In [13]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Cleaning the data

In [14]:
```
df = pd.read_csv('C:/Users/computer world/OneDrive/Desktop/IRIS.csv')
```

In [15]:
```
df.head()
```

Out[15]:

	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 [16]:
```
df.tail()
```

Out[16]:

	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

In [17]:
```
df.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 [18]:
```
df['species'].value_counts()
```

Out[18]:
```
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: species, dtype: int64
```

In [19]:
```
df['species'] = df['species'].str.replace('Iris-','')
```

In [20]:
```
df['species'].value_counts()
```

Out[20]:
```
setosa        50
versicolor    50
virginica     50
Name: species, dtype: int64
```

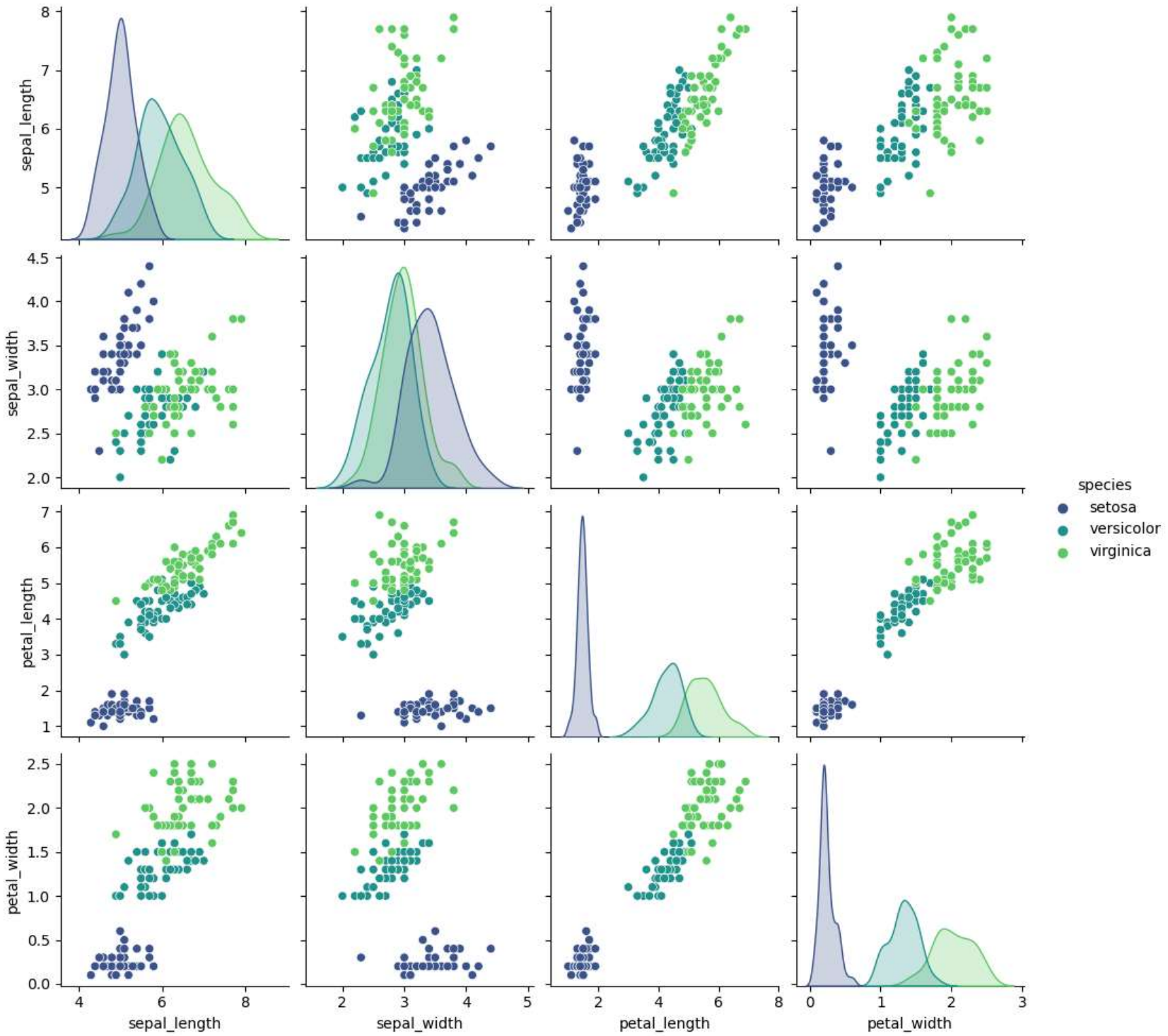
In [21]:
```
missing_values = df.isnull().sum()
percentage_missing = (missing_values/len(df))*100
pd.DataFrame({'missing_values':missing_values,'percentage_missing':percentage_missing})
```

Out[21]:

	missing_values	percentage_missing
sepal_length	0	0.0
sepal_width	0	0.0
petal_length	0	0.0
petal_width	0	0.0
species	0	0.0

Data visualization

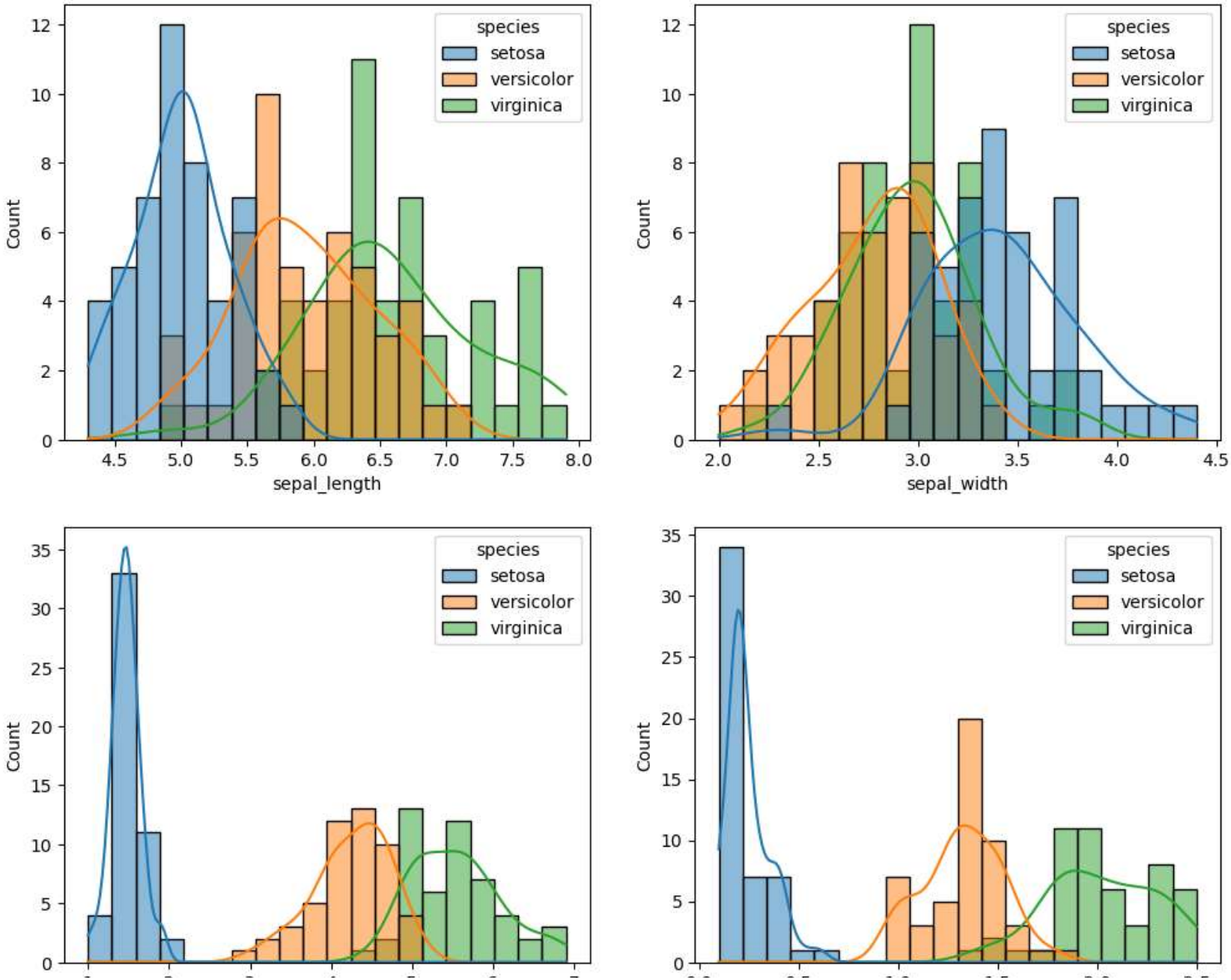
In [12]:
```
green_palette = sns.color_palette("viridis",n_colors = 3)
sns.pairplot(df,hue='species',palette=green_palette)
plt.show()
```


sepal_length
sepal_width
petal_length
petal_width
species
setosa
versicolor
virginica

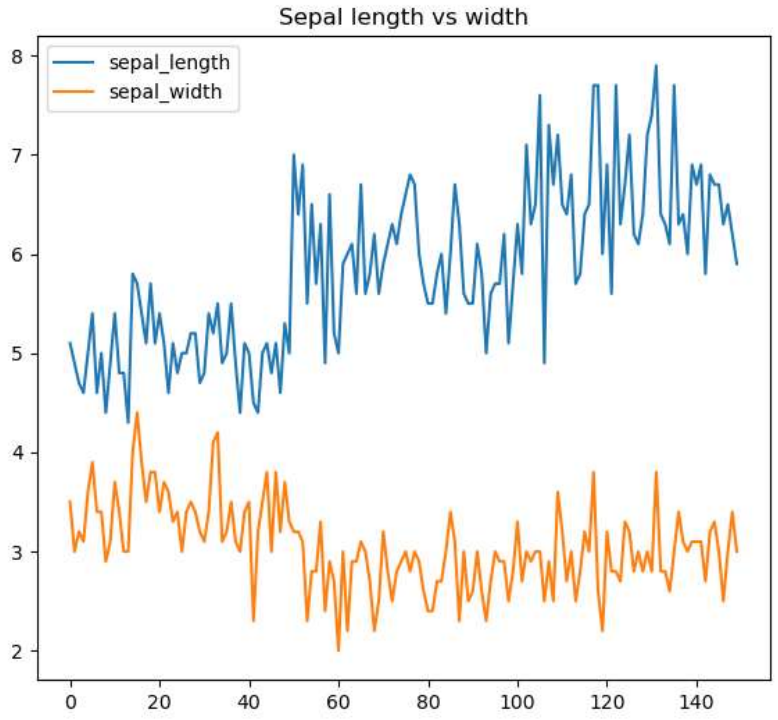
In [22]:

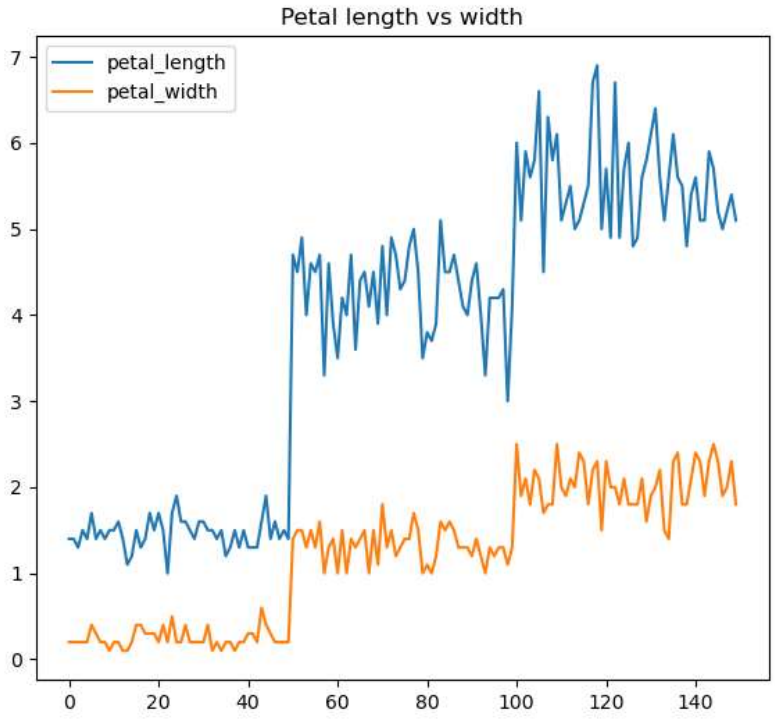
```
num_columns = list(df.select_dtypes(include=['float']).columns)
num=int(len(num_columns)/2) if int(len(num_columns)/2)>1 else 2
fig ,ax = plt.subplots(num,num,figsize=(12,10))
for j in range(num):
    for i in range(num):
        try:
            sns.histplot(data=df,x=num_columns[0],kde=True,bins=20,hue='species',ax=ax[j][i])
            num_columns.pop(0)
        except:
            fig.delaxes(ax=ax[j][i])
fig.suptitle('Histograms of features', fontsize=16)
plt.show()
```

Histograms of features

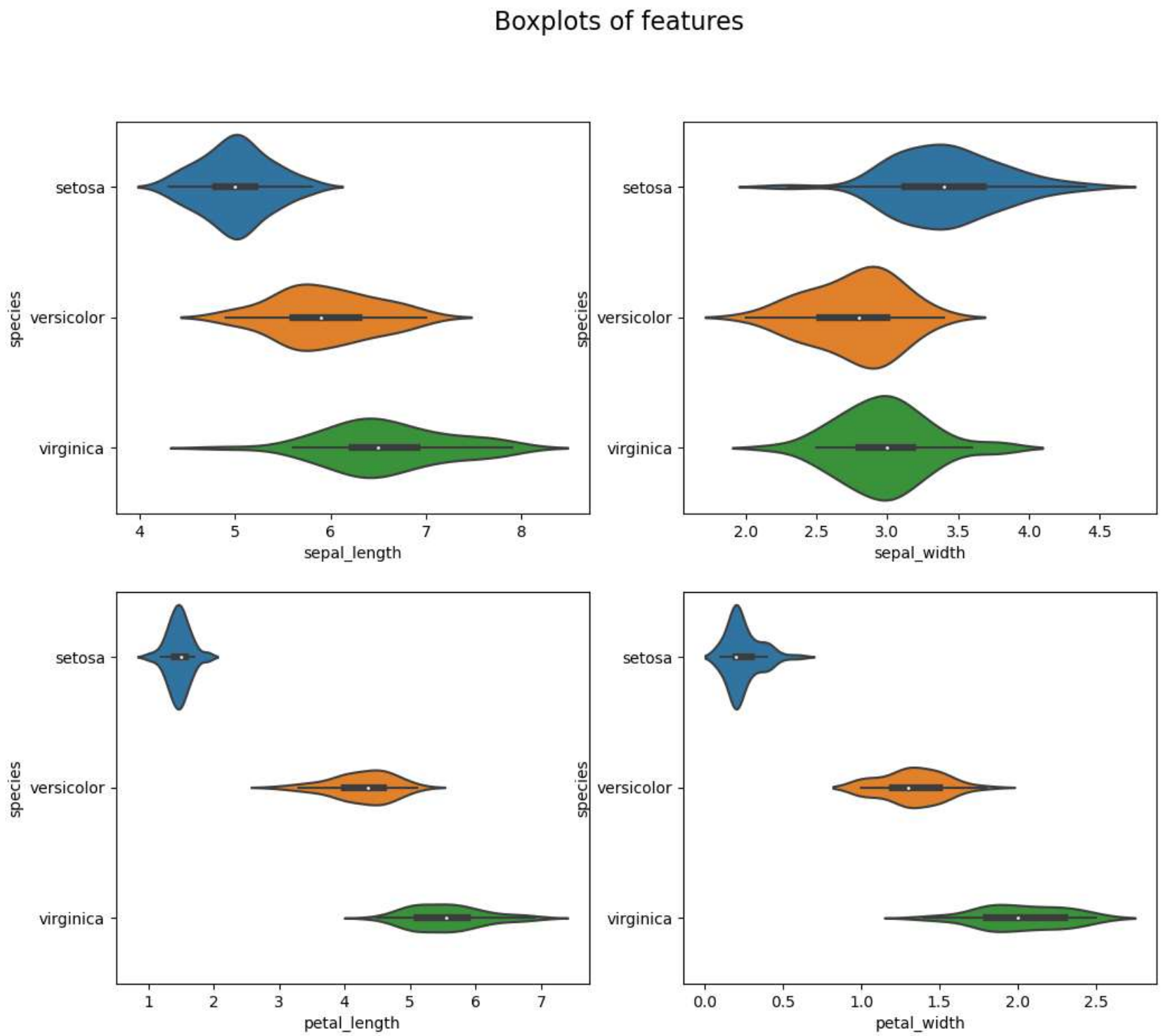


In [23]:
```
fig,ax = plt.subplots(1,2,figsize=(15,6))
ax[0].plot(df['sepal_length'])
ax[0].plot(df['sepal_width'])
ax[0].set_title('Sepal length vs width')
ax[0].legend(['sepal_length','sepal_width'])
ax[1].plot(df['petal_length'])
ax[1].plot(df['petal_width'])
ax[1].set_title('Petal length vs width')
ax[1].legend(['petal_length','petal_width'])
plt.show()
```





In [24]:
```
num_columns = list(df.select_dtypes(include=['float']).columns)
num=int(len(num_columns)/2) if int(len(num_columns)/2)>1 else 2
fig ,ax = plt.subplots(num,num,figsize=(12,10))
for j in range(num):
    for i in range(num):
        try:
            sns.violinplot(data=df,x=num_columns[0],y='species',ax=ax[j][i])
            num_columns.pop(0)
        except:
            fig.delaxes(ax=ax[j][i])
fig.suptitle('Boxplots of features', fontsize=16)
plt.show()
```


Boxplots of features
species
setosa
versicolor
virginica
4
5
6
7
8
sepal_length
species
setosa
versicolor
virginica
2.0
2.5
3.0
3.5
4.0
4.5
sepal_width
species
setosa
versicolor
virginica
1
2
3
4
5
6
7
petal_length
species
setosa
versicolor
virginica
0.0
0.5
1.0
1.5
2.0
2.5
petal_width

Model Building

In [25]:
```
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler,LabelEncoder
from sklearn.metrics import accuracy_score
from sklearn.linear_model import LogisticRegression
from sklearn.neighbors import KNeighborsClassifier
from sklearn.tree import DecisionTreeClassifier
```

In [28]:
```
df['species'] = LabelEncoder().fit_transform(df['species'])
X = df.drop(['species'],axis=1)
y = df['species']
X_train,X_test,y_train,y_test = train_test_split(X,y,test_size=0.2,random_state=42)
lg = LogisticRegression()
dt = DecisionTreeClassifier()
knn = KNeighborsClassifier()
```

In [29]:
```
models = [lg,dt,knn]
for model in models:
    model.fit(X_train,y_train)
    y_pred = model.predict(X_test)
    print(f'Accuracy score of {model} is {accuracy_score(y_test,y_pred)}')
```

```
Accuracy score of LogisticRegression() is 1.0
Accuracy score of DecisionTreeClassifier() is 1.0
Accuracy score of KNeighborsClassifier() is 1.0
```

In [ ]: