IRIS_FLOWER_CLASSIFICATION

TASK :-(Iris Flower Classification)

1. The Iris flower dataset consists of three species: setosa, versicolor, and virginica. These species can be distinguished based on their measurements. Now, imagine that you have the measurements of Iris flowers categorized by their respective species. Your objective is to train a machine learning model that can learn from these measurements and accurately classify the Iris flowers into their respective species.
2. Use the Iris dataset to develop a model that can classify iris flowers into different species based on their sepal and petal measurements. This dataset is widely used for introductory classification tasks.

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.datasets import make_classification
from sklearn.metrics import accuracy_score
from sklearn.tree import DecisionTreeClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.preprocessing import StandardScaler

import time
import warnings
warnings.filterwarnings("ignore")
%matplotlib inline
```

In [2]:
```
iris=pd.read_csv("IRIS.csv")
```

In [3]:
```
iris.head()
```

Out[3]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [4]:
```
iris.tail()
```

Out[4]:

	sepal_length	sepal_width	petal_length	petal_width	species
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

Statistical Analysis about the data

In [5]:
```
iris.describe()
```

Out[5]:

	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [6]:
```
iris.shape
```

Out[6]:
```
(150, 5)
```

In [7]:
```
iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   sepal_length  150 non-null    float64
 1   sepal_width   150 non-null    float64
 2   petal_length  150 non-null    float64
 3   petal_width   150 non-null    float64
 4   species       150 non-null    object 
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

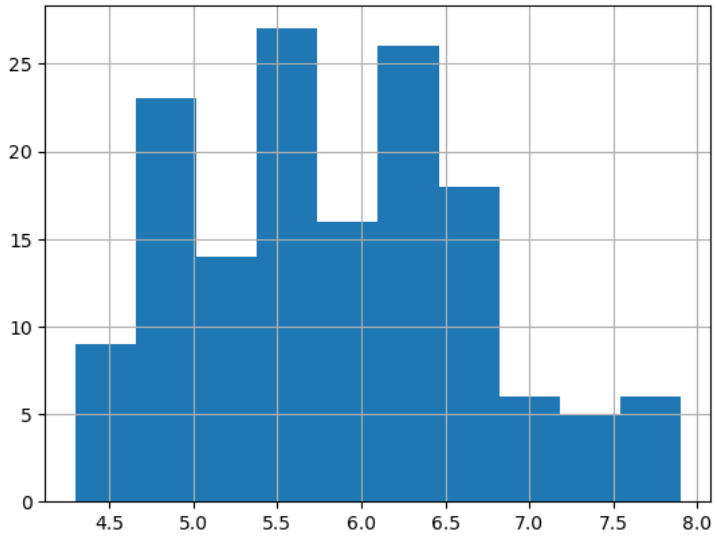
In [8]:
```
iris.isnull().sum()
```

Out[8]:
```
sepal_length    0
sepal_width     0
petal_length    0
petal_width     0
species         0
dtype: int64
```

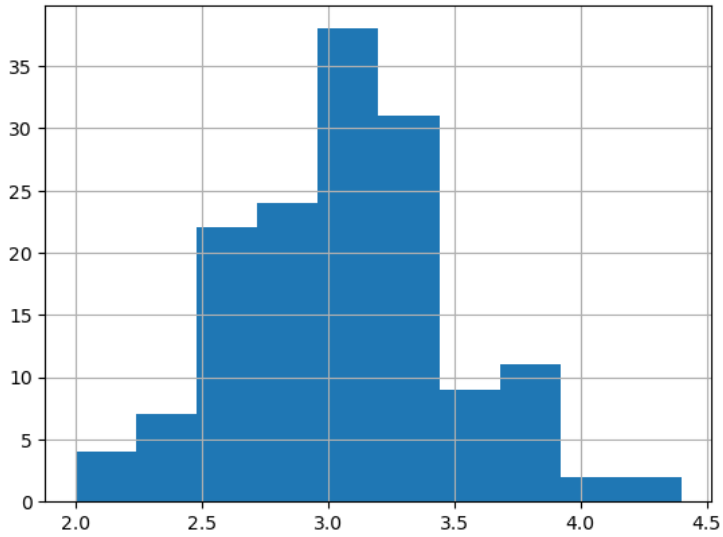
In [9]:
```
iris['species'].value_counts()
```

Out[9]:
```
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: species, dtype: int64
```

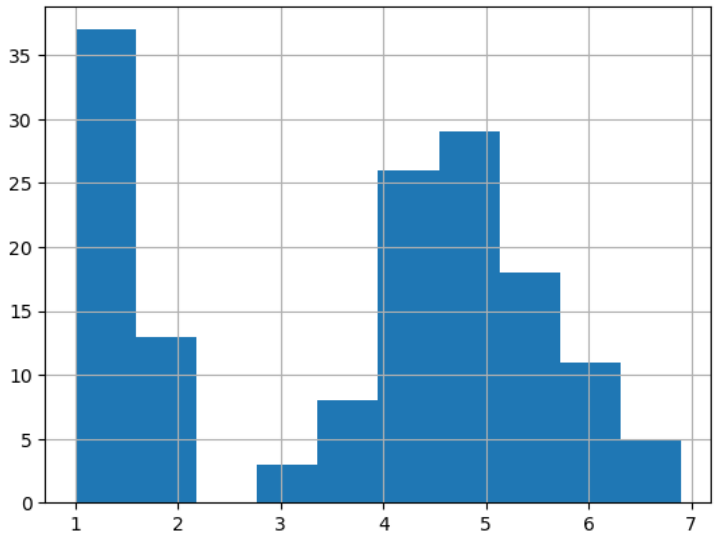
In [11]:
```
iris['sepal_length'].hist()
plt.show()
```



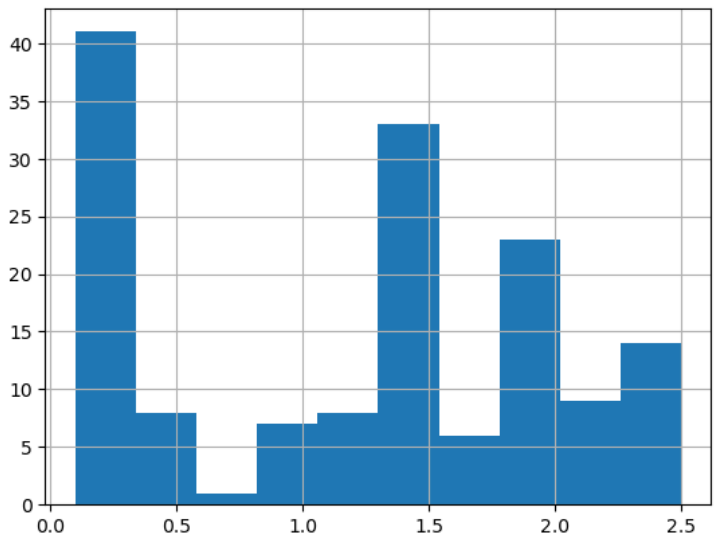
In [12]:
```
iris['sepal_width'].hist()
plt.show()
```



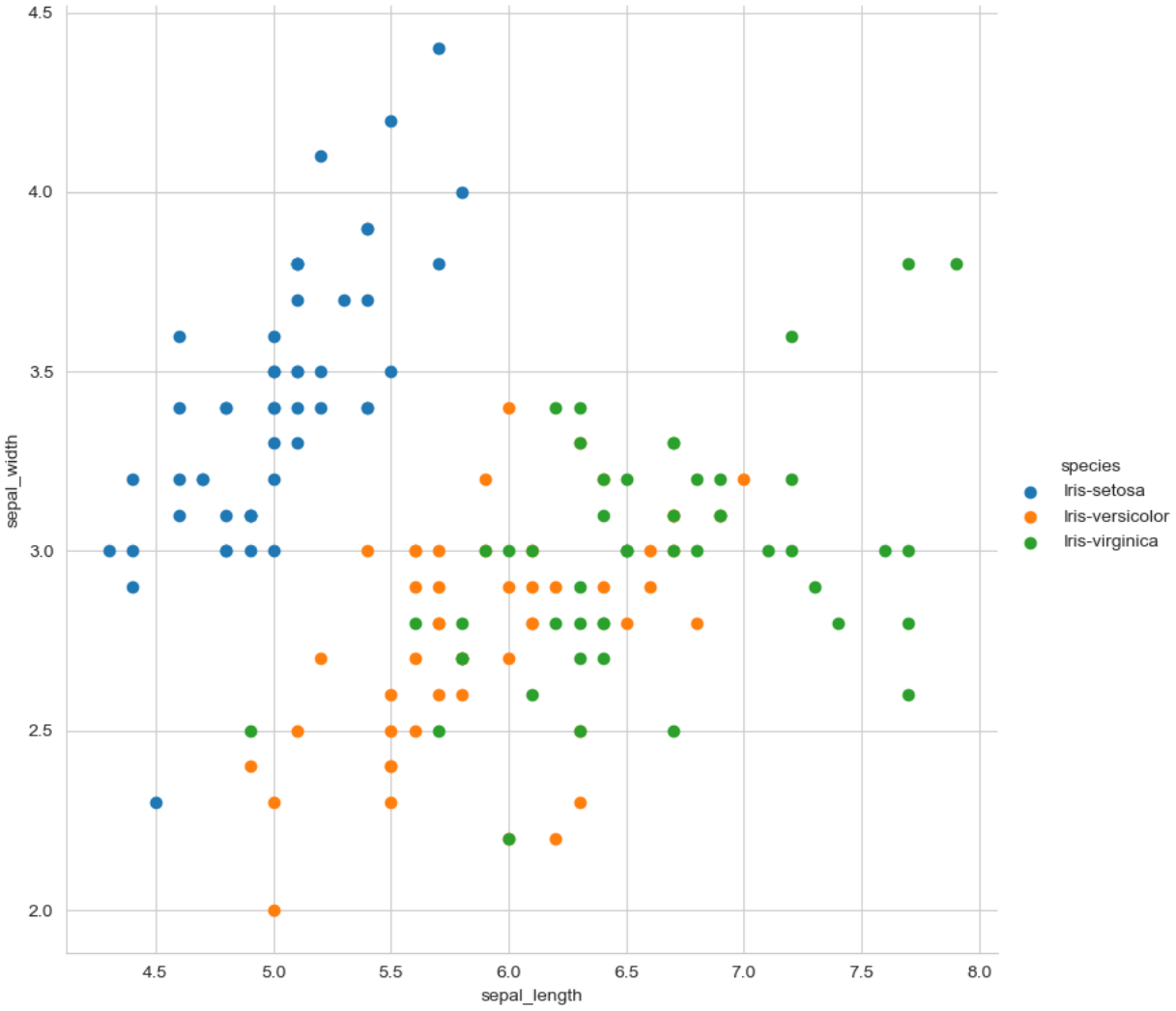
In [13]:
```
iris['petal_length'].hist()
plt.show()
```



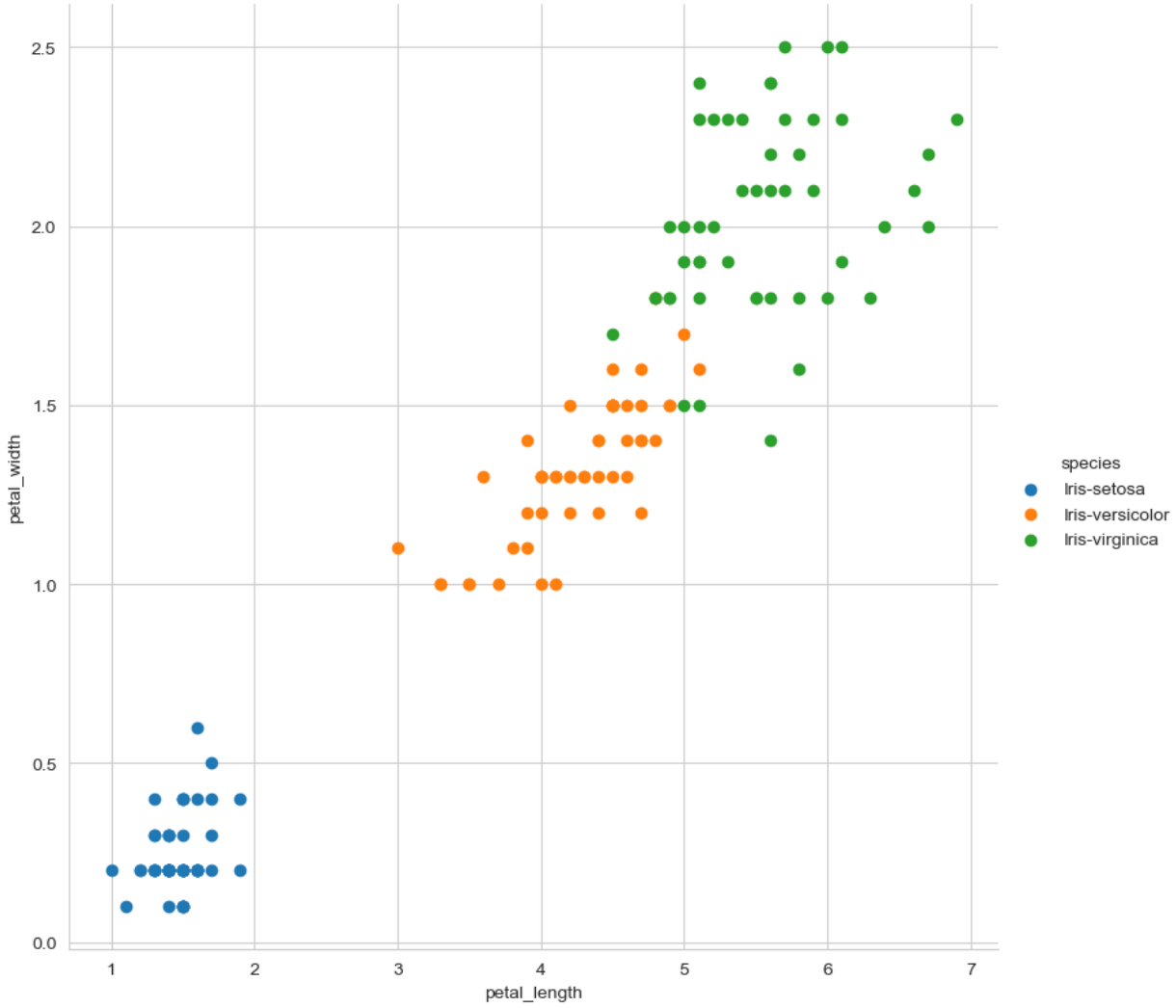
In [14]:
```
iris['petal_width'].hist()
plt.show()
```



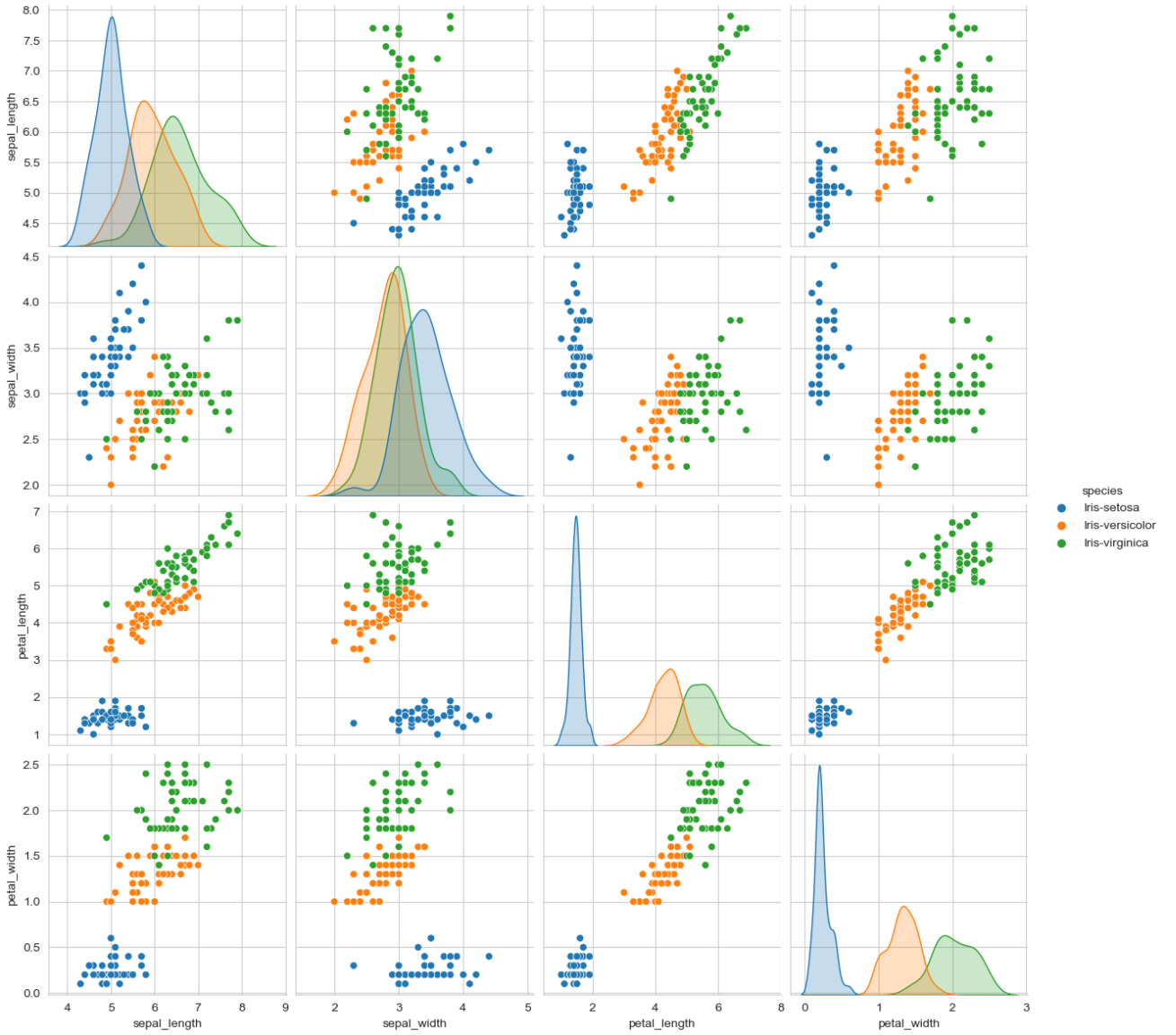
In [17]:
```
##scatter plot
sns.set_style("whitegrid");
g = sns.FacetGrid(iris, hue = "species", height = 8)
g.map (plt.scatter, "sepal_length","sepal_width")
g.add_legend();
plt.show();
```



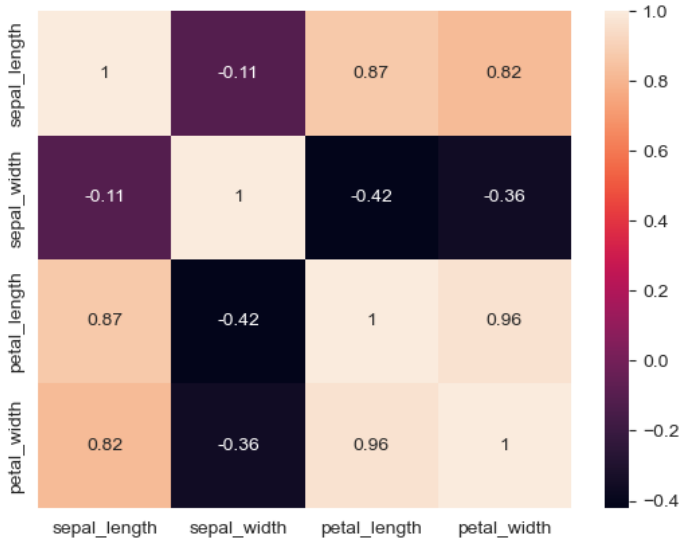
In [18]:
```
sns.set_style("whitegrid")
g=sns.FacetGrid(iris,hue="species",height=8)
g.map(plt.scatter,"petal_length","petal_width")
g.add_legend();
plt.show();
```



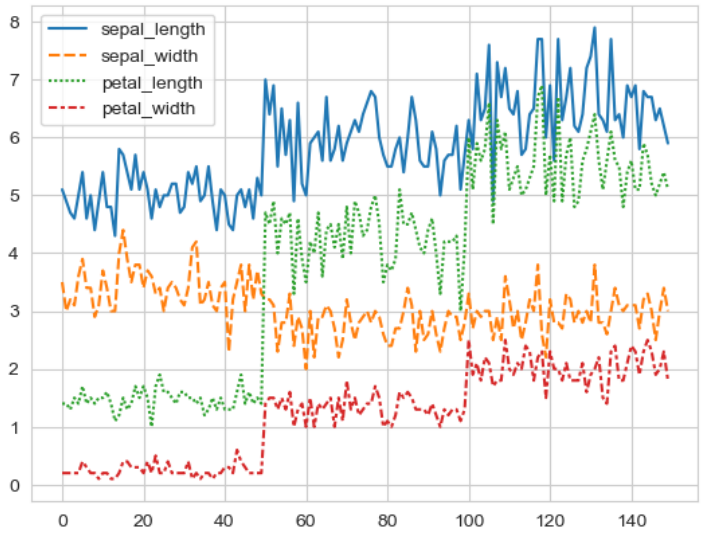
In [20]:
```
sns.pairplot(iris,hue="species",height=3)
plt.show()
```



In [22]:
```
sns.heatmap(iris.corr(), annot=True)
plt.show()
```



In [24]:
```
sns.lineplot(data=iris.drop(['species'], axis=1))
plt.show()
```



spliting the data into training and testing

In [25]:
```
# training the model.
x=iris[['sepal_length','sepal_width','petal_length','petal_width']]
y=iris["species"]
```

In [26]:
```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.30,random_state=5)
```

In [27]:
```
scaler=StandardScaler()
xtrain_scale=scaler.fit_transform(x_train)
xtest_scale=scaler.transform(x_test)
```

In [28]:
```
#model
log_model = LogisticRegression()
#model fitting
log_model.fit(x_train, y_train)
```

Out[28]:
```
LogisticRegression()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [29]:
```
# Prediction of y
ypred = log_model.predict(x_test)
ypred
```

Out[29]:
```
array(['Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
       'Iris-setosa', 'Iris-virginica', 'Iris-versicolor', 'Iris-setosa',
       'Iris-virginica', 'Iris-setosa', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-setosa', 'Iris-versicolor',
       'Iris-virginica', 'Iris-setosa', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-virginica',
       'Iris-setosa', 'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-versicolor', 'Iris-setosa', 'Iris-setosa', 'Iris-virginica',
       'Iris-setosa', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-setosa', 'Iris-versicolor'],
      dtype=object)
```

In [31]:
```
#Evaluation metrics
acc = accuracy_score(y_test, ypred)
acc
```

Out[31]:
```
0.9777777777777777
```

In [32]:
```
# Logistic Algorithm..
log = LogisticRegression()

start_log = time.time()
log.fit(xtrain_scale,y_train)
end_log = time.time()

ytest_pred3 = log.predict(xtest_scale)
acc_log = accuracy_score(y_test,ytest_pred3)*100

train_score_log = log.score(xtrain_scale, y_train)*100

print(log)
print("Train Accuracy :{:.5f}".format(train_score_log))
print("Test Accuracy :{:.5f}".format(acc_log))
```

```
LogisticRegression()
Train Accuracy :97.14286
Test Accuracy :93.33333
```

In [33]:
```
# Decision tree Algorithm..
dt=DecisionTreeClassifier()

start_dt=time.time()
dt.fit(xtrain_scale,y_train)
end_dt=time.time()

ytest_pred1=dt.predict(xtest_scale)
acc_dt=accuracy_score(y_test,ytest_pred1)*100

train_score_dt=dt.score(xtrain_scale,y_train)*100

print(dt)
print("Train Accuracy :{:.5f}".format(train_score_dt))
print("Test Accuracy :{:.5f}".format(acc_dt))
print("Training Time : {:.2f} seconds.".format(end_dt-start_dt))
```

```
DecisionTreeClassifier()
Train Accuracy :100.00000
Test Accuracy :95.55556
Training Time : 0.01 seconds.
```

Thank You!!!

GitHub: [https://github.com/anujtiwari21?tab=repositories (https://github.com/anujtiwari21?tab=repositories)](https://github.com/anujtiwari21?tab=repositories)