

**Project Design Phase-II**  
**Solution Requirements (Functional & Non-functional)**

Date	13 May 2023
Team ID	NM2023TMID15563
Project Name	Deep learning model for the detecting diseases in tea leaves

**Functional Requirements:**

1. Data Collection: The system should be able to collect a sufficient amount of tea leaf images with annotations indicating the presence or absence of diseases.
2. Data Preprocessing: The system should preprocess the collected data by resizing images, normalizing pixel values, and applying data augmentation techniques to improve model performance.
3. Model Training: The system should train a deep learning model using the preprocessed dataset, employing a suitable architecture and transfer learning techniques for disease detection in tea leaves.
4. Disease Detection: The trained model should be capable of accurately detecting diseases in tea leaves based on input images, providing the corresponding disease classification.
5. Performance Evaluation: The system should evaluate the performance of the trained model using appropriate metrics to assess its accuracy, precision, recall, F1 score, and AUC-ROC.
6. Deployment: The system should provide a deployment mechanism, such as a web-based interface or a mobile application, to allow users to interact with the model and obtain disease detection results for tea leaves.

**Non-functional Requirements:**

1. Accuracy: The deep learning model should achieve a high level of accuracy in disease detection to minimize false positives and false negatives.
2. Speed: The system should provide efficient and timely disease detection results to ensure quick and reliable diagnosis of tea leaf diseases.
3. Scalability: The solution should be able to handle large-scale datasets and accommodate an increasing number of tea leaf images for continuous improvement and adaptation to new disease patterns.
4. Usability: The user interface of the system should be intuitive and user-friendly, enabling users with minimal technical expertise to easily interact with the model and obtain disease detection results.
5. Reliability: The model should be robust and reliable, demonstrating consistent performance across different tea leaf images and disease variations.
6. Security and Privacy: The system should incorporate appropriate measures to protect user data, ensuring the privacy and confidentiality of the tea leaf images and disease-related information.

7. Maintainability: The solution should be designed with modularity and proper documentation to facilitate future maintenance, updates, and enhancements.
8. Compatibility: The system should be compatible with different platforms and operating systems to reach a wide range of users and devices.
9. Ethical Considerations: The solution should adhere to ethical standards, including obtaining necessary permissions and consents for data usage, and ensuring transparency in the model's decision-making process.
10. Performance Optimization: The system should be optimized for efficient resource utilization, making the most effective use of computational resources and minimizing memory and processing requirements.

These requirements provide a comprehensive overview of the functional and non-functional aspects necessary for developing a deep learning model for detecting diseases in tea leaves.