

Crop Yield Recommendation System App

Intuition

India (20%) ranks first globally with highest net cropped area followed by US (19%) and China (16%). The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India.

The reason for this decline in the agriculture sector is due to the fact that farmers are not empowered and due to lack of application of IT in the farming sector. Farmers have less knowledge about the crops they grow.

We are trying to contribute our knowledge by applying machine learning techniques to predict the crop yield and name by considering various factors such as temperature, rainfall, season and area

Application & Aim

The project finds a huge application in improving real life farming scenarios. A lot of crops are destroyed every year due to lack of knowledge of weather patterns such as temperature, rainfall, etc. which play a huge role in deciding the crop yield. This project not only helps in predicting these parameters for throughout the year, but also assists in predicting the yield of various crops in various seasons based on past trends and soil parameters. Hence it allows the farmers to decide the best crop to grow to suffer minimum losses.

Result

1. Prediction based on Soil, rainfall, humidity and temperature

- We used Naïve-Bayes, Random Forest and Gradient Boosting Classifier for predicting crop and yield
- We achieved approx. 99% accuracy with the help of Gradient Boosting algorithm

2. Recommendation App

- We used PySimpleGUI interface to build app
- App take the soil parameter, temperature, rainfall and humidity data based on it, it gives the best growing crop for that environment, field and soil

Enter the values

```
In [30]: data.rename(columns={'label': 'Crop'}, inplace=True)
data.head()

Out[30]:
```

	N	P	K	temperature	humidity	ph	rainfall	Crop
0	90	42	43	20.879744	82.002744	6.502985	202.935536	rice
1	85	58	41	21.770462	80.319644	7.038096	226.655537	rice
2	60	55	44	23.004459	82.320763	7.840207	263.964248	rice
3	74	35	40	26.491096	80.158363	6.980401	242.864034	rice
4	78	42	42	20.130175	81.604873	7.628473	262.717340	rice

```
In [21]: le = preprocessing.LabelEncoder()
crop = le.fit_transform(list(data["Crop"]))

In [22]: # Features
NITROGEN = list(data["N"])
PHOSPHORUS = list(data["P"])
POTASSIUM = list(data["K"])
TEMPERATURE = list(data["temperature"])
HUMIDITY = list(data["humidity"])
PH = list(data["ph"])
RAINFALL = list(data["rainfall"])
```

Crop Recommendation Assistant App

Please enter the following details :-

Enter ratio of Nitrogen in the soil : 90

Enter ratio of Phosphorous in the soil : 42

Enter ratio of Potassium in the soil : 43

Enter average Temperature value around the field : 20

Enter average percentage of Humidity around the field : 82

Enter PH value of the soil : 6

Enter average amount of Rainfall around the field : 202

Output

Crop Recommendation Assistant App

Please enter the following details :-

Enter ratio of Nitrogen in the soil	:	90	
Enter ratio of Phosphorous in the soil	:	42	
Enter ratio of Potassium in the soil	:	43	
Enter average Temperature value around the field	:	20	*C
Enter average percentage of Humidity around the field	:	82	%
Enter PH value of the soil	:	6	
Enter average amount of Rainfall around the field	:	202	mm

Submit **Quit**

close()
90
[['90' '42' '43' '20' '82' '6' '202']]
[20]
Rice
high humid
Normal
heavy rain
not to less but also not to high
less
less
neutral

3. Prediction based on Area, Season & Year

- We used Linear Regression, Random Forest and LSTM Neural network to predict production