Optimized Fertilizer Quantity Recommendation

1. Introduction

This project introduces an AI-based solution for recommending optimal quantities of Urea, DAP, and MOP fertilizers based on Indian soil characteristics. The approach aims to enhance agricultural efficiency and sustainability.

2. Dataset

The dataset is sourced from NICES - ISRO Bhuvan:

https://bhuvan-app3.nrsc.gov.in/data/download/index.php?c=p&s=NICES&p=isd&g=TS

It includes raster maps (.asc) for soil texture, depth, and organic carbon density. These were processed into a tabular format using rasterio.

3. Methodology

Features: SoilTexture (categorical), OrganicCarbonDensity (float), AvgDepth (float)

Models used: Random Forest and XGBoost classifiers. Labels were derived using rule-based logic.

4. Results

Both models achieved 100% accuracy on test data. XGBoost was chosen for final deployment due to performance and scalability. Gradio was used for deployment inside Google Colab.

5. Conclusion

This system provides a scalable, interpretable solution for soil-aware fertilizer recommendations across India. Future extensions may integrate crop-specific tuning and weather dynamics.

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