EDGE: BU-CSE DIGITAL SKILLS TRAINING

Project on

Fertilizer & Pesticide Recommendation System

Method : Python

Submitted to

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Executive Summary

The Fertilizer & Pesticide Recommendation System is a software tool designed to help farmers and agricultural professionals make informed decisions regarding soil fertilization and pest control. The system suggests suitable fertilizers based on crop type and soil quality and recommends pesticides based on observable pest symptoms. By integrating this tool, farmers can enhance crop yield, minimize costs, and reduce environmental damage from excessive chemical use.

Objectives

The primary objectives of this project are:

1. To develop a system that recommends appropriate fertilizers based on crop type and soil quality.
2. To provide a mechanism for identifying pest symptoms and suggesting effective pesticides.
3. To enhance agricultural productivity through scientific and data-driven recommendations.
4. To minimize the environmental impact of excessive or inappropriate fertilizer and pesticide use.
5. To make decision-making easier for farmers by providing quick and reliable recommendations.

Methods

The system is implemented using Python and follows a rule-based approach. The methodology consists of the following steps:

1. **Data Collection:** The system relies on predefined sets of fertilizer and pesticide recommendations based on agricultural best practices.
2. **User Input:** Users provide details about their crop type, soil quality, and pest symptoms.
3. **Decision Logic:**
    - The program uses a dictionary-based approach to map fertilizers to crops and soil conditions.
    - Pest symptoms are analyzed using a lookup table that suggests suitable pesticides.
4. **Output Generation:** Based on the user input, the system displays the best fertilizer and pesticide options.
5. **Implementation:** The logic is implemented in Python with simple input prompts and outputs.

Results

The system successfully provides recommendations based on the following:

- **Fertilizer Recommendations:**
    - Wheat:
        - Poor soil: NPK 10-26-26
        - Moderate soil: DAP
        - Rich soil: Urea

    - Rice:
        - Poor soil: Ammonium Sulfate
        - Moderate soil: Superphosphate
        - Rich soil: Potash
    - Corn:
        - Poor soil: NPK 20-20-20
        - Moderate soil: Urea
        - Rich soil: Compost
- **Pesticide Recommendations:**
    - Yellow Leaves: Neem Oil Spray
    - Holes in Leaves: Bacillus Thuringiensis
    - Wilting Plants: Copper Fungicide
    - Brown Spots: Sulfur Fungicide

Users receive instant recommendations based on their inputs, allowing them to take timely action to improve their crop health.

Conclusions

The Fertilizer & Pesticide Recommendation System provides an easy-to-use and efficient tool for agricultural decision-making. It helps farmers select the right fertilizers based on crop and soil conditions and choose appropriate pesticides to combat pest infestations. The rule-based approach ensures accurate and quick recommendations, contributing to better farming practices. Future improvements may include integrating a database for more crop varieties, implementing machine learning for predictive recommendations, and developing a mobile-friendly version of the system.

Future Work:

- Expand crop database to include more varieties.
- Integrate real-time soil and pest detection using IoT sensors.
- Develop a mobile or web application for wider accessibility.
