

Multivariate Leaf Disease Detection System : A Machine Learning Approach

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Problem Statements

Common In Our Country

Corn

• Common Rust

Potato

• Early Blight

Foreign Crop

Bell
pepper

Bacterial
Spot

Current Approach:

1. naked eye observation
2. requires continuous monitoring
3. expensive and difficult in large farms

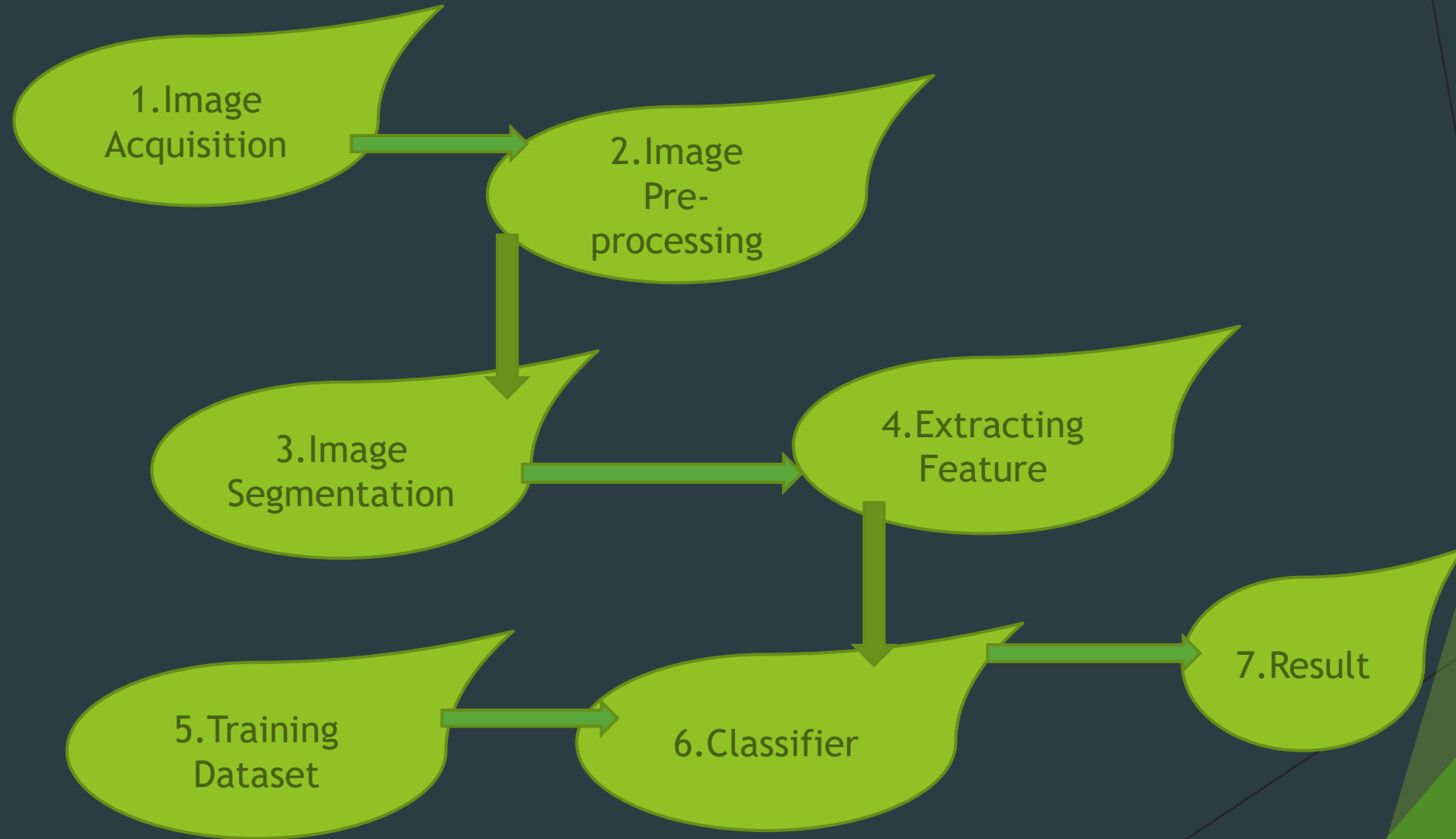
Motivation & Objective

- Farmers to detect disease soon
- minimizing production and economic losses
- ensuring quality and quantity of agricultural products
- minimizing agrochemicals use

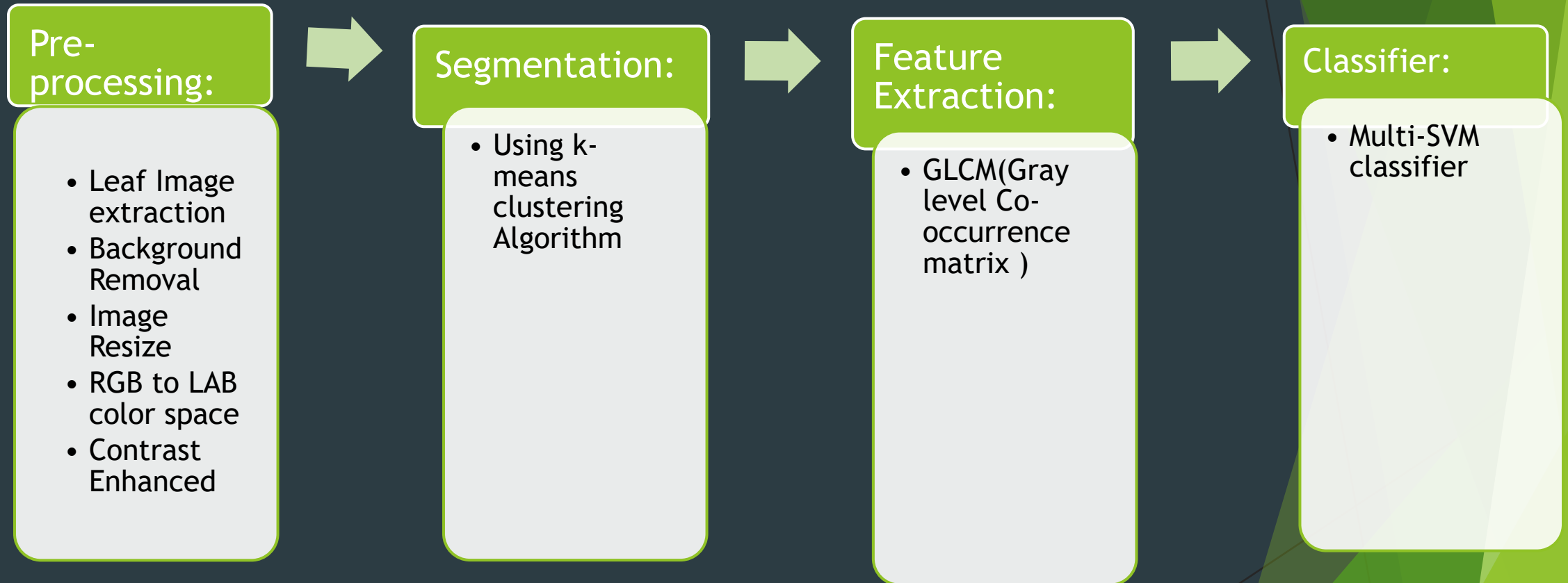
To present a model that

- ❖ Employs GLCM technique to extract features
- ❖ Multi-SVM Classifier to identify Multiple Crop disease

Proposed System



Methodology



Methodology

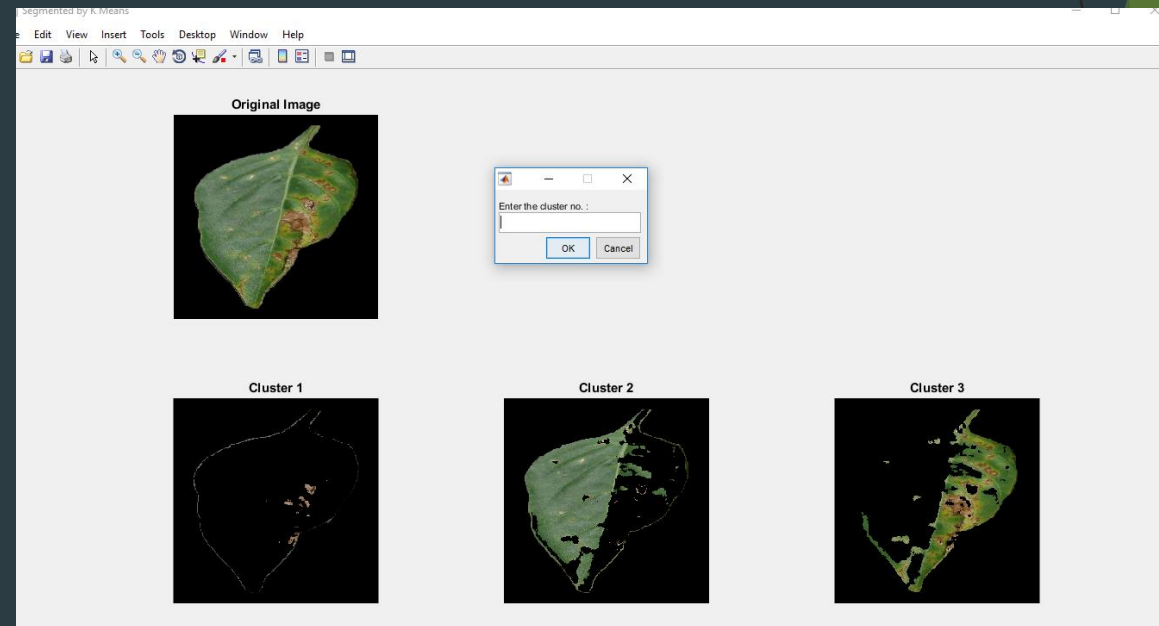


1. Pre-processing:

- Leaf Image extraction
- Background Removal
- Image Resize
- RGB to LAB color space
- Contrast Enhanced

2. Segmentation:

Using k-means clustering Algorithm



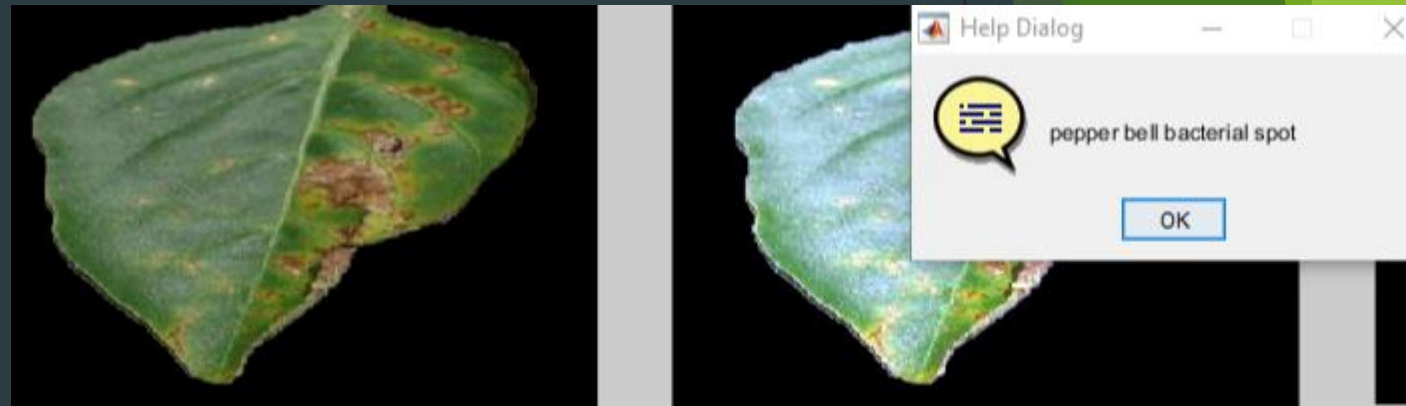
Methodology

3. Feature Extraction:

GLCM(Gray level Co- occurrence matrix)

4. Classifier: Multi-SVM classifier

FEATURES	
Mean	1.27914
S.D	11.0206
Entropy	0.38794
RMS	1.6836
Variance	118.75
Smoothness	0.999999
Kurtosis	110.224
Skewness	9.98224
IDM	255
Contrast	0.0405684
Correlation	0.77676
Energy	0.966009
Homogeneity	0.993631



pepper bell bacterial spot

pepper bell bacterial spot

21.294


Snapshots of the System

DetectDisease_GUI

Multivariate Leaf disease detector


LOAD IMAGE

Query Image




ENHANCE CONTRAST

Contrast Enhanced



SEGMENT IMAGE

Segmented Image



CLASSIFICATION RESULT

pepper bell bacterial spot

AFFECTED REGION in %

21.294

EXIT

ACCURACY in %

98.7755

FEATURES

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Experiment Result

Training:

↓
Train 480 image
data

↓
3 Crops
Variation

↓
80 image of each
6classes

Testing:

↓
Test 60 data

↓
3 Crops Variation

↓
Total of 6 classes

Correctly Identified: 45 data
Incorrectly Identified: 15 data

ACCURACY: 75%

Limitation & Future Work

Limitation:

- Database is not rich
- Requires manual background removal
- Sensitive to too high or too low brightness

Future Work:

- Increase training data
- Try integrating other classification and clustering algorithm
- Reduce complexity of the system
- Create cloud database
- Build a mobile application for ease of use

**THANK
YOU**

