Data Collection and Preprocessing Phase

Date	21 June 2024
Team ID	739792
Project Title	Opticrop:Smart Agricultural Prodution Optimization Engine
Maximum Marks	6 Marks

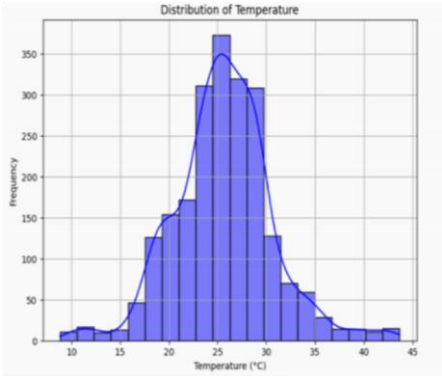
Data Exploration and Preprocessing Report

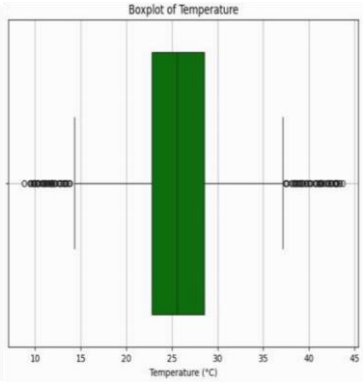
The purpose of this report is to outline the key steps and findings from the data exploration and preprocessing phase for the Opticrop project. This project aims to develop a Smart Agricultural Production Optimization Engine using data-driven approaches.the data sources are Agricultural sensor networks, satellite imagery, weather stations. The data exploration and preprocessing phases for the Opticrop project have been crucial in ensuring the quality and reliability of input data for subsequent modeling and optimization tasks. By addressing issues such as missing values, outliers, and data inconsistencies, we have prepared a clean and structured dataset ready for machine learning and analytics.

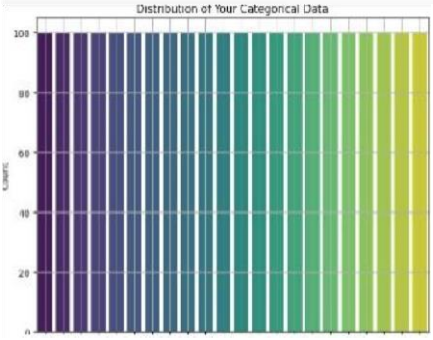
Section	Description

<table>
<tr>
<td>Data Overview</td>
<td>Dimension:
2200 rows × 8 columns Descriptive statistics:

```
df.describe()
```

	N	P	K	temperature	humidity	ph	rainfall
count	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000
mean	50.551818	53.362727	48.149091	25.616244	71.481779	6.469480	103.463655
std	36.917334	32.985883	50.647931	5.063749	22.263812	0.773938	54.958389
min	0.000000	5.000000	5.000000	8.825675	14.258040	3.504752	20.211267
25%	21.000000	28.000000	20.000000	22.769375	60.261953	5.971693	64.551686
50%	37.000000	51.000000	32.000000	25.598693	80.473146	6.425045	94.867624
75%	84.250000	68.000000	49.000000	28.561654	89.948771	6.923643	124.267508
max	140.000000	145.000000	205.000000	43.675493	99.981876	9.935091	298.560117
</td>
</tr>
<tr>
<td>Univariate Analysis</td>
<td> 

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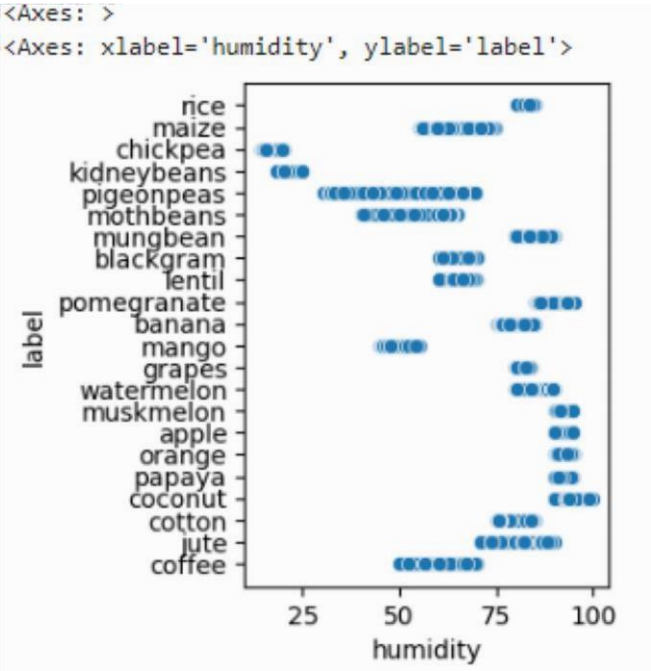
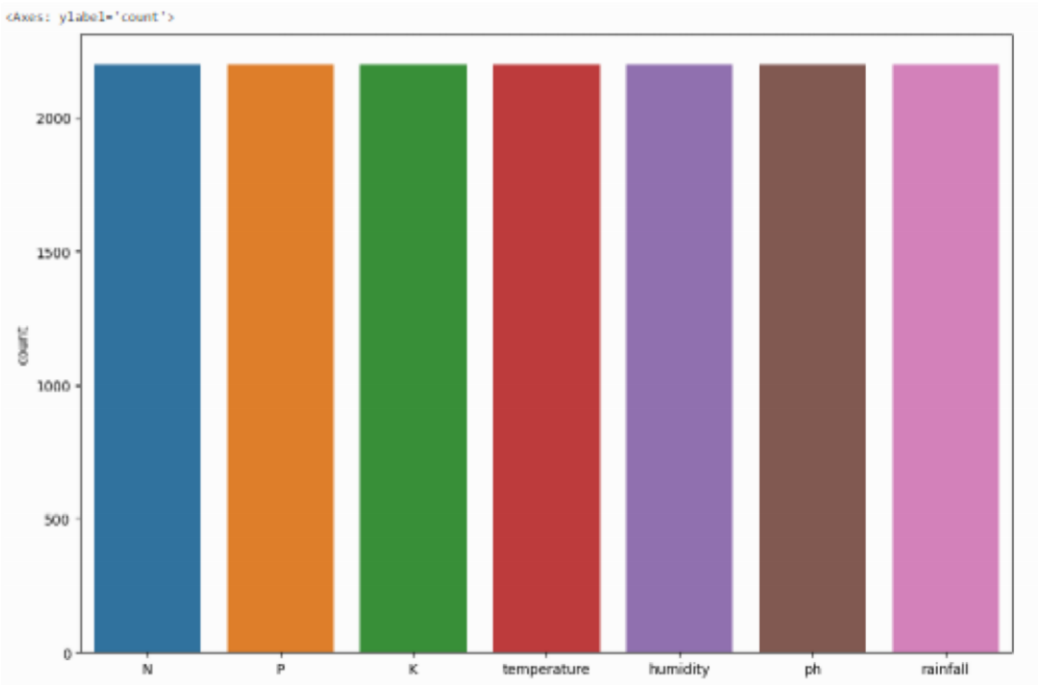
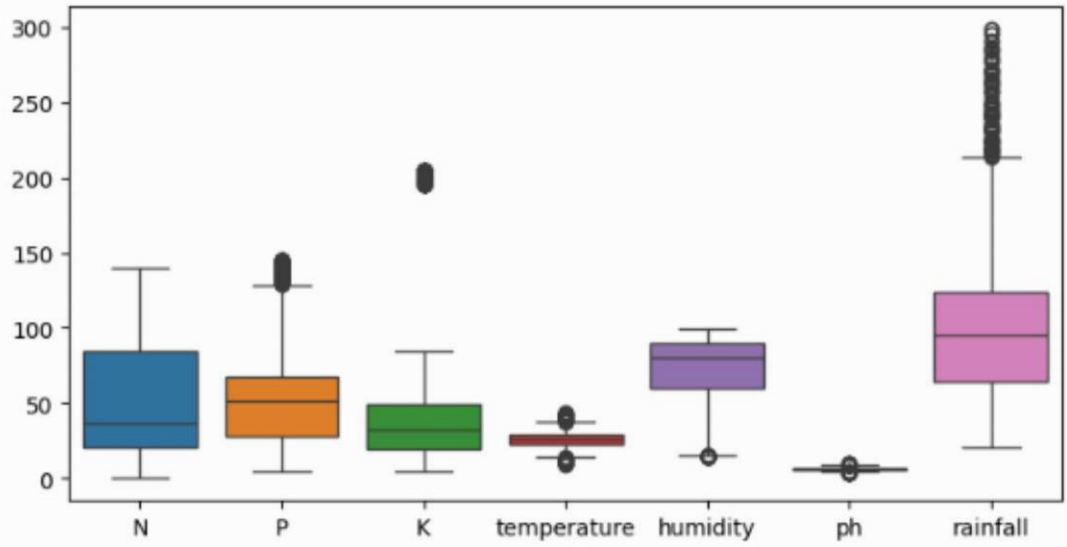
</tr>
</table>

Bivariate Analysis	
Multivariate Analysis	

Outliers and Anomalies	``` plt.figure(figsize=(8,4)) sns.boxplot(df) ``` ``` <Figure size 800x400 with 0 Axes> <Axes: > ```  ``` Q1=df['P'].quantile(0.25) Q3=df['P'].quantile(0.75) IQR=Q3-Q1 filter=(df['P']>=Q1-1.5*IQR) & (df['P']<=Q3+1.5*IQR) df=df.loc[filter] ```
Data Preprocessing Code Sc reenshots	

<table>
<tr><td>Loading Data</td><td>

```
df = pd.read_csv('/content/Crop_recommendation.csv')
df.head()
```

	N	P	K	temperature	humidity	ph	rainfall	label
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

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<tr><td>Handling Missing Data</td><td>

```
df.isnull().sum()
```

```
N              0
P              0
K              0
temperature    0
humidity       0
ph             0
rainfall       0
label          0
dtype: int64
```

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<tr><td>Data Transformation</td><td>-</td></tr>
<tr><td>Feature Engineering</td><td>Attached the codes in final submission.</td></tr>
<tr><td>Save Processed Data</td><td>-</td></tr>
</table>