**Image-Based Plant Disease Detection: A Comparison of Deep Learning and Classical Machine Learning Algorithms**

**ABSTRACT:**

Rapid human population growth requires corresponding increase in food production. Easily spreadable diseases can have a strong negative impact on plant yields and even destroy whole crops. That is why early disease diagnosis and prevention are of very high importance. Traditional methods rely on lab analysis and human expertise which are usually expensive and unavailable in a large part of the undeveloped world. Since smartphones are becoming increasingly present even in the most rural areas, in recent years scientists have turned to automated image analysis as a way of identifying crop diseases. This paper presents the most recent results in this field, and a comparison of deep learning approach with the classical machine learning algorithms.

**EXISTING SYSTEM:**

Human population steadily continues to grow, and along with it the need for food production increases. According to the UN projections [1], human population is expected to reach 9.7 billion in 2050, 2 billion more than today. Considering that most of the population growth is to occur in the least developed countries (around 80% increase in the next 30 years), where the food scarcity is the main problem, it is easy to conclude that minimizing food loss in those countries is a primary concern. It is estimated that the yield loss worldwide is between 20 and 40 percent [2], with many farms suffering a total loss.Easily spreadable diseases can have a strong negative impact on plant yields and even destroy whole crops. That is why early disease diagnosis and prevention are of very high importance.

**DISADAVANTAGES:**

❖ Data Collection Problem

❖ It searches from a large sampling of the cost surface.

**PROPOSED SYSTEM:**

Traditional methods for detecting diseases require manual inspection of plants by experts. This process needs to be continuous, and can be very expensive in large farms, or even completely unavailable to many small farm holders living in rural areas.the PlantVillage Dataset is used [3]. It consists of images of plant leaves taken in a controlled environment. In total, there are 54 306 images of 14 different plant species, distributed in 38 distinct classes given as species/disease pair.Classical methods rely on image pre-processing and the extraction of features which are then fed into one of the ML algorithms. Popular algorithm choices are Support Vector Machines (SVM), k-Nearest Neighbours (k-NN), Fully Connected Neural Networks (FCNN), Decision Trees, Random Forests etc

**ADAVANTAGES:**

* Machine learning algorithm optimizes both variables efficiently, continuous or discrete
* Gives a number of optimum solutions, not a single solution. So different image segmentation results can be obtained at the same time
* Large number of variables can be processed at the same time.
* It can optimize variables with highly complex cost surfaces.

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

❖ System : Pentium Dual Core.

❖ Hard Disk : 500 GB.

❖ Monitor : 15’’ LED

❖ Input Devices : Keyboard, Mouse

❖ Ram : 32GB.

**SOFTWARE REQUIREMENTS:**

Operating system : Windows 7.

Coding Language : Python

Tool : PyCharm,VisualStudio Code

Database : MYSQL

**REFERENCE:**

Draško Radovanović 1, Slobodan Đukanović ,“**Image-Based Plant Disease Detection: A Comparison of Deep Lea rning and Classical Machine Learning Algorithms**”, 24th International Conference on InformationTechnology(IT)Zabljak,18–22February 2020978-1-7281-5136-6/20/$31.00 ©2020 IEEE