# PRIOR KNOWLEDGE

| TEAM ID | PNT2022TMID48071 |
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| PROJECT NAME | FERTILIZER 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 following steps.

### 2. Image Acquistion:

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:**

A Convolutional Neural Network has three layers: a convolutional layer, a pooling layer, and a fully connected layer.Convolutional layer: produces an activation map by scanning the pictures several pixels at a time using a filter.Pooling layer: reduces the amount of data created by the convolutional layer so that it is stored more efficiently.Fully connected input layer – The preceding layers' output is "flattened" and turned into a single vector which is used as an input for the next stage. The first fully connected layer – adds weights to the inputs from the feature analysis to anticipate the proper label. Fully connected output layer – offers the probability for each label in the end.

**5. Fertilizer Recommendation System:**

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 beetagged 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 Algorithm are characteristics based on the output type and type of the Problem that need to be Addressed. So, these Algorithm 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

1. K – Nearest Neighbor
2. Logistic Regression
3. Decision Tree
4. Random Forest
5. Naive Bayes
6. CNN

**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 Linear Regression.

**Clustering:**

Clustering is unsupervised Machine Learning , it is used to group data point having similar characteristics as cluster.

Clustering is divided into two groups

Hard Clustering **-** In Hard clustering , the data point is assigned to one of the Clusters only.

Soft Clustering - It Provides a Probability Likehood of a Data Point to be in each of the cluster.

**Python Flask:**

Flask, a backend this compact and controlled is capable of handling all the data processing required to support a full-featured frontend finance tracking app for fiscal fanatics, like me! I hope you've enjoyed my article on Flask as a compact backend development tool for Python.