

RESULTS AND DISCUSSION

Test Results

There are several ways to evaluate the “AgroAgri” model that has been developed. Firstly, for the crop recommendation, the ML model is used to predict the crop, in that accuracy of the algorithm tells us how effective the solution is. The applied algorithms are Decision Tree, Naïve Bayes, SVM and Random Forest which has the accuracy of 96%. Fertilizer recommendation is just a dictionary based solution. In pesticide recommendation if the user uploads a picture and the pests are identified through DL model called CNN.

Output

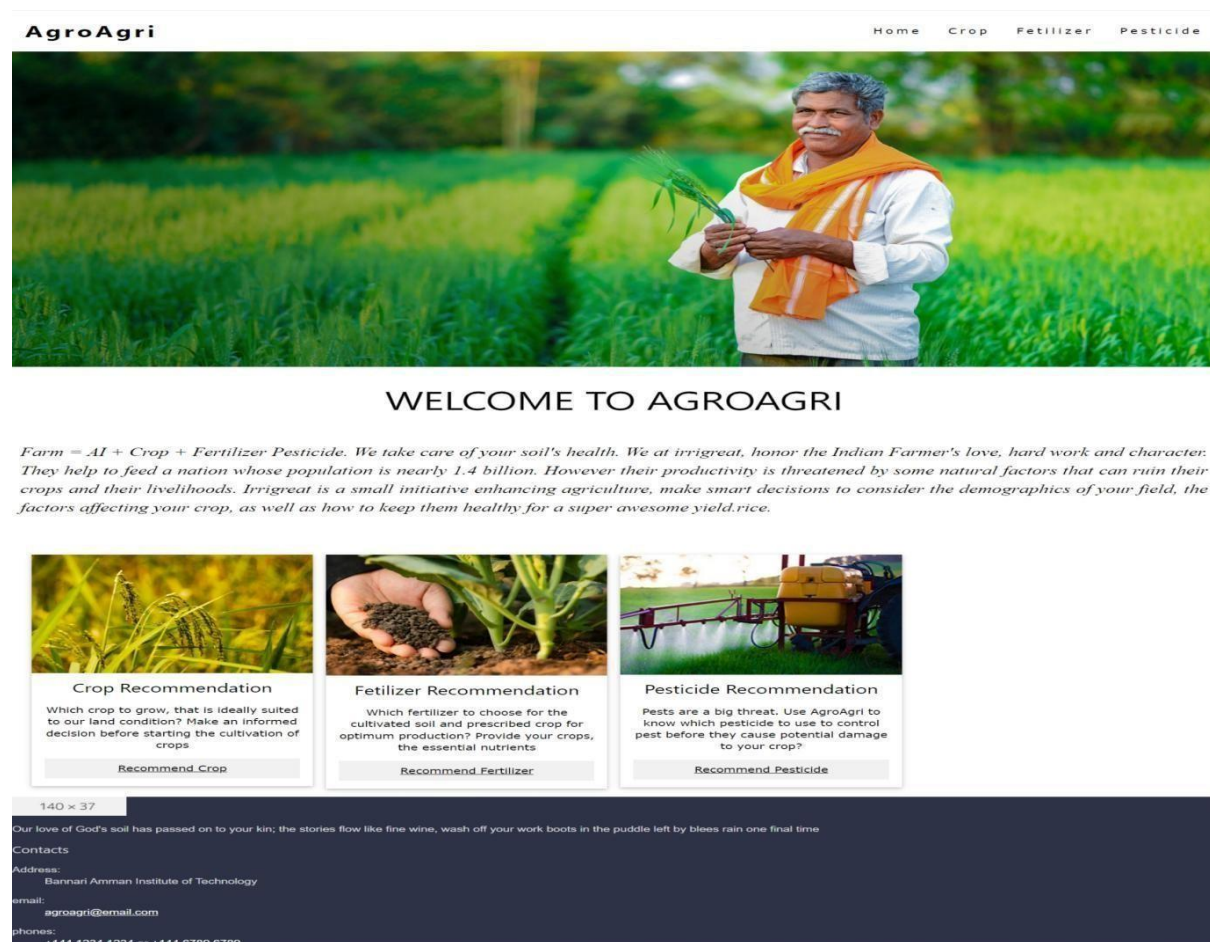


Fig 1.1 Home Page

Let's say the user wishes to use the Crop Suggestion service. In order to find out what crop they should grow on their farm, they can fill out the N, P, K, pH, rainfall, temperature, and relative humidity values in the units indicated. Fig 1.2 represents the crop recommendation.

AgroAgri Home Crop Fertilizer Pesticide

Crop Prediction Form

Nitrogen (ratio):

Phosphorous (ratio):

Potassium (ratio):

ph level:

Rainfall (in mm)

Temperature (in °C):

Relative Humidity (in %)

Predict

Fig 1.2 Crop Recommendation page

After entering all the corresponding values it recommends the suitable crops for our land , here it recommends mango. The predicted crop is given below for you reference.



Fig 1.3 Crop Recommendation Output

The user can also use the "Fertilizer Suggestion" Service by entering the crop, N, P, and K values (Fig 1.2). After the user has gained knowledge of the soil's condition and can distinguish between the nutrients required and those present on their farm, "AgroAgri" will provide knowledgeable advice on the best organic fertilisers to employ given the soil's current state. For references, see figure 1.3.

The image shows a web interface for 'AgroAgri' with a 'Prediction Form'. The form is titled 'Prediction Form' and contains four input fields: 'Nitrogen (ratio)' with a value of 50, 'Phosphorous (ratio)' with a value of 50, 'Potassium (ratio)' with a value of 50, and a dropdown menu for 'Crop you want to grow' with 'apple' selected. Below the form is a 'Predict' button.

Fig 1.4 Fertilizer Recommendation Page

Difference between desired value of N and your farm's N value is 30.0

The N value of soil is high and might give rise to weeds.

Please consider the following suggestions:

1. *Manure* – adding manure is one of the simplest ways to amend your soil with nitrogen. Be careful as there are various types of manures with varying degrees of nitrogen.
2. *Coffee grinds* – use your morning addiction to feed your gardening habit! Coffee grinds are considered a green compost material which is rich in nitrogen. Once the grounds break down, your soil will be fed with delicious, delicious nitrogen. An added benefit to including coffee grounds to your soil is while it will compost, it will also help provide increased drainage to your soil.
3. *Plant nitrogen fixing plants* – planting vegetables that are in Fabaceae family like peas, beans and soybeans have the ability to increase nitrogen in your soil
4. Plant 'green manure' crops like cabbage, corn and broccoli
5. *Use mulch (wet grass) while growing crops* - Mulch can also include sawdust and scrap soft woods

Difference between desired value of P and your farm's P value is 75.0

The P value of your soil is low.

Please consider the following suggestions:

1. *Bone meal* – a fast acting source that is made from ground animal bones which is rich in phosphorous.
2. *Rock phosphate* – a slower acting source where the soil needs to convert the rock phosphate into phosphorous that the plants can use.
3. *Phosphorus Fertilizers* – applying a fertilizer with a high phosphorous content in the NPK ratio (example: 10-20-10, 20 being phosphorous percentage).
4. *Organic compost* – adding quality organic compost to your soil will help increase phosphorous content.
5. *Manure* – as with compost, manure can be an excellent source of phosphorous for your plants.
6. *Clay soil* – introducing clay particles into your soil can help retain & fix phosphorus deficiencies.
7. *Ensure proper soil pH* – having a pH in the 6.0 to 7.0 range has been scientifically proven to have the optimal phosphorus uptake in plants.
8. If pH is low, add lime or potassium carbonate to the soil as fertilizers. Pure calcium carbonate is very effective in increasing the pH value of the soil.
9. If pH is high, addition of appreciable amount of organic matter will help acidify the soil. Application of acidifying fertilizers, such as ammonium sulfate, can help lower soil pH

Difference between desired value of K and your farm's K value is 150.0

The K value of your soil is low.

Please consider the following suggestions:

1. Mix in muricate of potash or sulphate of potash
2. Try kelp meal or seaweed
3. Try Sul-Po-Mag
4. Bury banana peels an inch below the soils surface
5. Use Potash fertilizers since they contain high values potassium

Fig 1.5 Fertilizer Recommendation Output

The third module, "Pesticide Recommendation," is depicted. Here, the user has the option to upload an image of the pest. If the user is not familiar with the pests, he or she can upload a picture of the pest that clearly depicts it (Fig 1.6), and "AgroAgri" will identify the insect and prescribe the 21 appropriate pesticides (Fig 1.8). The user must be careful to ensure that the image is not blurry as this could result in the pest being incorrectly identified.

Prediction Form

Please upload the picture which clearly shows the pest

Choose File No file chosen

Predict

Fig 1.6 Pesticide Recommendation Page

Prediction Form

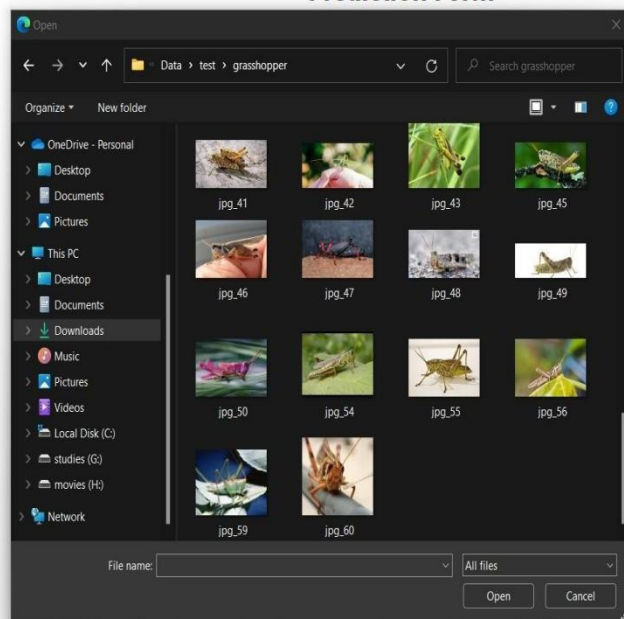


Fig 1.7 Uploading Image - Pesticide Recommendation

Identified Pest: *grasshopper*

Recommended Products



Fig 1.8 Pesticide Recommendation Output 1