
Indian Institute of Information Technology, Lucknow

भारतीय सूचना प्रौद्योगिकी संस्थान, लखनऊ

- **Title of the Project**: Plant Disease Detection And Classification
- **Name of the Supervisor**: Dr. Brijesh Kumar Chaurasia
- **Abstract**:

Plant diseases contribute 10–16% losses in the global harvest of crops each year costing an estimated US$220billion. According to a report of the Food and Agriculture Organization (FAO), our world population is anticipated to hit 9.1billion in 2050. Therefore, agricultural production needs to be increased up to 70% to fulfill the food requirements of a steadily growing population. On the other hand, abundant use of chemicals such as bactericides, fungicides, and nematicides to control plant diseases has been causing adverse effects in the agro-ecosystem. Currently, there is a need for effective early disease detection techniques to control plant diseases for food security and sustainability of agro-ecosystem.

To implement this I'm going to use Plant-Village dataset that's publicly available. This dataset contains 54,309 records. The images span 14 crop species: Apple, Blueberry, Cherry, Grape, Orange, Peach, Bell Pepper, Potato, Raspberry, Soybean, Squash, Strawberry, and Tomato. It contains images of 17 fundal diseases, 4 bacterial diseases, 2 mold diseases, 2 viral diseases, and 1 disease caused by a mite. 12 crop species also have images of healthy leaves that are not visibly affected by a disease.

I'm going to implement a deep learning model that can identify plant diseases, using Tensorflow framework, a Convolutional Neural Network (CNN) architecture. The goal is to detect different plant diseases by looking at their picture.

- **Learning Objectives**:
  - ***Knowledge to Acquire***:

    Plant Disease
    Neural Network
    Deep learning
    Data Augmentation

  - ***Skills to Acquire***:

    Python
    Jupyter Notebook
    Numeric Python
    Data Visualization
    Image processing
    Deep learning
    keras
    ResNet

  - ***Competences to Acquire***:

    In-depth knowledge of Deep learning layer based Sequential models
    Image processing using Pillow library
    Proficiency of working on Jupyter notebook
    Skill of implementing Tensorflow
    Working on google colab for handling large data sets

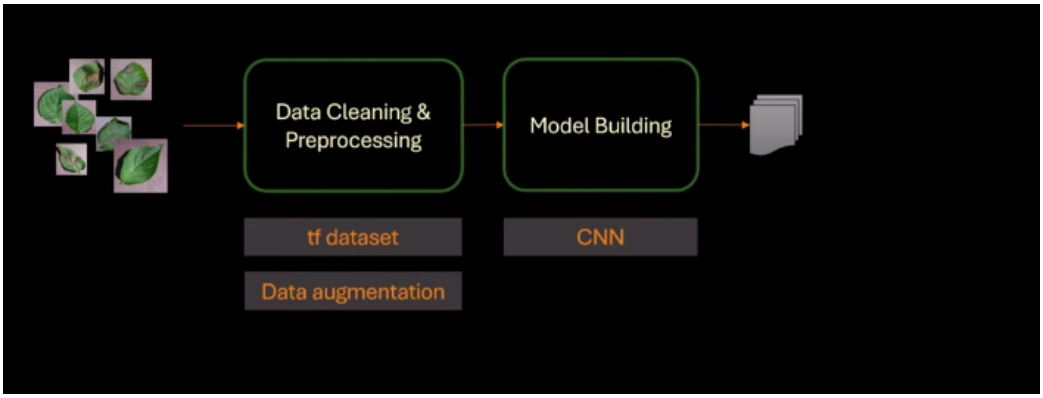
  - ***Attempting to solve any Research Problem?***:

    Yes

– ***Overview of Research Problem/Project***:

Plant diseases contribute to 10–16 % losses on the world's annual crop yield costing an estimated USD 220 billion. According to a report by the Food and Agriculture Organization, the global population is expected to reach 9.1 million by 2050. Therefore, agricultural production needs to be increased to 70 % to meet the food needs of the slowly growing population. On the other hand, excessive use of chemicals such as bactericides, fungicides, and nematicides to control plant diseases has had adverse effects on the agro-ecosystem. At present, there is a need for effective early diagnostic methods to control plant diseases for food security and agro-ecosystem sustainability.

- **Workflow diagram**




- **Signature of all the students along with the signature of their supervisor**

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LCS2019059

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