

Project Report for CS-546

Field Monitoring with IoT and AR

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Introduction

The entire project is divided into two modules:

- Predicting Environmental Conditions for the crop
- Visualizing real time data over AR

For the first part, I (Simpal Kumar) have made a website which takes input from the user in the form of Temperature, Humidity and Rainfall and predicts the environmental conditions for the crop. Second module is done separately by [Rahul Narava](#) .

I've used 20 crops for the experiment and created the dataset manually.

I've calculated the mean for optimal and non-optimal labels for each crop. Then I calculated the Euclidean distance between the user's incoming values ([temp,humidity,rainfall]) and the mean optimal/non-optimal for a crop. Whichever distance is low , is going to return.

Following is the instance of our code:

1.

```
wheat_not_optimal': array([70. , 27.8, 14.6]),  
wheat_optimal': array([23.33333333, 54.44444444, 40.44444444])
```
2.

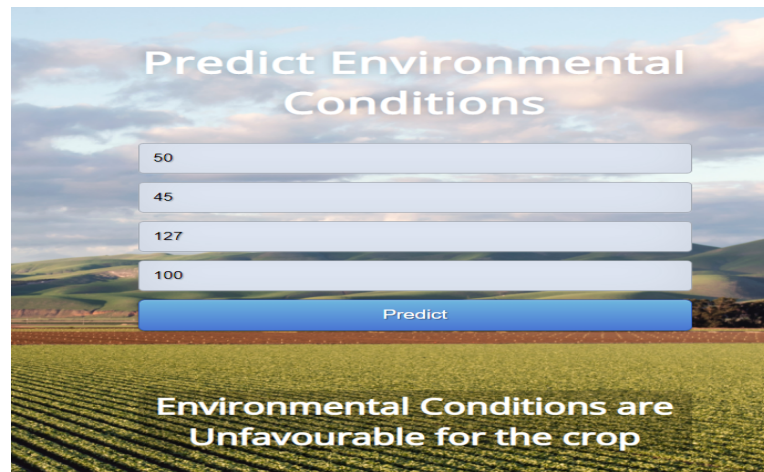
```
user_request = np.array([45,45,45])
```
3.

```
dist_optimal = np.linalg.norm(user_request - mean_df['wheat_optimal'] )  
dist_not_optimal = np.linalg.norm(user_request - mean_df['wheat_not_optimal'] )
```
4.

```
if dist_optimal > dist_not_optimal:  
    print("Not Optimal")  
  
else :  
    print("Optimal")
```

Plot

1. Beginning: In the beginning, crops were not considered and the KNN model was used.



The screenshot shows a web application interface with a background image of a green field under a cloudy sky. The title "Predict Environmental Conditions" is at the top. Below it are four input fields with values 50, 45, 127, and 100. A blue "Predict" button is below the inputs. At the bottom, a text box displays the result: "Environmental Conditions are Unfavourable for the crop".

2. Middle: Created a dataset of 20 crops considering what's optimal or non-optimal for the crop.
3. Ending: Created a website showing results for 20 different crops.



The screenshot shows a web application interface with a background image of a green field. The title "Predict Environmental Conditions" is at the top. Below it is a "Select Crop" dropdown menu with "Masoor" selected. Below the dropdown are three input fields, each with the value 45. A blue "Predict" button is below the inputs. At the bottom, a text box displays the result: "Environmental Conditions are not optimal for masoor".



Conclusion

We can predict the environmental conditions for a crop by simply entering three values i.e., Temperature , Humidity and Rainfall. Based on Euclidean Distance, we'll get the results.

The project helped to understand the basics of modeling and data manipulation.

