Project Guideline: Idea Proposal Submission

1. Project Idea:

The specific problem addressed by the project is the significant threat to food security in developing countries due to crop diseases. Crop losses, often caused by diseases, impact the livelihoods of farmers and contribute to the cycle of poverty and food insecurity. The goal is to mitigate these losses and enhance sustainable agriculture practices by leveraging machine learning for early detection and management of crop diseases.

The primary goal of the project, named "AgriGuard: Smart Crop Health Management," is to develop a machine learning system that empowers farmers in developing countries to proactively manage and prevent crop diseases.

2. Relevance to Sustainable Development Goals (SDGs):

Zero Hunger (SDG 2): The project directly aligns with SDG 2 by addressing the challenge of crop losses and enhancing food security in developing countries. By reducing crop losses through early disease detection and management, AgriGuard contributes to achieving the goal of zero hunger, ensuring that people have access to sufficient, safe, and nutritious food.

3. Literature Examples:

Deep Learning-Based Leaf Disease Detection in Crops Using Images for Agricultural Applications
Journal: Agronomy, 2022
Authors: by Andrew J., Jennifer Eunice, Daniela Elena Popescu, M. Kalpana Chowdary and Jude Hemanth
Link: https://www.mdpi.com/2073-4395/12/10/2395
This research paper presents a deep learning-based approach for plant disease detection, using a convolutional neural network (CNN) to classify plant images into healthy and diseased categories.
Deep learning models for plant disease detection and diagnosis
Authors: Konstantinos P. Ferentinos
Published: February 2018, Pages 311-318Journal/Conference: Computers, Materials & Continua
In this paper, convolutional neural network models were developed to perform plant disease detection and diagnosis using simple leaves images of healthy and diseased plants, through deep learning methodologies.
Link:
https://www.sciencedirect.com/science/article/pii/S0168169917311742?casa_token=nG0AKjbDkw8
AAAAA:VJYqrQetbfi7JHeajaFrKICRHTvWK6F1n6Ob7nM47BjPhAFZ8smy-fPh3PDtog__Ivn9cRI#ab005

4. Describe Your Data:

powerful sources for agricultural data: PlantVillage, Kaggle Datasets, Open Access Repositories, UCI Machine Learning Repository
The dataset will primarily consist of images capturing the visual characteristics of crops, including both healthy and diseased states. The images may be in commonly used formats such as JPEG or PNG. The dataset size will depend on the diversity of crops and diseases targeted.
Data Preprocessing Steps: Image Preprocessing, Metadata Integration, Data Quality Assurance, Balancing the Dataset, Data Collection Strategy.

5. Approach (Machine Learning or Deep Learning):

Approach: Deep Learning
The choice of a deep learning approach is justified for several reasons related to the complexity of the task and the nature of the data in the project such as Complexity of the Task**,** Feature Representation, Data Complexity and Variability, Continuous Learning, Scalability.