



## **Assessment Report**

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# "Classify Plants Based on Water Needs" submitted as partial fulfilment for the award of

## **BACHELOR OF TECHNOLOGY**

## **DEGREE**

SESSION 2024-25 in

CSE(AI)

By

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KIET Group of Institutions, Ghaziabad JULY, 2025

#### 1. Introduction

Water is essential for plant survival, but different plants have varying water requirements. Knowing how much water a plant needs can help in water conservation and plant health. This project uses machine learning to classify plants into categories (Low, Medium, or High water needs) based on environmental inputs such as:

- Sunlight exposure
- Soil type
- Watering frequency

By training a model on labeled plant data, we aim to create a system that can make predictions about unknown plants' water needs.

#### 2. Problem Statement

To predict the water requirement category of a plant (Low, Medium, High) using its environmental preferences such as sunlight exposure, soil type, and watering frequency.

### 3. Objectives

- Automate the classification process using a data-driven approach.
- Assist gardeners, farmers, and plant enthusiasts in understanding plant care needs.
- Optimize water usage by recommending accurate watering practices.
- Leverage machine learning to uncover hidden patterns in plant-environment relationships.

## 4. Methodology

#### 1. Data Collection:

A CSV file containing plant features (sunlight, soil, watering frequency) and their water needs was used.

#### 2. Data Preprocessing:

- Missing values were checked.
   Categorical values were converted into numerical labels using Label Encoding.
   Model Selection:
- o A Random Forest Classifier was used for classification because of its high accuracy and robustness.

#### 4. Training and Testing:

- o The dataset was split into training (80%) and testing (20%) sets.
- The model was trained on the training set and tested on the testing set.

#### 5. Evaluation:

o Accuracy and classification report were used to evaluate model performance.

#### 5. Code

```
# Step 1: Import Libraries import pandas as pd import numpy as np
from sklearn.model_selection import train_test_split from
sklearn.preprocessing import LabelEncoder from sklearn.ensemble
import RandomForestClassifier from sklearn.metrics import
classification_report, accuracy_score
# Step 2: Load the Uploaded CSV File df =
pd.read_csv('/content/drive/MyDrive/plants.csv')
```

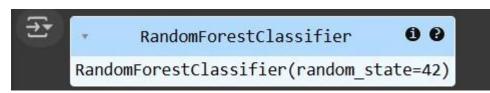
```
# Step 3: View First Few Rows print("Dataset Preview:\n",
df.head()) # Step 4: Check for Missing Values
print("\nMissing Values:\n", df.isnull().sum())
```

```
# Step 9: Make Predictions y_pred
= model.predict(X_test)

# Step 10: Evaluate the Model print("\nClassification
Report:")
print(classification_report(y_test, y_pred))
   print("Accuracy Score:", accuracy_score(y_test, y_pred))
```

# 6. Output

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<b>∓</b>	Dataset Preview	v:				
	sunlight_h	ours watering	g_freq_per	_week s	oil_type w	ater_need
	0 7.7893	L36		6	sandy	low
	1 11.6686	808		4	loamy	high
	2 9.0039	943		2	loamy	low
	3 11.1486	541		5	loamy	low
	4 9.384	333		2	clay	high
<del>∑</del>	Missing Values: sunlight_hours watering_freq_per_week soil_type water_need dtype: int64		0 0 0			



<b>₹</b>	Classificatio	n Report: precision	recall	f1-score	support
	ø	0.29	0.40	0.33	5
	1	0.38	0.27	0.32	11
	2	0.20	0.25	0.22	4
	accuracy			0.30	20
	macro avg	0.29	0.31	0.29	20
	weighted avg	0.32	0.30	0.30	20
	Accuracy Scor	e: 0.3			

## 7. References

- scikit-learn documentation
- pandas documentation
- Seaborn visualization library