TITLE PAGE

- **Problem Statement ID – 1639**
- **Problem Statement Title-Sustainable Fertilizer Usage Optimizer for Higher Yield**
- **Theme-Agriculture, FoodTech & Rural Development**
- **PS Category- Software**
- **Team ID-**
- **Team Name (Registered on portal)**

Your Team Name

IDEA TITLE

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Detailed Explanation of the Proposed Solution:

Input Collection:

- Collect location, pincode, image, crop type.
- Gather farming type and irrigation details.
- Fetch soil data from government databases.
- Retrieve weather data via APIs.

Disease Identification:

- Analyze soil and weather data for deficiencies.
- Identify potential diseases.

Fertilizer Recommendations:

- Suggest fertilizer type based on crop and soil.
- Calculate precise fertilizer quantity to avoid overuse.

Time of Application:

- Recommend application timing based on weather patterns.

Sustainability Measures:

- Advice on sustainable practices for soil health.
- Recommend crop rotation and cover crops.

How It Addresses the Problem:

Prevents Soil Degradation:

- Recommends correct fertilizer type and amount.

Improves Agricultural Productivity:

- Tailored advice ensures plants receive essential nutrients.

Economic Benefits for Farmers:

- Reduces fertilizer costs, increases yield and income.

Innovation and Uniqueness of the Solution:

Data-Driven Precision:

- Combines soil, crop, and weather data for personalization.

Hybrid AI/ML Models:

- AI/ML techniques include CNN, regression, LSTM models.

Real-Time Data Integration:

- Uses real-time weather and soil data for accuracy.

Sustainability Focus:

- Recommends sustainable practices for long-term soil health

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TECHNICAL APPROACH

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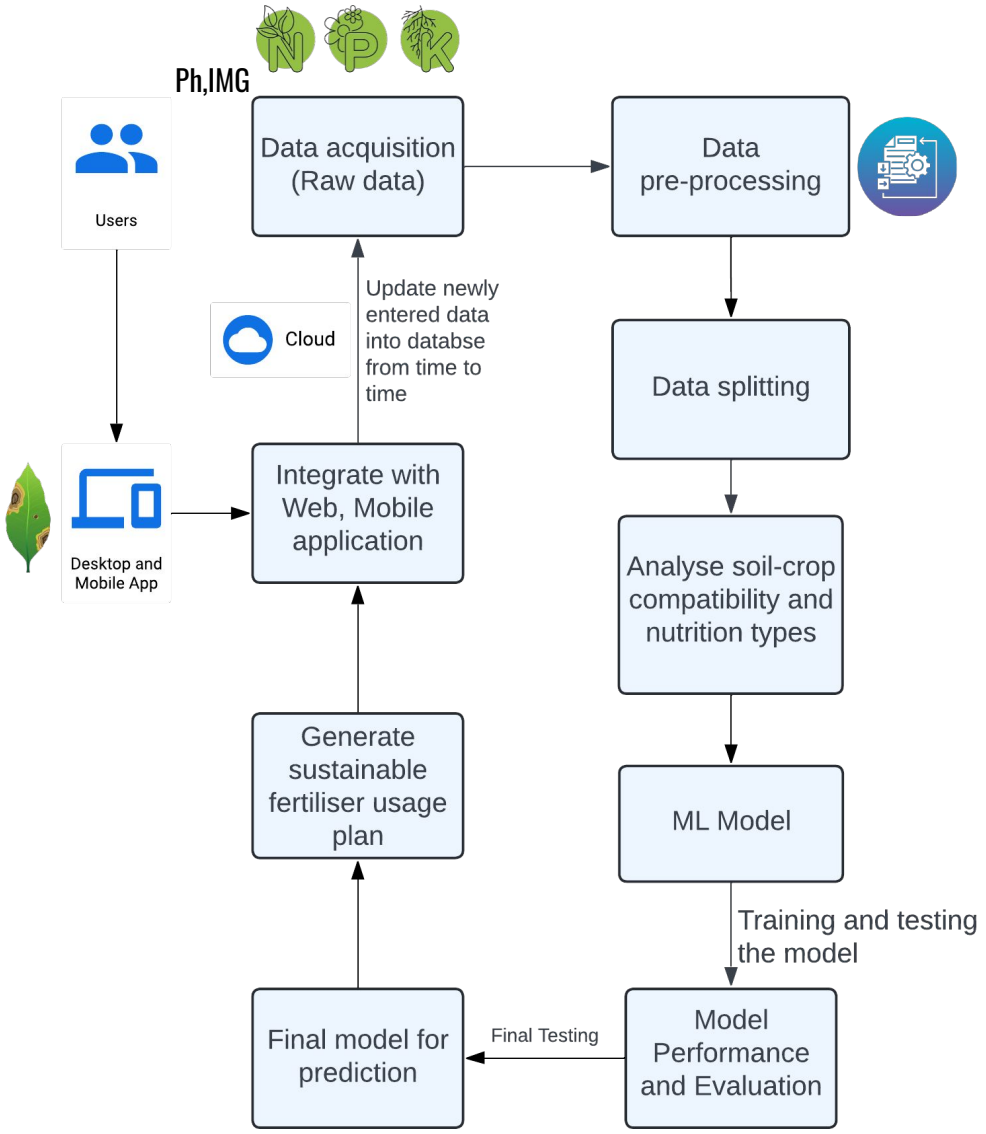


Technology Stack

M E R N

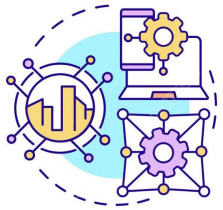
IBM Cloud

Flutter

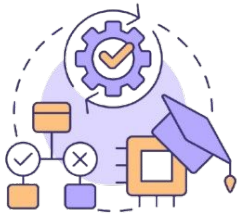
React Native

Flask

python



IoT Devices



Machine Learning Algorithms

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FEASIBILITY AND VIABILITY

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Analysis of the Feasibility of the Idea:

- **Data Availability:** Soil data, weather APIs, and crop information are accessible through government databases and open-source APIs.
- **Technology Readiness: Established AI/ML models can be adapted.**
- **Farmer Adoption:** With increasing smartphone usage among farmers, a mobile-based solution can be widely adopted.

Potential Challenges and Risks:

- **Data Inconsistency**: Incomplete or outdated soil and weather data could lead to inaccurate recommendations.
- **Connectivity Issues**: Farmers in remote areas might face challenges accessing the app due to poor internet connectivity.
- **Complexity of AI Models**: Designing a model that balances accuracy and simplicity while handling diverse inputs (location, crop type, soil health) could be complex.

Strategies for Overcoming These Challenges:

- **Partnerships with Government**: Collaborate with local agricultural bodies to ensure accurate, up-to-date soil and weather data.
- **Offline Functionality**: Develop an offline version of the app, allowing farmers to input data and receive recommendations without internet connectivity.
- **Model Optimization**: Regularly refine AI/ML models using farmer feedback and updated datasets to improve accuracy and usability.

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IMPACT AND BENEFITS

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Potential Impact on the Target Audience

Farmers

- Empower farmers with data-driven insights to optimize fertilizer use.
- Results in higher crop yields and improved income.

Agricultural Sector

- Enhances sustainable agricultural practices.
- Ensures long-term soil health and better resource management.

Local Communities

- Contributes to food security by increasing productivity.
- Reduces reliance on chemical fertilizers, promoting healthier ecosystems.

Benefits of the Solution

Economic

- Reduces input costs by recommending precise fertilizer quantities.
- Increases crop yield and quality, boosting farmers profitability.
- Minimizes crop loss due to nutrient deficiencies and soil degradation.

Social

- Enhances farmers knowledge through real-time, personalized recommendations.
- Promotes sustainable farming practices, benefiting future generations.

Environmental

- Reduces fertilizer overuse, protecting soil and water from contamination.
- Supports long-term soil fertility through sustainable farming techniques.
- Lowers greenhouse gas emissions by optimizing fertilizer application.

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RESEARCH AND REFERENCES

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- https://github.com/sksarvesh007/Indian-weather-analysis/blob/main/weather.csv
- Detection and prediction of rice plant diseases using convolutional neural network (CNN) method
- Machine_Learning-Based_Rice_Crop_Disease_Identification_and_Prediction_for_Improved_Agricultural_Management_Section A-Research_paper_Machine_Learning-Based Rice Crop Disease Identification and Prediction for Improved Agricultural Management
- Advanced diagnosis of common rice leaf diseases using KERTL-BME ensemble approach
- A Machine Learning Technique for Rice Blast Disease Severity Prediction Using K-Means SMOTE Class Balancing
- Optimal Routing and Deep Regression Neural Network for Rice Leaf Disease Prediction in IoT
- ACCURATE AND TIMELY PREDICTION OF RICE CROP DISEASE BY MEANS OF MACHINE LEARNING ALGORITHMS
- Deep Learning Based Multi-Classification Model for Rice Disease Detection
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- Recent Developments in the Quality Evaluation of Rice Disease Detection System
- Automatic Rice Disease Detection and Assistance Framework Using Deep Learning and a Chatbot
- Advancements in rice disease detection through convolutional neural networks: A comprehensive review
- Comparing Inception V3, VGG 16, VGG 19, CNN, and ResNet 50: A Case Study on Early Detection of a Rice Disease
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- Rider Water Wave-enabled deep learning for disease detection in rice plant
- Rice leaf disease detection based on bidirectional feature attention pyramid network with YOLO v5 model
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