CROPQUEST

Empowering Farmers Through Data-Driven Insights

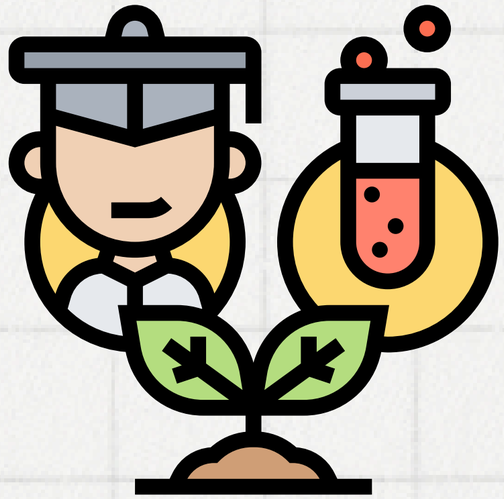
Team Name: FarmFusion

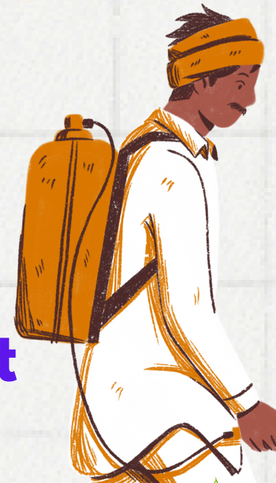
Team Members: Abhiram Laha

Shubham Keshari

Faizan Raza

Tathagata Das



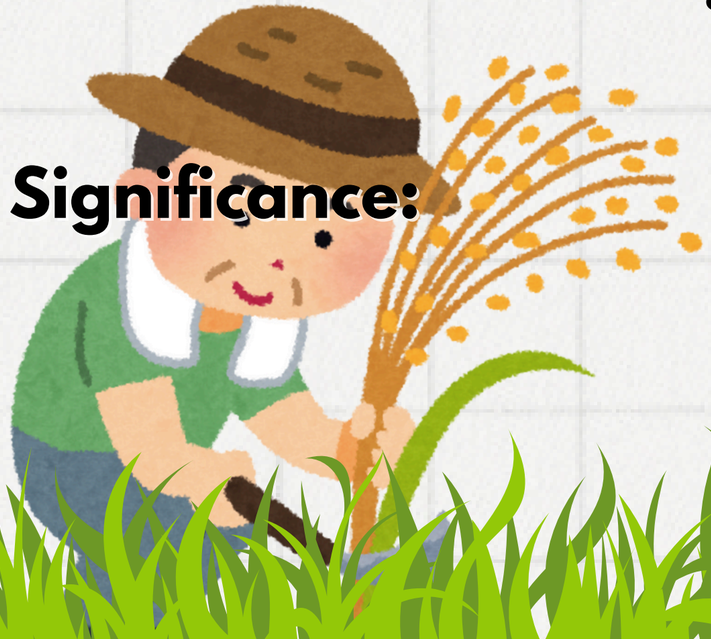


College Name: Future Institute of Engineering & Management

Problem Statement: Challenges in agriculture like suboptimal crop choices, incorrect fertilizer use, and low yields.

Objectives:

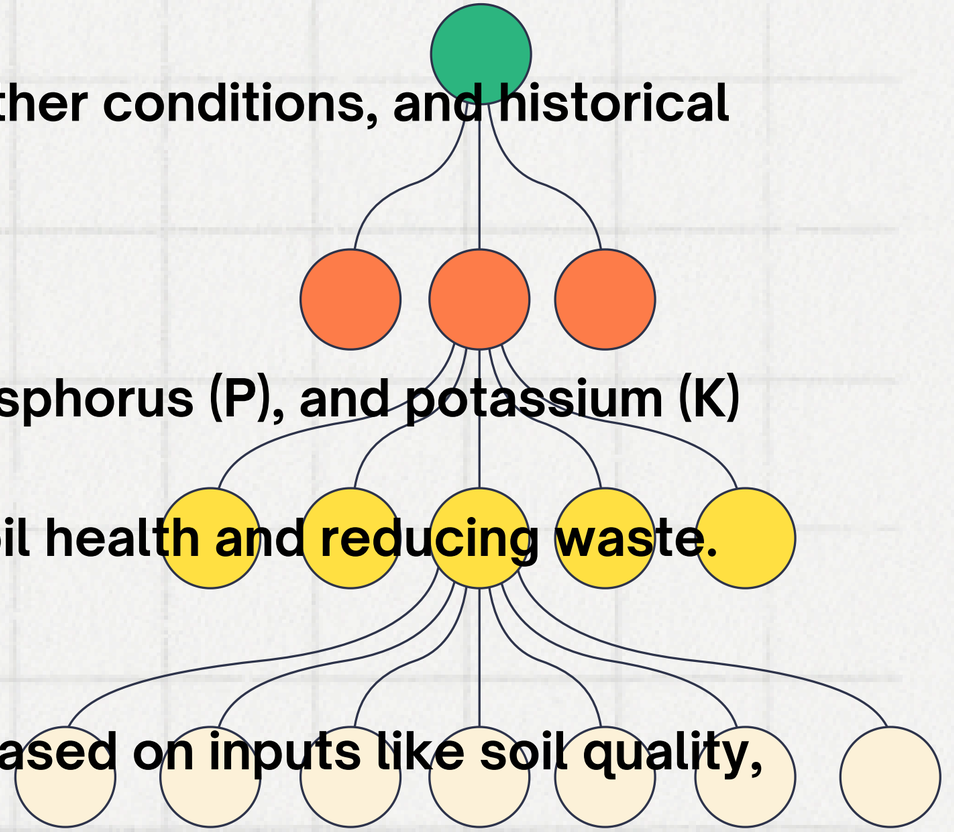
- Provide crop Data-driven crop recommendations tailored to local soil and weather conditions.
- Accurate fertilizer suggestions to balance soil nutrients and improve yield.
- Insights into crop yield predictions based on historical data and advanced machine learning models.



Significance: Promotes sustainable farming, enhances profitability, and offers an accessible, user-friendly platform for informed decisions.

Crop Recommendation:

- Provides optimal crop choices based on soil type, weather conditions, and historical data to maximize efficiency.



Fertilizer Suggestions:

- Offers precise recommendations for nitrogen (N), phosphorus (P), and potassium (K) levels tailored to the crop's needs.
- Promotes balanced nutrient application, enhancing soil health and reducing waste.

Crop Yield Prediction:

- Utilizes regression models to predict potential yield based on inputs like soil quality, weather patterns, and crop type.
- Helps farmers estimate output and plan resources effectively.

Technologies & Tools Used

- **HTML | CSS:** Used to design the responsive and interactive user interface.
- **Flask:** Python web framework for backend development and app deployment.
- **Pandas**: For data processing and manipulation of large datasets.
- **NumPy:** For performing numerical operations and handling arrays efficiently.
- **Scikit-learn:** For building and evaluating machine learning models.
- **Matplotlib | Seaborn:** Libraries for creating visualizations like graphs and charts.
- **Jupyter Notebook:** Interactive environment for running code, data analysis, and visualization.
- **Kaggle:** A platform for sourcing and downloading datasets used in the project.

Working – Crop Recommendation

Data Collection:

- Gathered historical data on soil properties, weather, and crop yields.

Preprocessing:

- Cleaned data, normalized attributes, and encoded soil types for analysis.

Model Selection:

- Used Random Forest Classifier for its high accuracy and ability to handle non-linear data.

Model Training:

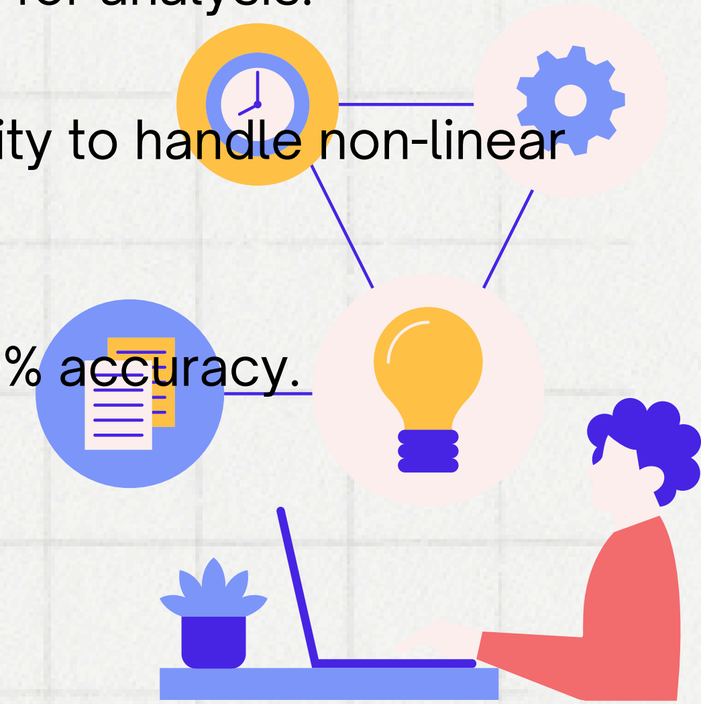
- Trained the model with an 80:20 train-test split, achieving 90% accuracy.

Prediction Process:

- Input: Soil type, pH level, weather data.
- Output: Suggests the optimal crops based on suitability.

Deployment:

- Integrated the model into a Flask app for real-time recommendations.



Conclusion:

- CropQuest provides farmers with data-driven crop recommendations, tailored fertilizer suggestions, and accurate yield predictions, empowering them to make informed decisions for better agricultural outcomes.

- Future Scope:
  - Crop Disease Classification: Integrate Deep Learning models (CNNs) for early disease detection in crops, enabling proactive measures to reduce crop loss and improve productivity.
  - Real-time Soil Monitoring: Incorporate IoT sensors for continuous soil condition analysis and real-time recommendations.

Thank you very much!

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