Fertilizers Recommendation System For Disease Prediction Using IBM Watson

An Industrial/Practical Training Report

Submitted to the Faculty of Engineering of
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA, KAKINADA

In partial fulfillment of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY
In
COMPUTER SCIENCE AND ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SESHADRI RAO GUDLAVALLERU ENGINEERING COLLEGE
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2022-23

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CERTIFICATE

This is to certify that the project report entitled **"Fertilizers Recommendation System For Disease Prediction Using IBM Watson"** is a bonafide record of work carried out by **G DEEP AMAN (19481A0558), CH RAGHAVA (19481A0536), B SATYA RAHUL (19481A0513), D VENKATA APPAJI (1948510545)** under the guidance and supervision of **Ms.K.Srilakshmi ,M.Tech** in the partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering of Jawaharlal Nehru Technological University Kakinada, Kakinada** during the academic year 2022-23.

Project Guide **Head of the Department**

(Guide Name) **(Dr. M. Babu Rao)**

External Examiner

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of any task would be incomplete without the mention of people who made it possible and whose constant guidance and encouragements crown all the efforts with success.

We would like to express our deep sense of gratitude and sincere thanks to **Ms.K.Srilakshmi ,M.Tech ,** Department of Computer Science and Engineering for **his** constant guidance, supervision and motivation in completing the project work.

We feel elated to express our floral gratitude and sincere thanks to **Dr. M. Babu Rao** , Head of the Department, Computer Science and Engineering for his encouragements all the way during analysis of the project. His annotations, insinuations and criticisms are the key behind the successful completion of the project work.

We would like to take this opportunity to thank our beloved principal **Dr. G. V. S. N. R. V. Prasad** for providing a great support for us in completing our project and giving us the opportunity for doing project.

Our Special thanks to the faculty of our department and programmers of our computer lab. Finally, we thank our family members, non-teaching staff and our friends, who had directly or indirectly helped and supported us in completing our project in time.

Team members

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Date

With immense pleasure, this is to approve that the students of Seshadri Rao Gudlavalleru Engineering College i.,e

G DEEP AMAN (19481A0558), CH RAGHAVA (19481A0536),
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successfully completed their Project and Project Report on **"Fertilizers Recommendation System For Disease Prediction Using IBM Watson"** under our guidance.

We are highly impressed with the work that they have done and commend them on their quick grasping skills. They have shown good intent to learn and have put the knowledge gained into application in the form of this project. We appreciate the hard work and commitment shown by them.
We, hereby approve that this document is completely checked and accepted by SmartBridge Technical Team. Its been an absolute pleasure to educate and mentor these students. We hope that this document will also serve as a Letter of Recommendation, to whomsover applied.

We wish them success in all future endeavors and a great career ahead.

Shivam Shivhare

1.INTRODUCTION

1.1 Overview:

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques.

An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.

1.2 Purpose:

The main purpose of the project is to enhance the utilization of the technology by using the advancement in the Deep Learning domain to enable the formers to identify the disease that is affecting their farm from the comfort of their home with the help of a single click through the website. In this, the farmer or the user has to submit the image of disease affected leaf on our website, and our website in turn produces the result about the disease and the necessary actions to be taken. With the help of this project, we achieve an interactive system that helps the farmers to identify the disease affecting the crop at early stages and reduce crop damage.

2.Literature Survey

2.1 Existing Problem

Previously people have to visit help centers or depend on fertilizer retailers in order to identify and understand the appropriate solution to the disease affecting the crop. People from rural areas have to travel long distances to visit help centers, in some cases, they have to depend on local fertilizer retailers which in turn either increase their expenses or result in crop damage.

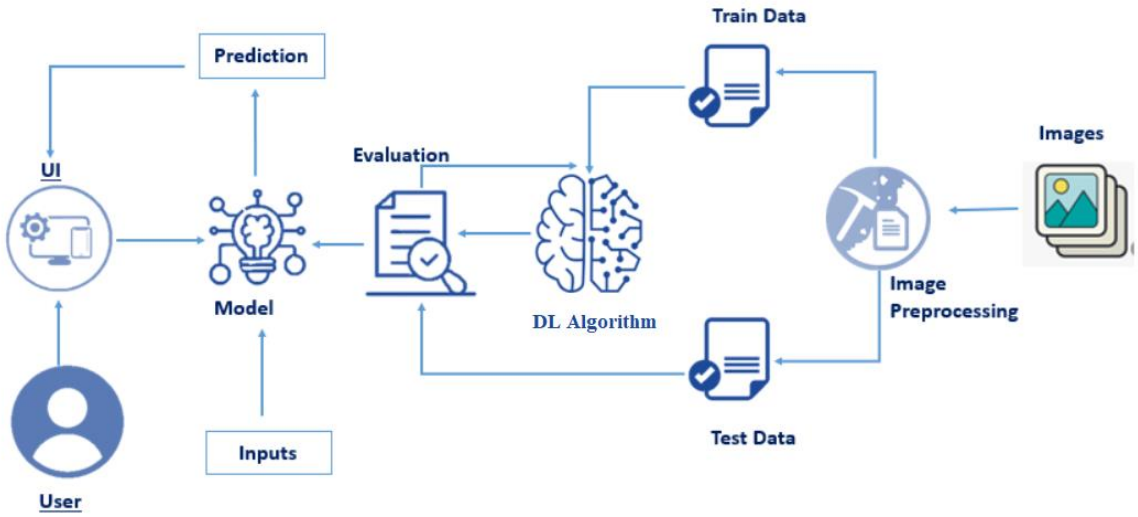
And there are even a few solutions using machine learning techniques like Naive Bayes, Random Forest Classifiers, etc. But they fail to produce good accuracy because they are not appropriate for image processing. In some cases, they ask for chemical values of the crop which requires heavy testing on the leaf resulting in a burden to the farmers again.

2.2 Proposed Solution

In this proposed project, we will use an advanced Deep Learning model that is a Convolution neural network to perform processing on the image of the disease-affected leaf submitted by a user. The usage of Convolution neural networks brought a large leap in accuracy in predicting the leaf disease of a crop. With this, we will help the former to monitor the crop growth and identify diseases of the crop as earlier as possible. In this, we also implemented the web page to help the former to understand the process with the help of the visual aids of the website. The project provides disease detections for a wide group of vegetable and fruit crops which helps the vast group of farmers.

3. Theoritical Analysis

3.1 Block diagram



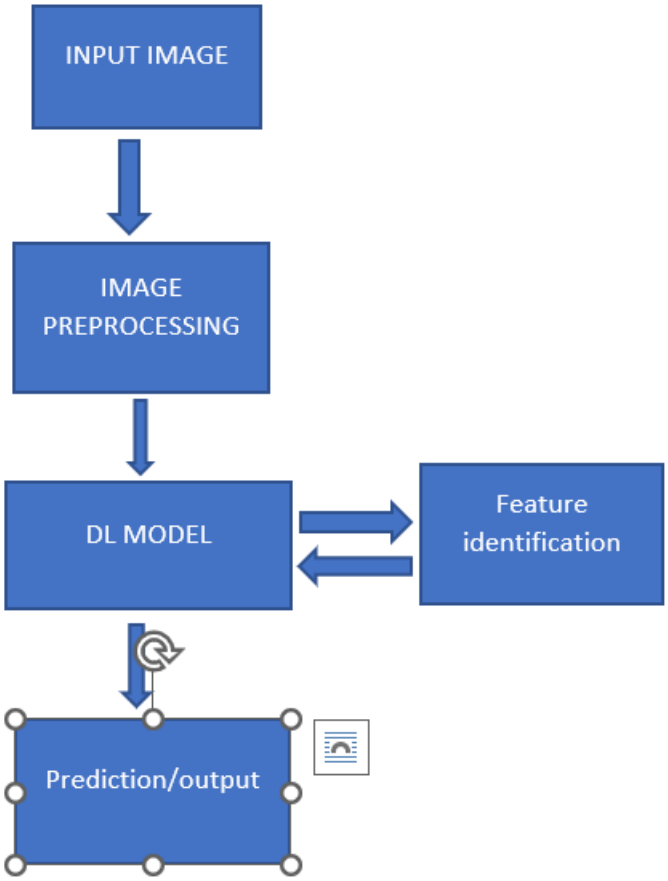
3.2 Hardware / Software designing

- Hardware Requirements
  - Processor-i5
  - RAM-8GB
- Software requirements
  - Anaconda3
  - Jupyter Notebook
  - Brackets
  - Spyder

4.Experimental Investigation

For the implementation of the project, we have gone through several research papers from the "researchgate" website. We have also gone through several You tube channels including the Krish Naik channel. We have gone through several websites including towardsdatascience.com, tutorialspoint, geeks for geeks, etc.

5.Flow chart



6.Results

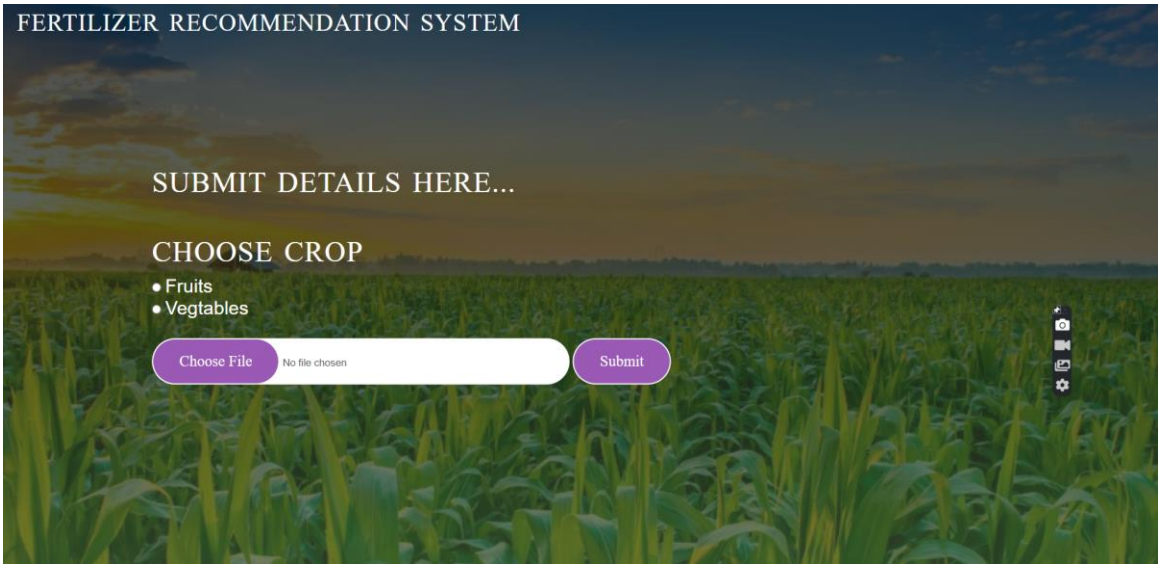
1.Vegetable training:

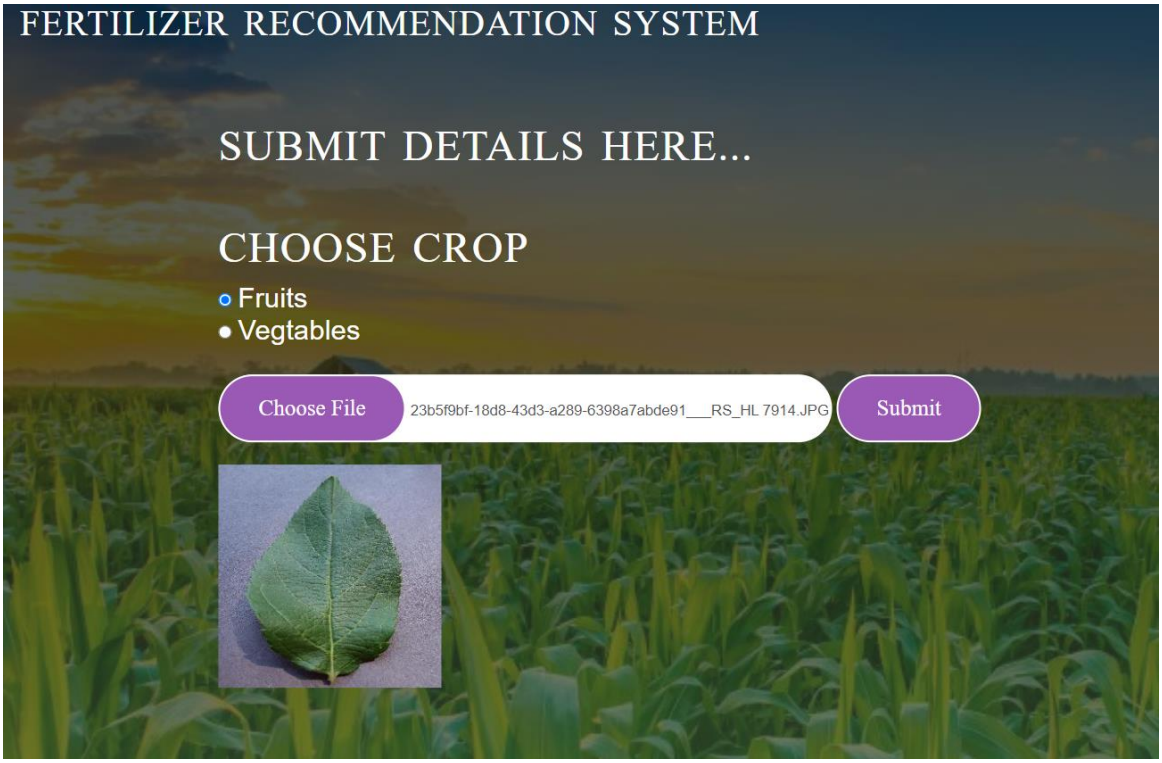
```
Epoch 1/10
89/89 [==============================] - 49s 535ms/step - loss: 1.8290 - accuracy: 0.6348 - val_loss: 91.3441 - val_accuracy:
0.7801
Epoch 2/10
89/89 [==============================] - 41s 455ms/step - loss: 0.5258 - accuracy: 0.8265 - val_loss: 38.2981 - val_accuracy:
0.8657
Epoch 3/10
89/89 [==============================] - 36s 402ms/step - loss: 0.4002 - accuracy: 0.8673 - val_loss: 57.5166 - val_accuracy:
0.8056
Epoch 4/10
89/89 [==============================] - 34s 379ms/step - loss: 0.3098 - accuracy: 0.8975 - val_loss: 209.4127 - val_accuracy:
0.6759
Epoch 5/10
89/89 [==============================] - 34s 384ms/step - loss: 0.2837 - accuracy: 0.8989 - val_loss: 164.7056 - val_accuracy:
0.7454
Epoch 6/10
89/89 [==============================] - 31s 347ms/step - loss: 0.2591 - accuracy: 0.9075 - val_loss: 144.3721 - val_accuracy:
0.7477
Epoch 7/10
89/89 [==============================] - 30s 343ms/step - loss: 0.2475 - accuracy: 0.9101 - val_loss: 529.0474 - val_accuracy:
0.5069
Epoch 8/10
89/89 [==============================] - 29s 325ms/step - loss: 0.2296 - accuracy: 0.9188 - val_loss: 384.2505 - val_accuracy:
0.6759
Epoch 9/10
89/89 [==============================] - 29s 330ms/step - loss: 0.1782 - accuracy: 0.9389 - val_loss: 442.1465 - val_accuracy:
0.6134
Epoch 10/10
89/89 [==============================] - 27s 308ms/step - loss: 0.1787 - accuracy: 0.9382 - val_loss: 472.4930 - val_accuracy:
0.6713
```

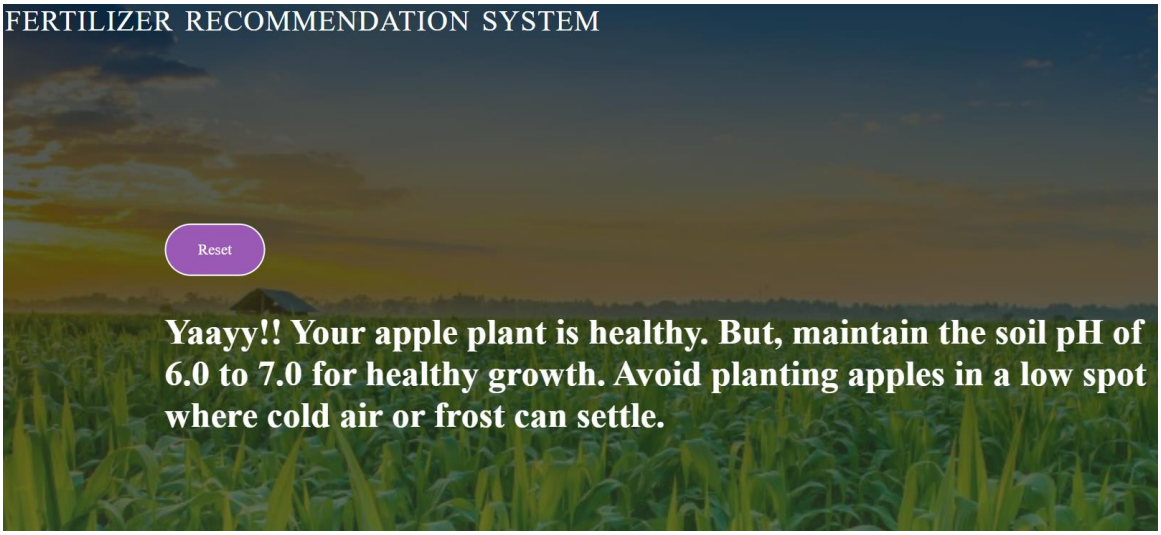
2.Fruit training:

```
racy: 0.5430
Epoch 102/200
712/712 [==============================] - 172s 241ms/step - loss: 0.0608 - accuracy: 0.9887 - val_loss: 2085.3843 - val_accu
racy: 0.4786
Epoch 103/200
712/712 [==============================] - 171s 241ms/step - loss: 0.0208 - accuracy: 0.9950 - val_loss: 2098.4421 - val_accu
racy: 0.5158
Epoch 104/200
712/712 [==============================] - 177s 248ms/step - loss: 0.0169 - accuracy: 0.9958 - val_loss: 3136.1836 - val_accu
racy: 0.5222
Epoch 105/200
712/712 [==============================] - 235s 329ms/step - loss: 0.0351 - accuracy: 0.9913 - val_loss: 2729.9072 - val_accu
racy: 0.4936
Epoch 106/200
712/712 [==============================] - 212s 298ms/step - loss: 0.0230 - accuracy: 0.9942 - val_loss: 2986.8337 - val_accu
racy: 0.4950
Epoch 107/200
712/712 [==============================] - 180s 252ms/step - loss: 0.0291 - accuracy: 0.9940 - val_loss: 1926.6597 - val_accu
racy: 0.4862
Epoch 108/200
```

3. Website:


FERTILIZER RECOMMENDATION SYSTEM
SUBMIT DETAILS HERE...
CHOOSE CROP
Fruits
Vegtables
Choose File
No file chosen
Submit


FERTILIZER RECOMMENDATION SYSTEM
SUBMIT DETAILS HERE...
CHOOSE CROP
Fruits
Vegtables
Choose File
23b5f9bf-18d8-43d3-a289-6398a7abde91___RS_HL 7914.JPG
Submit



7.Advantages and disadvantages

Advantages:

1.The first advantage of the model is accuracy. The accuracy of the model is around 80-90% which is a pretty decent accuracy.

2.With the advancement of the technology the task was made simple for the farmers. This enables the farmers to resolve their crop issues at home.

3.The third advantage is that with a simple click on camera is just enough to get the disease of crop.

Disadvantages:

1.The accuracy of the model is good. But really not so appropriate to the current situation. Since according to current situation, we need the accuracy around 97%. So that we can get good result.

2.For training model we need high quality images. Which is quite expensive and time taking.

8.Applications

1.This can be used to help the farmers to identify the crop disease with a single photo click which helps the user to identify the disease. And provide appropriate solution.

2.This also brings the modernization of the farming domain.

9.Conclusion

In this we have used the Convolution Neural Network for both the vegetables and fruits leaf disease detection which in turn yielded a good accuracy around 93% and 92% while execution. This algorithm performed more better than all previous ML techniques including Decision Tress, K-Nearest Neighbours etc. This project also includes the interactive interphase which in turn adds necessary put ups to it. With this the ML domain has been doing a fabulous job in every sector letting us to make the society a better place to live.

10.Future Scope

In this project we have used the convolution Neural Network which yielded a good accuracy around 92% but there are far more advanced techniques including Resnet networks, VGG networks and DenseNet networks which can work much better when compared to traditional CNN.