KDE Plot Visualization with Pandas and Seaborn

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KDE Plot described as **Kernel Density Estimate** is used for visualizing the Probability Density of a continuous variable. It depicts the probability density at different values in a continuous variable. We can also plot a single graph for multiple samples which helps in more efficient data visualization.

In this article, we will be using Iris Dataset and KDE Plot to visualize the insights of the dataset.

About the Iris Dataset –

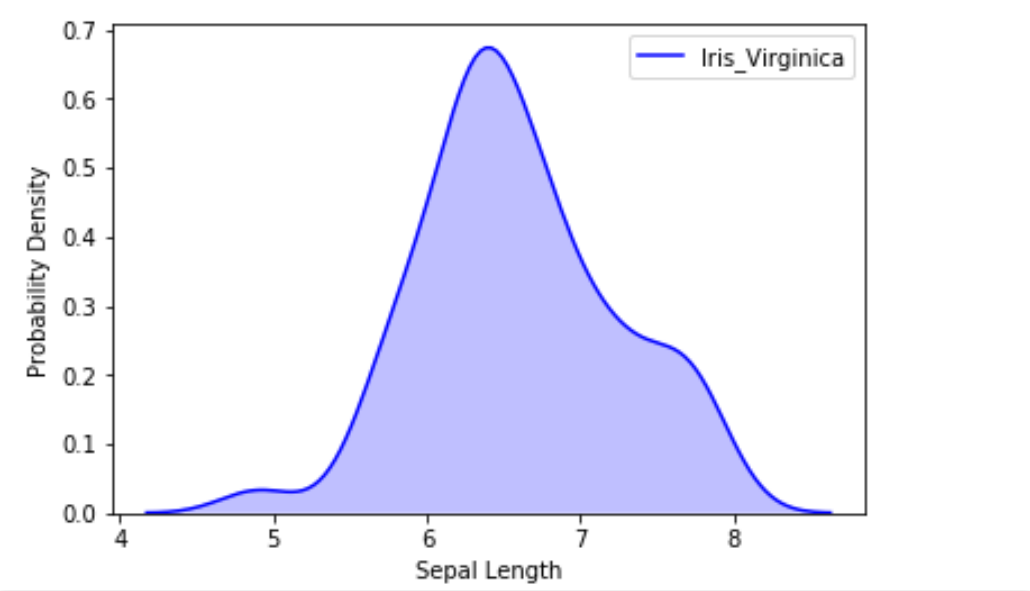
1. **Attributes** : Petal_Length (cm), Petal_Width (cm), Sepal_Length (cm), Sepal_Width(cm)
2. **Target** : Iris_Virginica, Iris_Setosa, Iris_Vercicolor
3. **Number of Instances** : 150

One-Dimensional KDE Plot :

We can visualize the probability distribution of a sample against a single continuous attribute.

```
# importing the required libraries
from sklearn import datasets
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline

# Setting up the Data Frame
iris = datasets.load_iris()

iris_df = pd.DataFrame(iris.data, columns=['Sepal_Length',
                      'Sepal_Width', 'Patal_Length', 'Petal_Width'])

iris_df['Target'] = iris.target

iris_df['Target'].replace([0], 'Iris_Setosa', inplace=True)
iris_df['Target'].replace([1], 'Iris_Vercicolor', inplace=True)
iris_df['Target'].replace([2], 'Iris_Virginica', inplace=True)

# Plotting the KDE Plot
sns.kdeplot(iris_df.loc[(iris_df['Target']=='Iris_Virginica'),
            'Sepal_Length'], color='b', shade=True, Label='Iris_Virginica')

# Setting the X and Y Label
plt.xlabel('Sepal Length')
plt.ylabel('Probability Density')
```

Output:

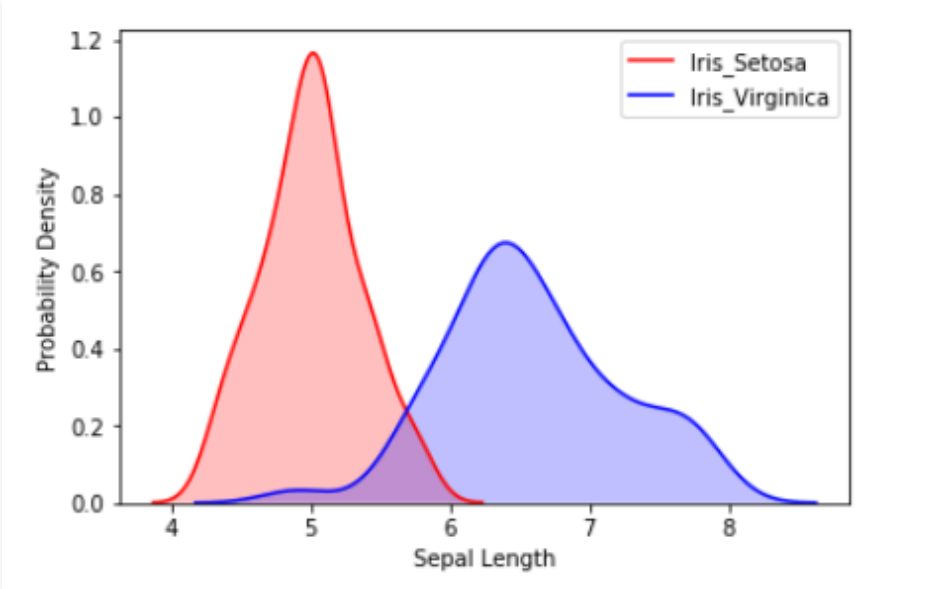


e can also visualize the probability distribution of multiple samples in a single plot.

```
# Plotting the KDE Plot
```

```
sns.kdeplot(iris_df.loc[(iris_df['Target']=='Iris_Setosa'),
            'Sepal_Length'], color='r', shade=True, Label='Iris_Setosa')

sns.kdeplot(iris_df.loc[(iris_df['Target']=='Iris_Virginica'),
            'Sepal_Length'], color='b', shade=True, Label='Iris_Virginica')

plt.xlabel('Sepal Length')
plt.ylabel('Probability Density')
```

Output:

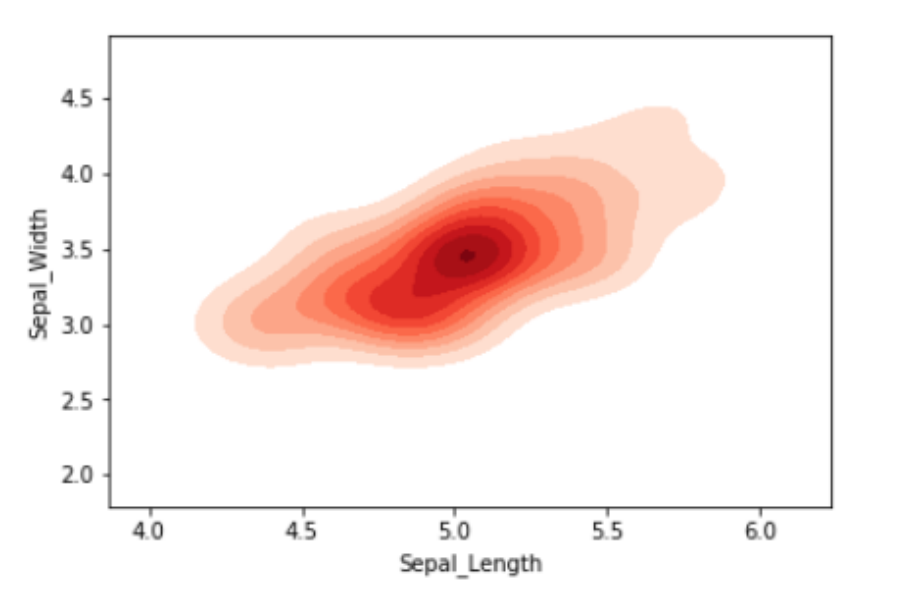


Two-Dimensional KDE Plot :

We can visualize the probability distribution of a sample against multiple continuous attributes.

```
# Setting up the samples
iris_setosa = iris_df.query("Target=='Iris_Setosa'")
iris_virginica = iris_df.query("Target=='Iris_Virginica'")

# Plotting the KDE Plot
sns.kdeplot(iris_setosa['Sepal_Length'],
            iris_setosa['Sepal_Width'],
            color='r', shade=True, Label='Iris_Setosa',
            cmap="Reds", shade_lowest=False)
```

Output:



We can also visualize the probability distribution of multiple samples in a single plot.

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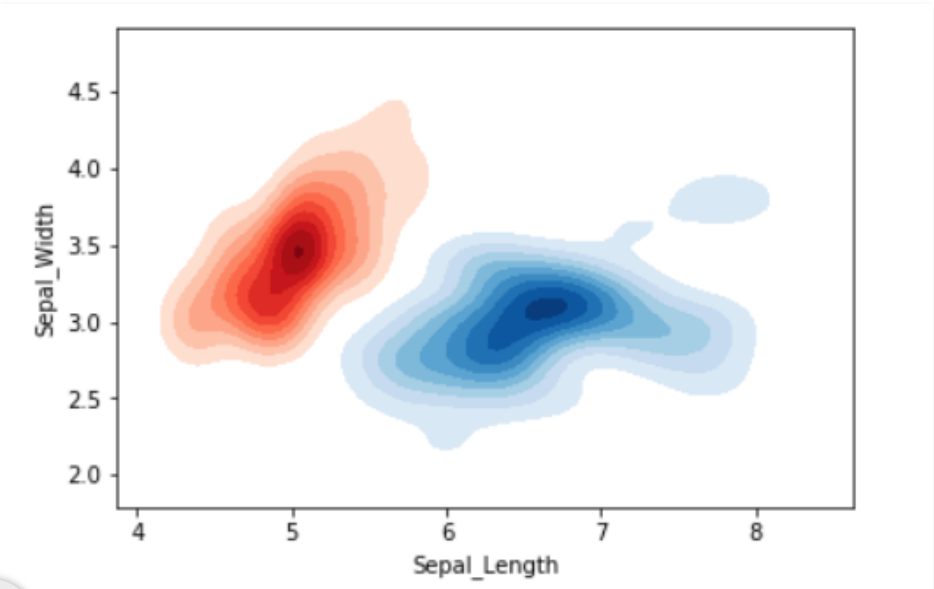
```
sns.kdeplot(iris_virginica['Sepal_Length'],
            iris_virginica['Sepal_Width'], color='b',
            shade=True, Label='Iris_Virginica',
            cmap="Blues", shade_lowest=False)
```

Output:



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sauravprateek
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