SMART INDIA HACKATHON 2024

TITLE PAGE

- **Problem Statement ID -** SIH1639
- **Problem Statement -** Sustainable fertilizer usage optimizer for higher yield
- **Theme -** Agriculture, FoodTech & Rural Development
- **PS Category** - Software
- **Team Name –** FasalAce

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Soil Sense: Smarter Farming Insights

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❖ Idea / Solution Details:

Our website analyzes key soil properties like texture, pH, and moisture to provide tailored crop recommendations and sustainable farming practices, helping farmers achieve optimal yields with minimal environmental impact

- **Soil analysis:**

- Gathers data such as color, texture, porosity, density, pH, moisture, and nutrient levels.
- Identifies the best crop types suited to the specific soil conditions for optimal yield.

- **Fertilizer and Pesticide Recommendations:**

- Verifies the input data to calculate the ideal amount of fertilizers and pesticides needed
- Prioritizes solutions in the following order:
  1. Homemade solutions for disease control
  2. Organic Alternatives if homemade solutions are ineffective
  3. Chemical Pesticides as a last resort

- **Weather Integration:**

- Provides accurate weather predictions to guide farmers on when to sow crops
- Notifies farmer before rain so that they can make required arrangements.

- **Comprehensive Farming Guidance:**

- Offers crop cultivation strategies and maintenance advice and suggests preventive measures for diseases

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TECHNICAL APPROACH

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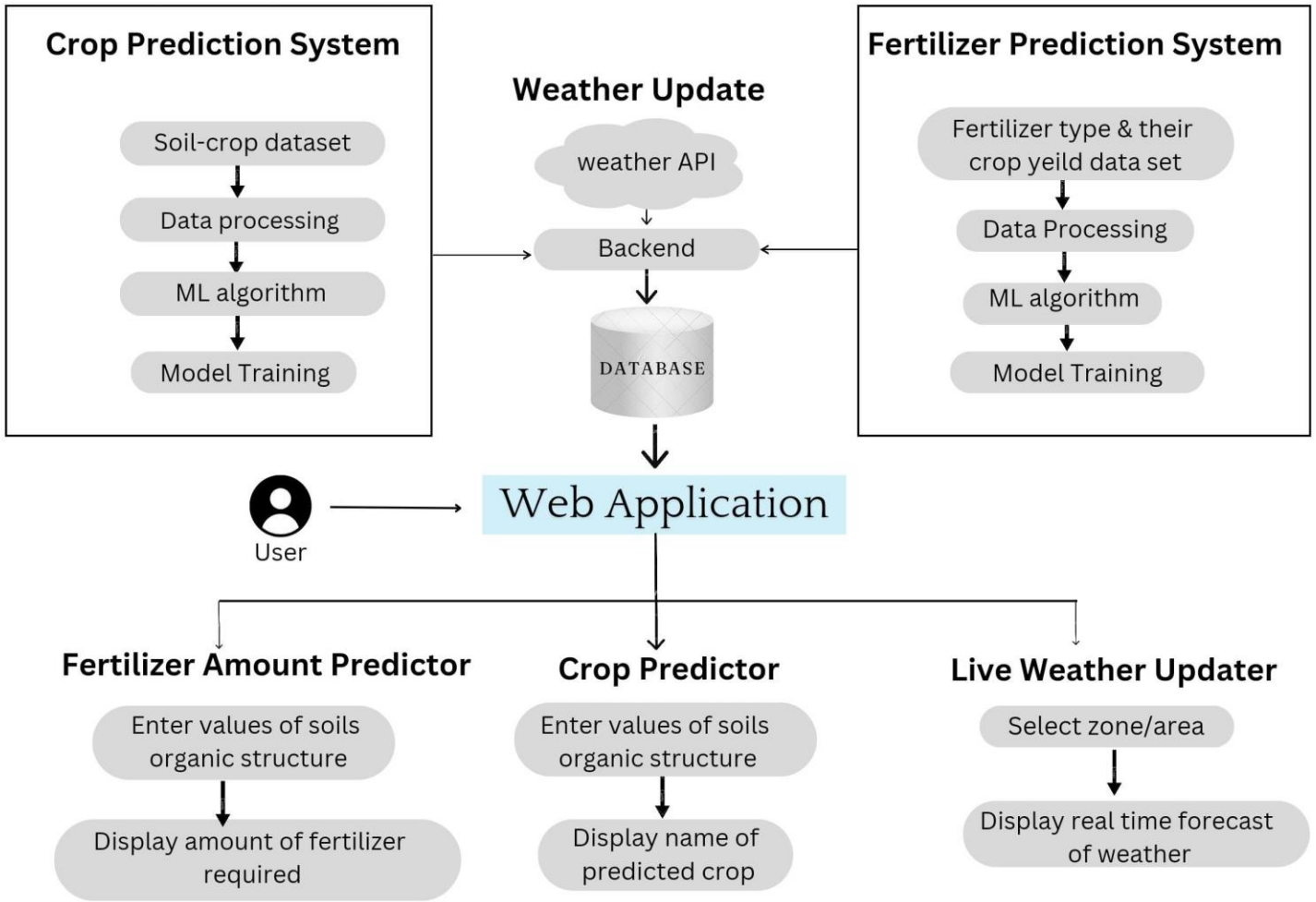
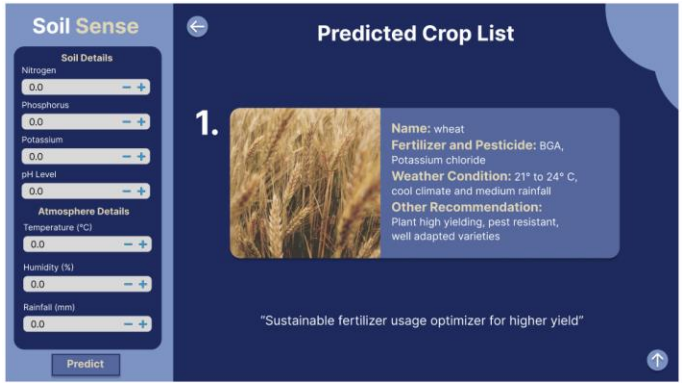
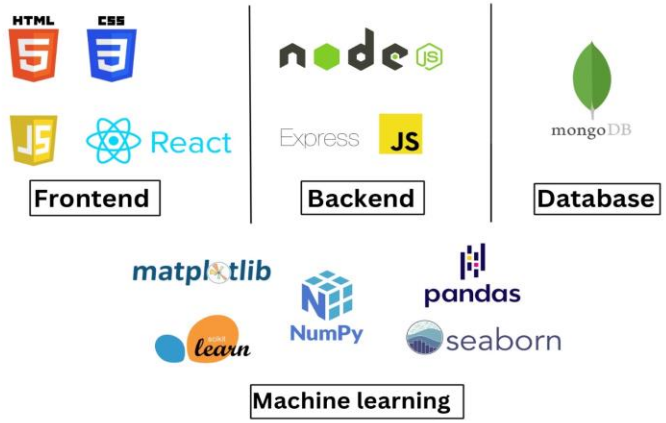


Prototype



Technology Stacks Used



FEASIBILITY AND VIABILITY

Feasibility:

- **Advanced Data Integration:** Unique combination of soil properties (texture, porosity, nutrients) with real-time weather predictions.
- **Customized Recommendations:** Tailored crop and pesticide suggestions specific to individual soil profiles.
- **Accessible Technology:** Mobile-friendly platform for easy access by farmers in remote areas.

Viability:

- **Holistic Approach:** Incorporates homemade, organic, and chemical pesticide solutions in a structured manner, prioritizing eco-friendly options.
- **Localized Insights:** Uses region-specific data for precise recommendations, increasing local relevance and acceptance.
- **Farmer Empowerment:** Offers preventive measures and yield improvement strategies based on predictive analytics, boosting farmer confidence.
- **Scalability & Adaptability:** Easily adaptable to different geographies and evolving climate conditions, ensuring long-term relevance

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CHALLENGES, IMPACT AND BENEFITS

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Potential Challenges :

- **Adoption Resistance:** Farmers may hesitate to adopt new technology without seeing clear benefits.
  - **Strategy:** Run small pilot projects to show real benefits and provide easy-to-use training for farmers.

- **Initial Investment:** Even with decreasing costs, implementation may still be financially challenging for some farmers
  - **Strategy:** Offer low-cost subscriptions or government subsidies to make the system affordable for farmers.

Impact:

- Reduces reliance on chemical pesticides, promoting environmental sustainability.
- Empowers farmers with data-driven crop selection and maintenance guidance.
- Helps prevent soil degradation by recommending appropriate soil management practices.

Benefits:

- Increases crop productivity and farm profitability.
- Enhances soil health and long-term agricultural sustainability.
- Supports informed decision-making for better crop management.

RESEARCH AND REFERENCES

- **Soil Fertility Database**
  https://www.kaggle.com/datasets/rahuljaiswalonkaggle/soil-fertility-dataset
- **Crop Nutrient Database**
  https://www.kaggle.com/datasets/crawford/crop-nutrient-database
- **Fertilizer Type and their crop yield Database**
  https://www.kaggle.com/datasets/yaliniraman/fertilizer-type-and-their-crop-yield
- **Crop Recommendation Database**
  https://www.kaggle.com/datasets/atharvaingle/crop-recommendation-dataset
- **Fertilizer Prediction Database**
  https://www.kaggle.com/datasets/gdabhishek/fertilizer-prediction