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| CENTRAL TOOL ROOM & TRAINING CENTER  B-36, CHANDAKA INDUSTRIAL AREA, NEAR INFOCITY, BBSR,(O.D) 751024  Department Of CSE(AI/ML) | | |
| images (1) | | |
| CERTIFICATE  Certified that Major Project Work entitled “PLANT DISEASE PREDICTION” is a bonafide work carried out by Aditya Prasad, Ayushaman Pattnayak, Trilochan Chakrabortty & Samrit kumar Bhutia in particular fulfillment of the requirements for the award of CERTIFICATION COURSE IN AI/ML from CENTRAL TOOL ROOM & TRAINING CENTER, Bhubaneswar, during the year 2025. It is certified that all the correction/suggestion indicated for internal assessment have been incorporated in the report. The major project report has been approved as is satisfied the academic requirements in the respect of project work prescribed for AI/ML, CTTC, Bhubaneswar. | | |
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| ……………………………………  Course  Faculty |  |  |

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Place: Bhubaneswar AI/ML

**DECLARATION**

We the batch of AI/ML studying as interns at CTTC (Central Tool Room & Training Center), Bhubaneswar, hereby declare that this major project work entitled “**PLANT DISEASE PREDICTION**” which is being submitted by us in the partial fulfillment for the award of the internship of AI/ML from CTTC, Bhubaneswar is an authentic record carried out during the Training year June 2025, under the supervision of Mrs. Ritu Maity at CTTC, Bhubaneswar.

**ABSTRACT**

The agricultural sector plays a vital role in a country's economy and food security. However, plant diseases significantly reduce crop yield and quality, posing a threat to farmers' livelihoods and food supply. This project, titled **"Plant Disease Prediction"**, leverages Artificial Intelligence (AI) and Machine Learning (ML) techniques to detect plant diseases from leaf images with high accuracy.

The system uses image processing and Convolutional Neural Networks (CNN) to classify plant diseases and provide real-time diagnoses. The goal is to assist farmers and agricultural experts in identifying diseases at an early stage and recommending appropriate remedies. The model is trained using publicly available datasets and deployed with a user-friendly Graphical User Interface (GUI), making it accessible even for non-technical users.

Keywords:-

Plant Disease Prediction, Artificial Intelligence (AI), Machine Learning (ML), Image Processing, Convolutional Neural Networks (CNN), Leaf Image Classification, Real-time Diagnosis, Agricultural Productivity, Crop Yield, Smart Farming, Disease Detection, Automated System, User-friendly Interface, Public Datasets.

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# **INTRODUCTION**

Plant diseases are one of the leading causes of reduced agricultural productivity. Traditionally, farmers rely on visual inspection or expert advice to detect these diseases, which is time-consuming and prone to errors. With the advancement of Artificial Intelligence and Machine Learning, it is now possible to develop automated systems that can identify diseases from images with high precision.

The objective of this project is to create a robust, intelligent system that predicts the presence of diseases in plants by analyzing leaf images. The system employs deep learning techniques to identify common diseases in crops like tomato, potato, maize, and others. This application can serve as a valuable tool in smart farming, reducing dependency on expert labor, and helping in early disease control.

**SYSTEM ARCHITECTURE:**

The architecture of the Plant Disease Prediction system can be divided into the following components:

### 1. **Data Acquisition**

* Collect a dataset of plant leaf images, either from public datasets like PlantVillage or real-time image collection.

### 2. **Preprocessing Module**

* Image resizing, noise removal, and normalization to prepare input for the model.

### 3. **Model Training**

* A Convolutional Neural Network (CNN) is trained using labeled data for different plant diseases.

### 4. **Prediction Engine**

* The trained model is used to classify new leaf images into healthy or diseased categories.

### 5. **Graphical User Interface (GUI)**

* A user-friendly interface to upload images and display predictions.

### 6. **Database (Optional)**

* Stores image data, results, user details, and prediction history for further analysis.

**Hardware and software Part**

### **Hardware Requirements:**

* Processor: Intel Core i5/i7 or equivalent
* RAM: 8GB minimum
* Storage: 100GB
* GPU: (Optional for training) NVIDIA GPU with CUDA support

### **Software Requirements:**

* **Programming Language:** Python
* **Libraries & Frameworks:** TensorFlow/Keras, OpenCV, NumPy, Pandas, Scikit-learn
* **Database:** SQLite/MySQL (optional)
* **GUI:** Tkinter / Flask / Streamlit
* **Operating System:** Windows/Linux/MacOS
* **IDE:** Jupyter Notebook / PyCharm / VS Code

**WORK FLOW OF GUI**

### **GUI Workflow:**

1. **User Login/Sign Up** (optional)
2. **Image Upload:**
   * The user selects or captures an image of a plant leaf.
3. **Prediction:**
   * Image is sent to the backend model for analysis.
4. **Result Display:**
   * The GUI displays the disease name (if detected) and suggested remedy.
5. **Reset/Upload New Image:**
   * Allows user to start a new prediction cycle.

### **Database Workflow (If implemented):**

* **User Table:**
  + Stores login credentials and basic info.
* **Image Table:**
  + Stores uploaded images, timestamps.
* **Prediction Table:**
  + Stores prediction results, confidence score, and related metadata.