PRIOR KNOWLEDGE

Team ID	PNT2022TMID33189
Project Name	Fertilizers Recommendation System For Disease Prediction
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Prior Knowledge:

Detection and recognition of plant diseases using machine learning are very efficient in providing symptoms of identifying diseases at their earliest. Plant pathologists can analyze digital images using digital image processing to diagnose plant diseases. Application of computer vision and image processing strategies assists farmers in all agriculture regions. Generally, plant diseases are caused by the abnormal physiological functionalities of plants. Therefore, the characteristic symptoms are generated based on the differentiation between expected physiological functionalities and abnormal physiological functionalities of the plants. Mainly, plant leaf diseases are caused by Pathogens positioned on the plants' stems. Different methods in image processing predict these different symptoms and diseases of leaves. These different methods include different fundamental processes like segmentation, feature extraction and classification and so on. Mainly, the prediction and diagnosis of leaf diseases depend on segmentation, such as segmenting the healthy tissues from diseased tissues of leaves.

1. Image Classification

The proposed image classification technique is divided into the following steps.

2. Image acquisition

The purpose of image preprocessing is improving image statistics so that undesired distortions are suppressed and image capabilities which are probably relevant for similar processing are emphasized. The preprocessing receives an image as input and generates an output image as a gray scale, an invert and a smoothed one.

3. Segmentation

Implements Guided active contour method. Unconstrained active contours applied to the difficult natural images. Dealing with unsatisfying contours, which would try and make their way through every possible grab cut in the border of the leaf. The proposed solution is used the polygonal model obtained after the first step not only as an initial leaf contour but also as a shape prior that will guide its evolution towards the real leaf boundary.

4. Disease Prediction

Leaves are affected by bacteria, fungi, virus, and other insects. Support Vector Machine (SVM) algorithm classifies the leaf image as normal or affected. Vectors are constructed based on leaf features such as color, shape, textures. Then hyperplane constructed with conditions to categorize the preprocessed leaves and implement multi class classifier, to predict diseases in leaf image with improved accuracy.

5. Fertilizer Recommendation

Recommend the fertilizer for affected leaves based on severity level. Fertilizers may be organic or inorganic. Admin can store the fertilizers based on disease categorization with severity levels. The measurements of fertilizers suggested based on disease severity.

Supervised and unsupervised learning:

In Supervised Learning, a machine is trained using 'labeled 'data. Datasets are said to be labeled when they contain both input and output parameters. In other words, the data has already been

tagged with the correct answer.

Unsupervised learning, also known uses machine learning algorithms to analyze and cluster unlabeled datasets. These algorithms discover hidden patterns or data groupings without the need for human intervention. Its ability to discover similarities and differences in information make it the ideal solution for exploratory data analysis, cross-selling strategies, customer segmentation, and image recognition.

Clustering, Classification and Regression:

In the field of machine learning we all know the type of problems are different, sometimes we predict the value on previous set of data – Where data learn from available dataset, or sometimes grouping them into some cluster. So today we are going to see what these terms are – Clustering, Classification and Regression means in Data science field. let us dive into this concept.

Generally, machine learning algorithms are categorized based on output type and type of problem that need to be addressed. So, these algorithms are divided into three categories –

1. Classification
2. Regression
3. Clustering

Classification:

Classification is the type of supervised machine learning, for any given input, the classification algorithm helps in the prediction of the class of the output variables. there can be multiple type of classification are – binary classification, multi-class classification.
Types of classification

- K – Nearest Neighbor
- Logistic regression
- Decision tree
- Random forest
- Naive Bayes
- SVM (Support Vector Machine)

Regression:

Regression is the type of supervised machine learning, When the output is continuous like age, height etc. one of very popular regression algorithm is LinearRegression.
Types of Regression

- Linear Regression
- Ridge Regression
- Lasso

Clustering:

Clustering is unsupervised machine learning algorithm; it is used togroup data point having similar characteristics as cluster.
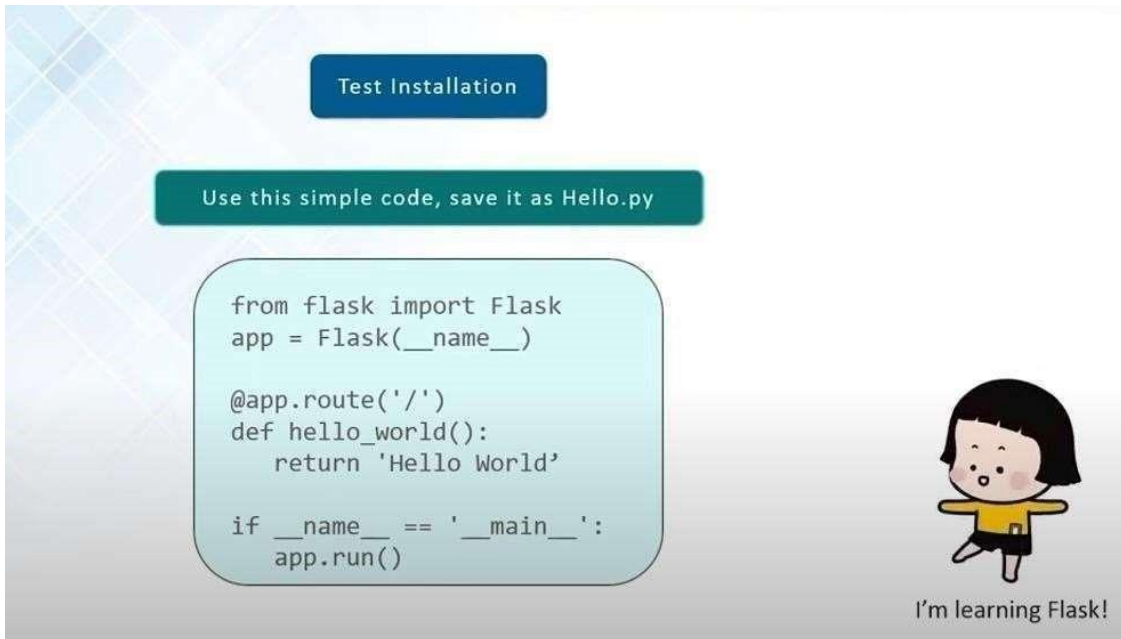Clustering is divided into two groups

1.Hard clustering – In hard clustering, the data point is assigned to one of theclusters only.

2.Soft clustering – It provides a probability likelihood of a data point to be ineach of the clusters.

Python Flask:

Flask Tutorial provides the basic and advanced concepts of the Python Flask framework. Our Flask tutorial is designed for beginners and professionals. Flask is a web framework that provides libraries to build lightweight web applications in python. It is developed by Armin Ronacher who leads an international group of python enthusiasts

(POCCO). Flask is a web framework that provides libraries to build lightweight web applications in python. It is developed by Armin Ronacher who leads an international group of python enthusiasts (POCCO). It is based on WSGI toolkit and jinja2 template engine. Flask is considered as a micro framework.

Test Installation

Use this simple code, save it as Hello.py

```python
from flask import Flask
app = Flask(__name__)

@app.route('/')
def hello_world():
    return 'Hello World'

if __name__ == '__main__':
    app.run()
```

I'm learning Flask!