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import pandas as pd
import matplotlib.pyplot as plt
import math
import numpy as np
import seaborn as sns

place_data = pd.read_csv("./example.csv")

#separate relationships

place_data['Incubation Center'] = np.where(place_data['Relationship'].str.contains("TechTown
Business Incubation Center Client"), 1, 0)
place_data['DTX Launch'] = np.where(place_data['Relationship'].str.contains("DTX Launch
Detroit Student Accelerator Participant"), 1, 0)
place_data['EIR Program'] = np.where(place_data['Relationship'].str.contains("D-Venture
Entrepreneur-in-residence"), 1, 0)
place_data['DTX Fellows'] = np.where(place_data['Relationship'].str.contains("DTX Fellows
Program Participant"), 1, 0)
place_data['Workshop'] = np.where(place_data['Relationship'].str.contains("Workshop
Attendee"), 1, 0)
place_data['Group Technical Assistance'] =
np.where(place_data['Relationship'].str.contains("Group Technical Assistance Recipient"), 1, 0)
place_data['Professional Service Provider'] =
np.where(place_data['Relationship'].str.contains("Professional Service Recipient"), 1, 0)
place_data['Professional Service Recipient'] =
np.where(place_data['Relationship'].str.contains("Professional Service Provider"), 1, 0)
place_data['Another Relationship'] = np.where(place_data['Relationship'].str.contains("Client of
Another TechTown Program"), 1, 0)

#separate meanings
place_data['New Initiatives'] = np.where(place_data['Meaning'].str.contains("Learning about new
TechTown initiatives"), 1, 0)
place_data['Upcoming Programs'] = np.where(place_data['Meaning'].str.contains("Hearing about
upcoming TechTown programs"), 1, 0)
place_data['First to Get Info'] = np.where(place_data['Meaning'].str.contains("Receiving
information before anyone else"), 1, 0)
place_data['Giving Back'] = np.where(place_data['Meaning'].str.contains("Giving back to the
organization"), 1, 0)
place_data['Specialized Education'] = np.where(place_data['Meaning'].str.contains("Receiving
specialized education"), 1, 0)
place_data['Volunteering'] = np.where(place_data['Meaning'].str.contains("Volunteering for
TechTown"), 1, 0)
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place_data['Networking'] = np.where(place_data['Meaning'].str.contains("Networking with other business owners"), 1, 0)
place_data['Group'] = np.where(place_data['Meaning'].str.contains("Being part of a group"), 1, 0)
place_data['Other Meaning'] = np.where(place_data['Meaning'].str.contains("Other"), 1, 0)

#separate topics

place_data['TechTown Resources'] = np.where(place_data['Topics'].str.contains("TechTown resources"), 1, 0)
place_data['Partner Resources'] = np.where(place_data['Topics'].str.contains("Resources and opportunities from TechTown partners"), 1, 0)
place_data['Neighborhood News'] = np.where(place_data['Topics'].str.contains("Neighborhood news"), 1, 0)
place_data['Tips/Tricks'] = np.where(place_data['Topics'].str.contains("Tips and tricks from TechTown staff and other industry leaders"), 1, 0)
place_data['Alumni News'] = np.where(place_data['Topics'].str.contains("Alumni news and stories"), 1, 0)
place_data['Research'] = np.where(place_data['Topics'].str.contains("Research and reports"), 1, 0)
place_data['Detroit'] = np.where(place_data['Topics'].str.contains("Detroit Events"), 1, 0)
place_data['Other Topic'] = np.where(place_data['Topics'].str.contains("Other"), 1, 0)

#separate initiatives

place_data['Attend Event'] = np.where(place_data['Initiatives'].str.contains("Attend an event"), 1, 0)
place_data['Attend Workshop'] = np.where(place_data['Initiatives'].str.contains("Attend a workshop or other learning opportunity"), 1, 0)
place_data['Alumni Workshop'] = np.where(place_data['Initiatives'].str.contains("Attend alumni only workshops"), 1, 0)
place_data['Alumni Office Hours'] = np.where(place_data['Initiatives'].str.contains("Access to alumni only office hours"), 1, 0)
place_data['1-1 Support'] = np.where(place_data['Initiatives'].str.contains("Utilize 1-1 support"), 1, 0)
place_data['Access PSN'] = np.where(place_data['Initiatives'].str.contains("Access the Professional Service Network"), 1, 0)
place_data['Offer Mentoring (PSN)'] = np.where(place_data['Initiatives'].str.contains("Offer your services or mentoring for Professional Service Network initiatives"), 1, 0)
place_data['Livestreamed Workshop'] = np.where(place_data['Initiatives'].str.contains("Watch a live streamed workshop on social media"), 1, 0)
place_data['Watch Video'] = np.where(place_data['Initiatives'].str.contains("Watch a video of pre-recorded educational opportunities"), 1, 0)
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place_data['Online Guide'] = np.where(place_data['Initiatives'].str.contains("Access to an online collection of educational guides with tips and tricks"), 1, 0)
place_data['Read'] = np.where(place_data['Initiatives'].str.contains("Read to stay informed"), 1, 0)
place_data['Networking'] = np.where(place_data['Initiatives'].str.contains("Networking events with other alumni"), 1, 0)
place_data['Feature in News'] = np.where(place_data['Initiatives'].str.contains("Being featured in newsletters sent to other alumni and TechTown affiliates"), 1, 0)
place_data['Other Initiative'] = np.where(place_data['Initiatives'].str.contains("Other"), 1, 0)

#separate resources

place_data['TechTown Staff'] = np.where(place_data['Resources'].str.contains("A Member of TechTown Staff"), 1, 0)
place_data['Member of PSN'] = np.where(place_data['Resources'].str.contains("A Member of the Professional Service Network"), 1, 0)
place_data['Peers/Entrepreneurs'] = np.where(place_data['Resources'].str.contains("Peers / Entrepreneurs"), 1, 0)
place_data['Social Media'] = np.where(place_data['Resources'].str.contains("Social Media"), 1, 0)
place_data['TechTown Newsletter'] = np.where(place_data['Resources'].str.contains("Regular TechTown Newsletter"), 1, 0)
place_data['Flyers'] = np.where(place_data['Resources'].str.contains("Flyers"), 1, 0)
place_data['None'] = np.where(place_data['Resources'].str.contains("I don't learn about TechTown events and resources"), 1, 0)
place_data['Other Resource'] = np.where(place_data['Resources'].str.endswith("Other"), 1, 0)

place_data.drop(columns=['Initiatives', 'Resources', 'Topics', 'Meaning', 'Relationship'], inplace=True)
place_data.to_csv(path_or_buf = r'C:\Users\ycaoj\Downloads\TechTown Detroit\Cleaned Tech Data.csv')

#Generate matrix frame

sns.set(style="white")
matrix = place_data.drop("ID", axis = 1)
matrix.drop(columns = ['Session Preference'], inplace = True)
corr = matrix.corr()

#Calculate probabilities

for i in corr:
    for j in corr:
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        andprob = 0
        for index, row in matrix.iterrows():
            if matrix[j][index] == 1 and matrix[i][index] == 1:
                andprob += 1
        corr[i][j] = andprob / matrix[i].sum()
        if math.isnan(corr[i][j]):
            corr[i][j] = 0
        if i == j:
            corr[i][j] = math.nan

#Drop extraneous columns
corr.drop(columns = ['New Initiatives', 'Upcoming Programs', 'First to Get Info', 'Giving Back',
'Specialized Education', 'Volunteering', 'Networking', 'Group', 'Other Meaning'], inplace = True)
corr.drop(columns = ['TechTown Resources', 'Partner Resources', 'Neighborhood News',
'Tips/Tricks', 'Alumni News', 'Research', 'Detroit', 'Other Topic'], inplace = True)
corr.drop(columns = ['Attend Event', 'Attend Workshop', 'Alumni Workshop', 'Alumni Office
Hours', '1-1 Support', 'Access PSN', 'Offer Mentoring (PSN)', 'Livestreamed Workshop', 'Watch
Video', 'Online Guide', 'Read', 'Feature in News', 'Other Initiative'], inplace = True)
corr.drop(columns = ['TechTown Staff', 'Member of PSN',  'Peers/Entrepreneurs', 'Social Media',
'TechTown Newsletter', 'Flyers', 'None', 'Other Resource'], inplace = True)
corr.drop(columns = ['Focus Group'], inplace = True)

#Drop rows

#focus group
corr.drop(['Focus Group'], inplace = True)

#relationship
corr.drop(['Incubation Center', 'DTX Launch', 'EIR Program', ‘DTX Fellows’, 'Workshop', 'Group
Technical Assistance', 'Professional Service Provider', 'Professional Service Recipient', 'Another
Relationship'], inplace = True)

#meanings
corr.drop(['New Initiatives', 'Upcoming Programs', 'First to Get Info', 'Giving Back', 'Specialized
Education', 'Volunteering', 'Networking', 'Group', 'Other Meaning'], inplace = True)

#topics
corr.drop(['TechTown Resources', 'Partner Resources', 'Neighborhood News', 'Tips/Tricks',
'Alumni News', 'Research', 'Detroit', 'Other Topic'], inplace = True)

#initiatives
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corr.drop(['Attend Event', 'Attend Workshop', 'Alumni Workshop', 'Alumni Office Hours', '1-1 Support', 'Access PSN', 'Offer Mentoring (PSN)', 'Livestreamed Workshop', 'Watch Video', 'Online Guide', 'Read', 'Feature in News', 'Other Initiative'], inplace = True)

#resources
corr.drop(['TechTown Staff', 'Member of PSN',  'Peers/Entrepreneurs', 'Social Media', 'TechTown Newsletter', 'Flyers', 'None', 'Other Resource'], inplace = True)

# Set up the matplotlib figure
f, ax = plt.subplots(figsize=(11, 9))

# Generate a custom diverging colormap
cmap = sns.diverging_palette(220, 10, as_cmap=True)

ax.set(title = "P(Y|X)")

# Draw the heatmap with the mask and correct aspect ratio
sns.heatmap(corr, cmap=cmap, center=0.5, square=True, linewidths=.5, cbar_kws={"shrink": .5}, annot = True)
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