DCS 640 Data Presentation & Visualization (DSC640-T302 2231-1)

Bellevue University

3.2 Exercises: Line Charts and Step Charts

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Assignment Instructions:

Submit 1 tree map, 1 area chart, and 1 stacked area chart with Python

In [77]:
```
'''
Import the necessary libraries to complete Exercise 2.2.
'''
import numpy as np
import pandas as pd
import seaborn as sns
import scipy.stats
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.patches as mpatches
import plotly.express as px
import squarify
```

In [2]:
```
'''
Check the versions of the packages.
'''
print('numpy version:', np.__version__)
print('pandas version:', pd.__version__)
print('seaborn version:', sns.__version__)
print('matplotlib version:', matplotlib.__version__)
```

```
numpy version: 1.20.3
pandas version: 1.3.4
seaborn version: 0.11.2
matplotlib version: 3.4.3
```

Dataset Understanding

In [3]:
```
'''
Import the datasets.
Note: A copy of the CSV file was placed into the same directory as this notebook.
Utilize pd.read_csv() to read the file as a pandas data frame.
'''
df1 = pd.read_csv('expenditures.txt', sep = "\t")
```

In [4]:
```
'''
Use head() function to display the first 5 rows of data of df1.
'''
df1.head()
```

Out[4]:

	year	category	expenditure	sex
0	2008	Food	6443	1
1	2008	Alcoholic Beverages	444	1
2	2008	Housing	17109	1
3	2008	Apparel	1801	1
4	2008	Transportation	8604	1

In [5]:
```
'''
Understand the shape of the df1.
'''
print('There are {} rows and {} columns in the df1.'.format(df1.shape[0], df1.shape[1]))
```

```
There are 350 rows and 4 columns in the df1.
```

In [6]:
```
'''
Convert Year to Date Time for df1.
```

```
Comment this section out of the code. Originally tried plotting with Date Type, however had success leaving it as numeric
'''
# df1['Year'] = pd.to_datetime(df1['Year'])
```

Out[6]:
```
'\nConvert Year to Date Time for df1.\nComment this section out of the code. Originally tried plotting with Date Type, ho
wever had success leaving it as numeric.\n'
```

In [7]:
```
'''
Find the type of data within each df1 column initially.
'''
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 350 entries, 0 to 349
Data columns (total 4 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   year         350 non-null    int64 
 1   category     350 non-null    object
 2   expenditure  350 non-null    int64 
 3   sex          350 non-null    int64 
dtypes: int64(3), object(1)
memory usage: 11.1+ KB
```

In [8]:
```
'''
Understand if there are any missing values in df1.
'''
df1.isna().sum().sort_values(ascending = False)
```

Out[8]:
```
year           0
category       0
expenditure    0
sex            0
dtype: int64
```

Chart Creation from the Dataset.

Tree Map

In [9]:
```
'''
Aggregate the data for df1.
'''
```

```
grouped_df = df1.groupby('category')[['expenditure']].sum()
grouped_df
```

Out[9]:

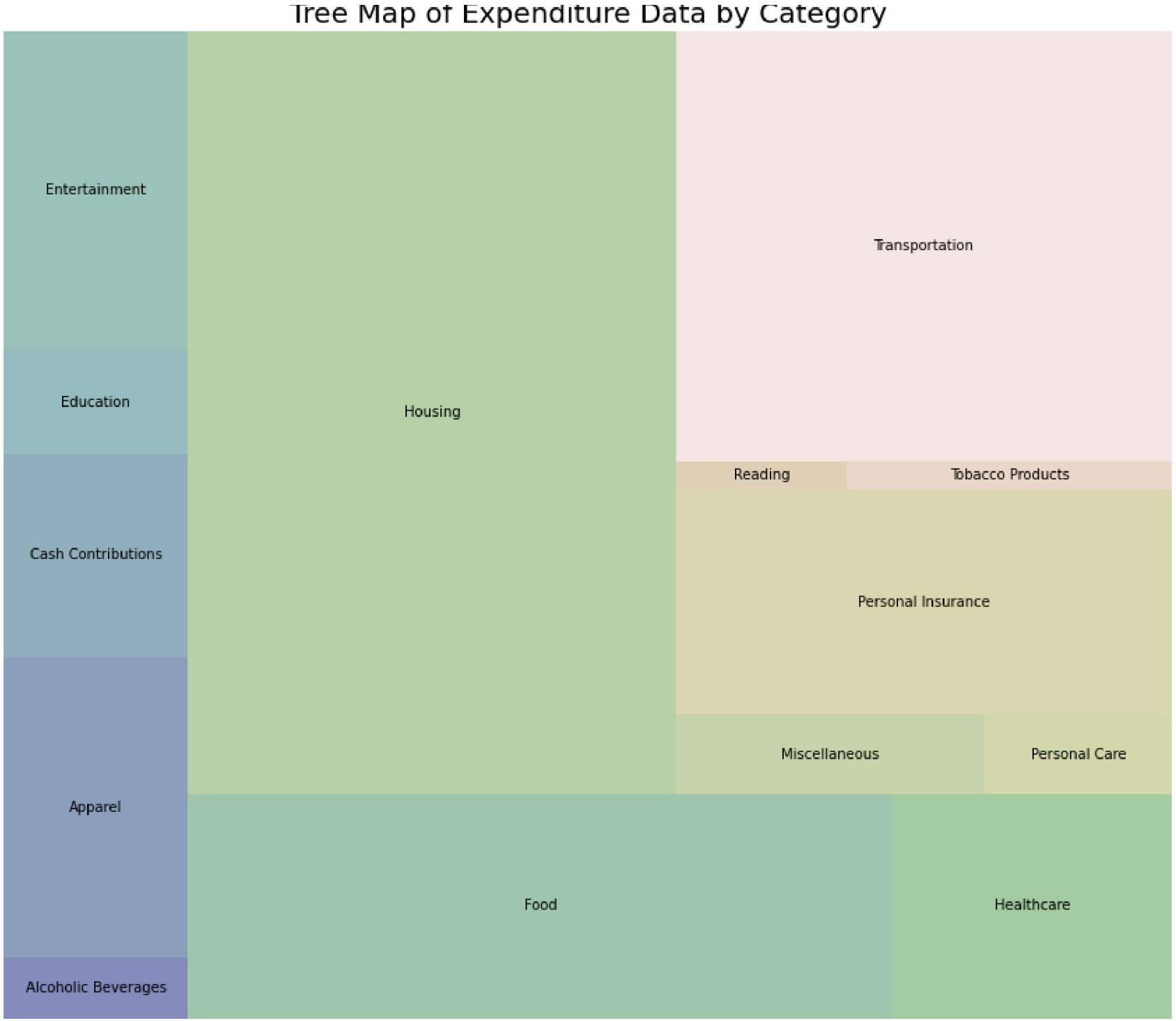
category	expenditure
Alcoholic Beverages	8424
Apparel	41833
Cash Contributions	27987
Education	14498
Entertainment	44273
Food	119297
Healthcare	47383
Housing	280256
Miscellaneous	18327
Personal Care	11123
Personal Insurance	84269
Reading	3636
Tobacco Products	6936
Transportation	160694

In [18]:

```
'''
Create a tree map using one of the expenditure dataset.
Use squarify to construct the plot.
'''
fig = plt.figure(figsize = (15,13))
squarify.plot(sizes = grouped_df.values, color=sns.color_palette("gist_earth", len(grouped_df)),
              label = grouped_df.index, alpha =0.5)
plt.title('Tree Map of Expenditure Data by Category', fontsize = 20)
plt.axis("off")
```

Out[18]:

```
(0.0, 100.0, 0.0, 100.0)
```


Tree Map of Expenditure Data by Category
Entertainment
Education
Cash Contributions
Apparel
Alcoholic Beverages
Housing
Transportation
Reading
Tobacco Products
Personal Insurance
Miscellaneous
Personal Care
Food
Healthcare

Area Chart

In [108…

```
'''
Create a dataframe specifically for the area chart.
'''
df_area = df1[['year','category','expenditure']]
df_area.head()
```

Out[108…

	year	category	expenditure
0	2008	Food	6443
1	2008	Alcoholic Beverages	444
2	2008	Housing	17109
3	2008	Apparel	1801
4	2008	Transportation	8604

In [110…

```
df_pivot = df_area.pivot(index='year', columns = 'category', values = 'expenditure')
df_pivot.head()
```

Out[110…

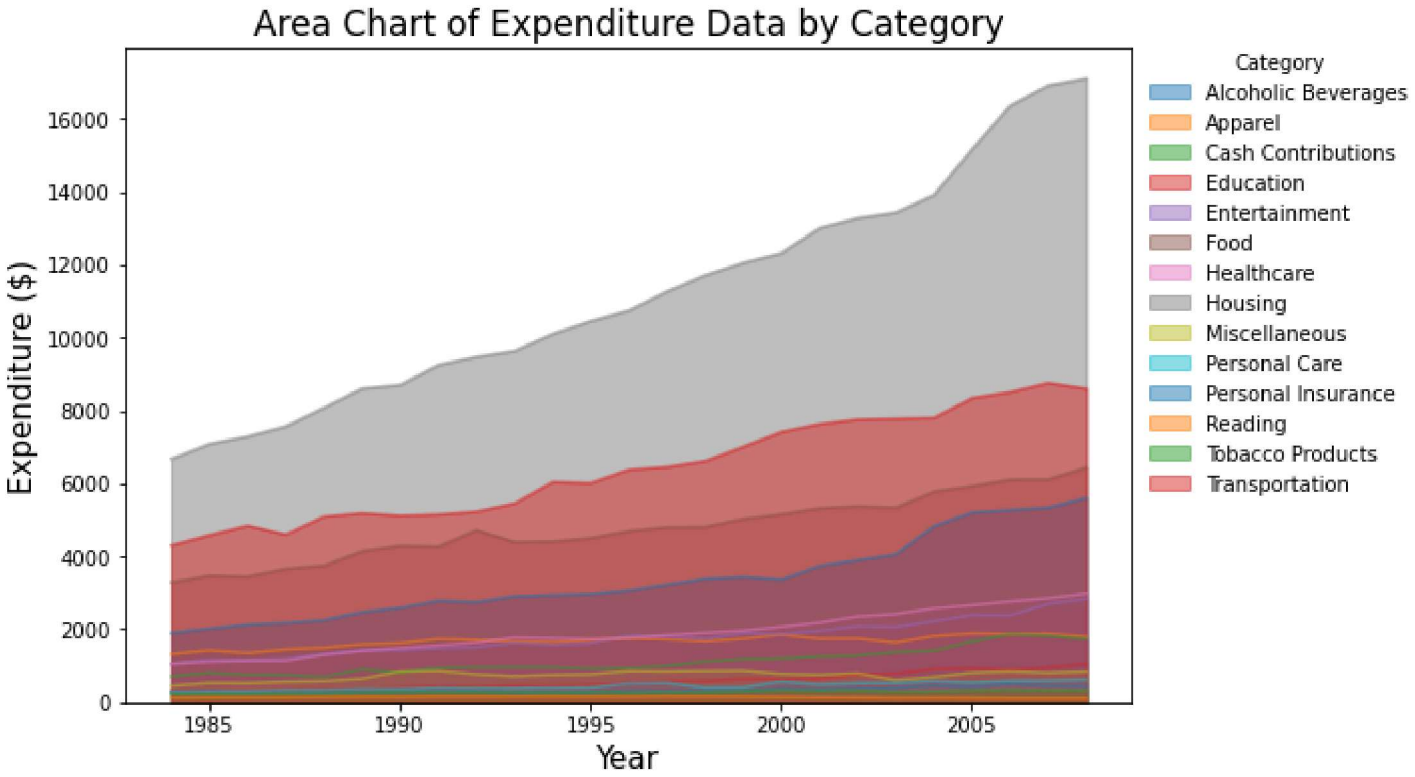
category	Alcoholic Beverages	Apparel	Cash Contributions	Education	Entertainment	Food	Healthcare	Housing	Miscellaneous	Personal Care	Personal Insurance	Readi
year												
1984	275	1319	706	303	1055	3290	1049	6674	451	289	1897	1
1985	306	1420	805	321	1170	3477	1108	7087	529	303	2016	1
1986	271	1346	746	314	1149	3448	1135	7292	522	303	2127	1
1987	289	1446	741	337	1193	3664	1135	7569	562	330	2175	1
1988	269	1489	693	342	1329	3748	1298	8079	578	334	2249	1

In [114…

```
'''
Create an area chart using the expenditure.
Use matplotlib and pandas to construct the plot.
```

```
'''
ax = df_pivot.plot(kind='area', figsize=(9,6), stacked = False)
ax.set_xlabel("Year",fontsize=15)
ax.set_ylabel('Expenditure ($)', fontsize = 15)
ax.set_title('Area Chart of Expenditure Data by Category', fontsize = 17)
ax.legend(title='Category', bbox_to_anchor=(1,1.02),loc='upper left', frameon=False)
```

Out[114… <matplotlib.legend.Legend at 0x23097517610>



Stacked Area Chart Using Plotly

In [92]:

```
'''
Create a stacked area chart of the expenditure data.
Utilize plotly.express.
'''
fig = px.area(df_area, x = 'year', y= 'expenditure', color = 'category', labels={'expenditure':"Expenditure ($)",
                                                                                 'year':'Year', 'category':"Category"},
              title = 'Stacked Area Chart of Expenditure Data by Category')
fig.show()
```

Stacked Area Chart Using Pandas and Matplotlib

In [115…

```
'''
Create stacked area chart using the expenditure.
Use matplotlib and pandas to construct the plot
'''
ax = df_pivot.plot(kind='area', figsize=(9,6), stacked = True)
ax.set_xlabel("Year",fontsize=15)
ax.set_ylabel('Expenditure ($)', fontsize = 15)
```

```
ax.set_title('Stacked Area Chart of Expenditure Data by Category', fontsize = 17)
ax.legend(title='Category', bbox_to_anchor=(1,1.02),loc='upper left', frameon=False)
```

Out[115… <matplotlib.legend.Legend at 0x23094698640>