevathiGummadiraju/UpSkills.git

5   Proposed Design/ Model

A low-cost weed detection device implemented ...

The Weed Warden uses a low-cost multispectral sensor, calibrated threshold, and vegetation index to detect green plants with the sensor placed up to 41 cm off the ground.

Crop and weed detection depends on the features of their size and texture. Weed detection is based on image processing which can be helpful to identify and separate the weeds from affected areas in crops. After removing the weeds from affected areas, the place can further be useful for seeding.

What are the advantages of weed detection?

This method involves a more refined approach, explicitly applying weed control treatments to the identified target weeds. This innovation facilitates autonomous weed management and precise identification of various weed species.

Weed control is the process of limiting infestation of the weed plant so that crops can be grown profitably. Weed management includes prevention, eradication and control by regulated use, restricting invasion, suppression of growth, prevention of seed production and complete destruction.

What sensors are used for weed detection?

Weed Warden: A low-cost weed detection device implemented ...

The Weed Warden uses a low-cost multispectral sensor, calibrated threshold, and vegetation index to detect green plants with the sensor placed up to 41 cm off the ground.

The image processing algorithm uses an erosion and dilation segmentation approach to detect the weeds. Using this algorithm the color image is converted into a binary image and the plant having higher white pixels than the predefined threshold is considered as a weed.

The Weeds dataset is a collection of garden weeds that can easily confuse object detection models due to similiarity of the weeds compared to its surroundings.

6 Performance Test

This is very important part and defines why this work is meant of Real industries, instead of being just academic project.

Here we need to first find the constraints.
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What are the advantages of weed detection?
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What is the importance of weed management in crops?
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7 My learnings

I learned a new technology using datascience and machine learning.

Today's farmer has more data available and much more computing

A good example is, a common weed in the United States, which can be difficult to control. This plant
grows quickly, competes aggressively with the crop, can get as large as mature corn plants, and
resembles a corn plant. This hard to control weed can introduce fungi, bacteria, and nematodes,
causing the grower a decrease in harvest yield and income. Killing the weed with herbicide is
expensive and reduces the grower's margin. Besides, herbicide sprayers can only get into cornfields
during the first part of the growing season due to late maturity corn plant size. Obviously, the best
defense is to prevent the weed from infecting other fields. However, if the weed is ingested into the
combine as the corn is harvested, the Shattercane seeds will easily be transferred to other fields as the
combine harvests crop in other fields. To prevent this, the grower will get out of the combine prior to
ingesting it and remove the weed. But to do this, they must know where the weed is in the field.
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8 Future work scope:

Crop and Weed detection project holds immense potential for future developments and expansion. Its future scope extends to various domains and technological advancements that can further revolutionize the industry.

In summary, the future of the "Crop and Weed Detection" project involves continuous innovation,