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import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb
# ***Basic of SeaBorn Library:***
#df = pd.read_csv("sample.csv")
index = ["us","ca","ir","gp","ch","tr","af","ru","hg","gr","fr","no","uae","uk","in"]
#index = np.arange(0,15)
data = np.random.randint(99,1000,(15,4))
columns = ["Jan","Feb","Mar","Apr"]
df = pd.DataFrame(data,index,columns)
# # # print(df.head().columns)
# Create a Scatter Plot
#>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
plt.figure(figsize=(12,8),dpi=72)
sb.scatterplot(x="Jan",y="Feb",data=df,alpha=0.9,s=200,#size="Founded",
               style="Mar",hue="Mar",palette="dark")
plt.savefig("ScatterPlot.png")
plt.show()
#>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
# Create Distribution Plots (Rug Plot, Histogram, KDE Plot)
sb.displot(data=df,x="Jan",bins=20,kde=True,rug=True) # Contains all Distribution Plots but Depricated
plt.savefig("DisPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<<
plt.figure(figsize=(8,6))
sb.rugplot(x="Feb",data=df,height=0.5)
plt.savefig("RugPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<<
sb.set_style("darkgrid")
sb.histplot(data=df,x="Jan",bins=20,color="red",edgecolor="blue")
plt.savefig("HistPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<<
sb.kdeplot(data=df,x="Jan",clip=[0,1200],bw_adjust=0.4,fill=True)  # shade depricated > fill
plt.savefig("KDEPlot.png")
plt.show()
#>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
# Create Categorical Plots (Count Plot, Bar Plot, Box Plot, Boxen Plot, Violin Plot, Swarm Plot)
plt.figure(figsize=(12,8),dpi=72)
sb.countplot(data=df,x="Mar",hue="Feb",palette="Set2")
plt.ylim(0,2)
plt.savefig("CountPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<<
plt.figure(figsize=(12,8),dpi=72)
sb.barplot(data=df,x="Mar",y="Feb",hue="Jan",palette="Set2",estimator=np.mean,errorbar="sd")
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plt.legend(bbox_to_anchor=(1.05,1))
plt.savefig("BarPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<
plt.figure(figsize=(12,8),dpi=72)
sb.boxplot(data=df,x="Mar",y="Feb",hue="Jan",palette="Set2")
plt.savefig("BoxPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<
plt.figure(figsize=(12,8),dpi=72)
sb.boxenplot(data=df,x="Mar",y="Feb",hue="Jan",palette="Set2")
plt.savefig("BoxenPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<
plt.figure(figsize=(12,8),dpi=72)
sb.violinplot(data=df,x="Mar",y="Feb",hue="Jan",palette="Set2",
              bw_method=1,inner="quartile") # inner= stick
plt.savefig("ViolinPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<
plt.figure(figsize=(12,8),dpi=72)
sb.swarmplot(data=df,x="Mar",y="Feb",hue="Jan",palette="Set2",size=8)
plt.savefig("SwarmPlot.png")
plt.show()
#>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
# Create a Categorical Plot (Joint Plot, Pair Plot)
sb.jointplot(data=df,x="Jan",y="Feb",palette="Set2",kind="kde",
#kinds=["hex","hist","kde","scatter"]
             alpha=0.8,fill=True) # shade depricated > fill
plt.savefig("JointPlot.png")
plt.show()
#<<<<<<<<<<<<<<<<<<<<<<<<<
sb.pairplot(data=df, hue="Feb", diag_kind="hist",corner=True)
plt.savefig("PairPlot.png")
plt.show()
#>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
# Create a Grid Plot (Cat Plot, Pair Grid Plot, Facet Grid)
sb.catplot(data=df,x="Jan",y="Feb",row="Apr"
           ,hue="Mar") # kinds=a kind of plot - col="Mar"
plt.savefig("CatPlot.png")
plt.show()
# #<<<<<<<<<<<<<<<<<<<<<<<<<
gp = sb.PairGrid(data=df)
gp.map_upper(sb.scatterplot)
gp.map_lower(sb.kdeplot)
gp.map_diag(sb.histplot)
plt.savefig("PairGridPlot.png")
plt.show()
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#<<<<<<<<<<<<<<<<<<<<<<<<<<
fgp = sb.FacetGrid(data=df,col="Apr",row="Feb")
fgp.map(plt.scatter,"Jan","Mar",edgecolor="w")
plt.savefig("FacetGridPlot.png")
plt.show()
#>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
# Create a Matrix Plot (Heat Map)
plt.figure(figsize=(12,8),dpi=72)
sb.heatmap(data=df,linewidths=0.5,annot=True,cmap="viridis") # center=40
plt.savefig("HeatMapPlot.png")
plt.show()
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