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| **Batch No:** | 08 | | |
| **Project Title:** | RICE CROP YIELD AND PROTIEN DEFICIENCY ANALYSIS | | |
| **Guide Name:** | Dr. JAGADISH RM | | |
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**BALLARI INSITUTE OF TECHNOLOGY AND MANGEMENT, BALLARI**

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***Department Of CSE (Data Science)***

**Project Synopsis**

1. **Introduction:**

The process of predicting rice crop yield and analyzing protein deficiency in rice can be challenging due to the numerous variables involved, such as weather conditions, soil types, farming practices, and genetic factors of the rice varieties. Traditionally, farmers and researchers rely on manual observation and trial-and-error methods to estimate yield and identify potential nutrient deficiencies. This approach is not only time-consuming but also lacks precision, making it difficult to optimize crop management strategies. Through predictive analytics, the system can forecast crop yields based on factors like temperature, rainfall, soil pH, and nitrogen use, while also identifying rice varieties that are more likely to suffer from protein deficiency.

1. **Purpose:**

The purpose of this project is to apply machine learning algorithms to predict rice crop yield and analyze the protein content based on various influencing factors such as weather, soil conditions, and farming practices. The goal is to develop predictive models that help farmers optimize their crop yields and ensure higher nutritional content in rice, especially protein, which is crucial for tackling malnutrition in rice-dependent regions.

1. **Scope of the Project:**

This project will focus on predicting rice crop yield based on climate conditions, soil type, water availability, and farming practices. Analyzing the protein content in different rice varieties and understanding how environmental and cultivation practices influence protein levels. Using machine learning models such as Random Forest Regression, Decision trees, and Neural Networks to predict and optimize yield and nutritional content. Enhancing sustainability and resource management through predictive models, which could help farmers optimize input use (e.g., water, fertilizers) to increase both yield and nutritional value.

1. **Vision & Mission:**

**Vision:**

The vision of this project is to empower rice farmers with predictive tools that will help them maximize crop yield while ensuring that the rice produced is nutritionally enriched. By utilizing advanced machine learning techniques, the project aims to contribute to global food security and improve the overall health of populations reliant on rice as a primary food source.

**Mission:**

The mission of this project is to:

* Leverage data science and machine learning to create models that predict rice yield and protein content accurately.
* Provide actionable insights to farmers to improve their crop management practices and increase both yield and nutritional quality.
* Enable the development of sustainable agricultural practices by recommending resource-efficient farming techniques that promote higher yields and protein content.

1. **Objectives:**

* Develop machine learning models to predict rice crop yield based on factors such as temperature, rainfall, soil type, and farming practices.
* Build models to predict and analyse protein content in rice based on factors like nitrogen use, soil health, temperature and water availability.
* Identify key factors that influence both crop yield and protein content to guide farming practices for better productivity and nutritional quality.
* Evaluate the performance of different machine learning models, such as Random Forest, Decision tree, and Neural Networks, for predicting rice yield and protein content.
* Provide recommendations for improving rice farming practices and ensuring better crop yields and nutritional quality, especially focusing on protein deficiency.

1. **Problem Statement:**

The current methods for predicting rice yield and analyzing protein content are manual and limited in accuracy. This project seeks to address these issues by utilizing **machine learning models** to predict rice yield and analyze protein content based on a wide range of influencing factors. This will help farmers make informed decisions to improve crop productivity and quality, ultimately contributing to improved food security and nutrition.

1. **Functional Requirements:**

* Data Collection and Integration
* Data Pre-processing
* Model Training
* Prediction
* User Interface
* Recommendation System

1. **Non-Functional Requirements:**

* Performance
* Scalability
* Usability
* Reliability
* Data Integrity
* Maintainability

1. **Domain Requirements:**

* Agricultural Data Accuracy
* Environmental Factors
* Rice Varieties and Agricultural Practices
* Nutritional Analysis
* Sustainability

**Signature of Guide Signature of HOD**