

# Shetkar-E Complete Guidance for Farmers

Ms.Akanksha A. Jagtap, Ms.Akanksha V. Wagh,  
Mr.Nikhil P. Jagtap, Mr.Ketan N. Dhamdhare

*Department of Computer Engineering, Savitribai Phule Pune University*

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## ABSTRACT

Soils are complex mixtures of minerals, water, air, organic matter, and countless organisms that are the decaying remains of once-living things. Soils serve as media for growth of all kinds of plants. We can say soil is an important ingredient of agriculture. There are several types of soils and each type of soil can have different kinds of features and different kinds of crops grow on different types of soils. We must know which type of our soil is go better in our soil. We can apply machine learning techniques to classify soil and to predict the crop suitable but there are lots of leaf disease our system give there.

**Keywords-** Soil series, Land type, Chemical feature, Geographical attribute, machine-learning, KNN,SVM, Regression.

## I. INTRODUCTION

The huge population of the world depends on their large economy. As well as the economy growth plays an important role in the development of any country and their GDP. The impact of this economy depends entirely on agriculture. But, different factors of cultivation affect the quality and quantity of grains and vegetables. These grains and vegetables come in contact with different diseases due to different climates and conditions in different places. As a result, cultivators in any country face severe losses

[1] because of these diseases. For leaf disease, the amount of crop production is decreasing day by day. The main challenge is to identify the leaf disease in properties such as portion, color information or boundaries are traced in the image [4].

In addition, the classification algorithm can be applied on the color image section for disease recognition. In this paper, we use convolutional neural network (CNN) models such as AlexNet and ResNet-50 which are different types of classification approach [5-7]. AlexNet and ResNet-50 classify the healthy and unhealthy leaf images and recognize the various diseases of leaves. Besides, in the area of agriculture, many existing systems can detect some plant leaf diseases but provide no process of preventive measures. For this reason, this paper proposes a system that can detect diseases and also provide a preventive measure using the mechanism of graphical user interface. The following contributions are the main synopsis of proposed framework: Firstly, we perform image processing technique on leaf datasets.

The key motivation for developing this project is as we say every part of world is developing but we can see that there is no such big achievement or development in soil or crop related issues. So we can give preference to this soil field and if we suggest suitable crop to farmers then it is beneficial for them.

## II. PROBLEM STATEMENT

Currently there is no such a system to find out crop and there disease so farmer get loss in farming and there is not a giving proper gaudiness to farmer to take which crop on that whether our system will easily find out the crop by using image processing concept and machine learning concept we are collecting soil data set to find crop.

## III. RELATED WORK

In this paper we have proposed one optimization technique like Gradient Descent with Momentum is used to train neural network pattern classification algorithm. The algorithm is tested for the Detection of soil moisture

content in each one hour advance by considering eleven different soil and environmental parameters collected during a field test. The Detection errors are analysed using MSE (Mean Square Error), RMSE (Root Mean Square Error), and Rsquared error.[4]Gradient descent is an optimization algorithm that follows the negative gradient of an objective function in order to locate the minimum of the function.

A problem with gradient descent is that it can bounce around the search space on optimization problems that have large amounts of curvature or noisy gradients, and it can get stuck in flat spots in the search space that have no gradient.

Momentum is an extension to the gradient descent optimization algorithm that allows the search to build inertia in a direction in the search space and overcome the oscillations of noisy gradients and coast across flat spots of the search space. After completing this tutorial, you will know, Gradient descent is an optimization algorithm that uses the gradient of the objective function to navigate the search space. Gradient descent can be accelerated by using momentum from past updates to the search position. How to implement gradient descent optimization with momentum and develop an intuition for its behavior.

In the future with advanced classification algorithms and techniques, the accuracy of the system can be increased with various datasets. The system can predict the crop, based on soil parameters. In the future, the location recommendation module can be added according to the crop suggestion means according to suggest crop the appropriate location will be suggested.

#### IV. PROPOSED WORK System Architecture

In this system, we take an image dataset as input and, using the Svm algorithm, determine which type of crop is. and detect the plant have disease or not using CNN algorithm: A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other, CNNs are used for image classification and recognition because of its high accuracy. The CNN follows a hierarchical model which works on building a network, like a funnel, and finally

gives out a fully-connected layer where all the neurons are connected to each other and the output is processed. Dependencies: Used Python Language: Python is commonly used for developing websites and software, task automation, data analysis, and data visualization. Since it's



Figure 1: System Architecture

relatively easy to learn, Python has been adopted by many non-programmers such as accountants and scientists, for a variety of everyday tasks, like organizing finances. Python is a general-purpose programming language, so it can be used for many things. Python is used for web development, AI, machine learning, operating systems, mobile application development, and video games. Python is a relatively easy programming language to learn and follows an organized structure.

The python language is one of the most accessible programming languages available because it has simplified syntax and not complicated, which gives more emphasis on natural language. Due to its ease of learning and usage, python codes can be easily written and executed much faster than other programming languages. Machine learning:

#### Data Flow Diagram

In Data Flow Diagram, we Show that flow of data in our system in DFD0 we show that base DFD in which rectangle present input as well as output and circle show our system, In DFD1 we show actual input and actual output of system input of our system is text or image

and output is rumor detected like wise in DFD 2 we present operation of user as well as admin.

### ER DIAGRAM

An entity-relationship model (or ER model) describes interrelated things of interest in a specific domain of knowledge. A basic ER model is composed of entity types (which classify the things of interest) and specifies relationships that can exist between entities (instances of those entity types). In software engineering, an ER model is commonly formed to represent things a business needs to remember in order to perform business processes. Consequently, the ER model becomes an abstract data model, that defines a data or information structure which can be implemented in a database, typically a relational database.

### UML DIAGRAMS

Unified Modeling Language is a standard language for writing software



Figure 2: Use case Diagram

### Activity Diagram

Activity diagrams are graphical representations of workflows of step wise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams are intended to model both computational and organizational processes (i.e workflows), as well as the data flows intersecting with the related activities. Although activity diagrams primarily show the overall flow of control they can also include elements showing the flow of data between activities through one or more data stores.

blueprints. The UML may be used to visualize, specify, construct and document the artifacts of a software intensive system. UML is process independent, although optimally it should be used in process that is use case driven, architecture-centric, iterative, and incremental. The Number of UML Diagram is available. Use case Diagram. Activity Diagram. Sequence Diagram. class Diagram. ER Diagram.

### Use Case Diagram

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses.

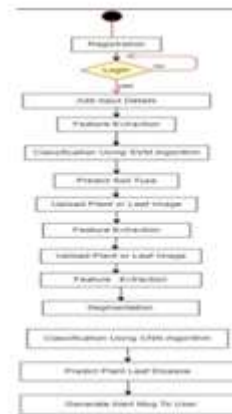


Figure 3: Activity Diagram

### Class diagram

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects. The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code. Class diagrams can also be used for data modeling.[1] The classes in a class diagram represent both the main elements, interactions in the application, and the classes to be programmed.

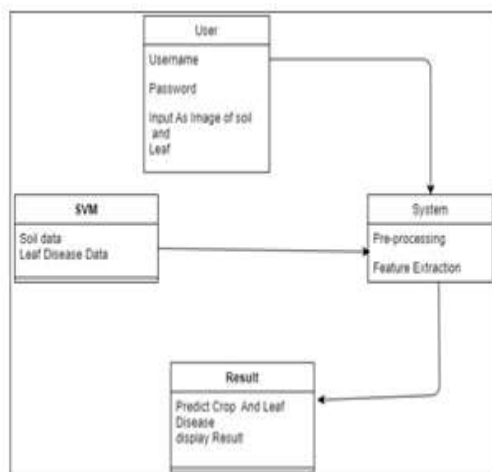


Figure 4: Class Diagram

## V. ADVANTAGES

Crop And Leaf Disease Detection is Simple and relatively easy to use.

- Inexpensive.
- Mostly Useful for Farmers.

Easy to identify soil and plant leaf disease detection.

### System Requirements

#### Database Requirements

- Database :MySQL

#### Hardware Requirements

- Hardware : intel core
- Speed : 2.80 GHz
- RAM : 8GB
- HardDisk : 40 GB

#### Required Tools

- Operating System: Windows 10
- IDE: Android Studio
- Programming Language : Java

## VI. CONCLUSION

A model is proposed for predicting soil series and providing suitable crop yield suggestion for that specific soil and detect plant leaf disease. The model has been tested by applying different kinds of machine learning algorithm. Bagged tree and K-NN shows good accuracy but among all the classifiers, SVM has given the highest accuracy in soil classification with less time. It gives us more accuracy as compared to existing system and gives more benefit to farmers.

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