

Phase5_Spiderplot

November 22, 2021

1 Visualization 2 - Interactive Spider Plot

1.0.1 COVID-19 and Changing Conversation Trends

COVID-19 has impacted our social interactions and methods over the past two years. We have had to change our routines and way of interacting with contacts in our lives. For example, we have had to keep in-person social interactions to a minimum to prevent the accidental spread of the disease and to protect the vulnerable among us. For the younger generations, transitioning to digital communication methods was easy, but for less technologically savvy people, this was a challenging task.

Not only were in-person interactions limited, but it is also harder to convey emotion when social distancing and mask rules are in place. Calbi, Langiulli, and Ferroni (2021) studied the effect mask mandates and social distancing had on reading emotions, and they found that some emotions were seen as more severe than others with facial coverings. Having to wear masks during regular in-person interactions could affect our readings of others emotions, and in the end effect our desire to interact with the public.

Having to interact primarily through digital means can also decrease the frequency of conversations with certain groups of people. Our older family members may not be available via text or email, and only voice call. On the other hand, younger generations will be more available than ever online.

1.0.2 Visualizing Changing Conversation Habits

For our second visualization, we want to address our second research question: what category of people do we interact with the most? This question is important to us because as final year university students, it is important to stay balanced in our interactions and try to still interact with friends and family. With the current pandemic, our interaction habits have changed, and we have had to adapt to different methods to keep up conversations with our friends, family, and colleagues. We want to have the ability to reflect if we were keeping up our interactions, and how our conversations trends compared to our groupmates.

1.0.3 Our Methodology

To measure our interactions, we recorded the date of conversations and category of person interacted with for one week. We recorded the conversations for the full day and did not stick to a specific time range. This was important because we all had different schedules and lifestyles. To record, we built a small forms app so we could use consistent terminology and format. This worked very well for us so we could record data from anywhere, and when combining our data sets it was easy to merge.

To visualize the trends in our conversation habits, we used a spider/radar plot built using Jupyter and Plotly. The plot has 6 'spokes' that represent the category of person. The magnitude of each datapoint along the spokes is representative of the number of conversations with that category of person. We decided to graph each person separately to visualize differences in our conversation habits, and colour is used to encode this.

```
[5]: import pandas as pd
import plotly.graph_objects as go
```

```
[6]: all_df = pd.read_csv("Phase5_Data.csv")
jessie_df = all_df.query('Submitter == "Jessie"')
shaina_df = all_df.query('Submitter == "SR"')
erin_df = all_df.query('Submitter == "Erin"')
luke_df = all_df.query('Submitter == "Luke"')
```

```
[7]: # https://plotly.github.io/plotly.py-docs/generated/plotly.graph\_objects.Scatterpolar.html
def createSpiderPlot(df):
    categories = ['School', 'Family', 'Friend', 'Stranger', 'Other', 'Work']
    SubmittersList = df['Submitter'].unique()

    fig = go.Figure()

    # plot web for each submitter
    for i in range(0, len(SubmittersList)):
        submitterName = SubmittersList[i]
        Submitter = all_df[all_df['Submitter'] == submitterName]

        # find submitter's percentage for each type of person interaction
        percentages = []
        for types in categories:
            typeTotal = len(Submitter[Submitter["General Category of Person"]_
            == types])
            percentage = typeTotal / len(Submitter)
            percentages.append(percentage * 100)

        # add web trace with the percentages
        # https://plotly.github.io/plotly.py-docs/generated/plotly.graph\_objects.Scatterpolar.html
        # can change color, adding attribute line:
        # line={'color':'red'}
        fig.add_trace(go.Scatterpolar(
            r=percentages,
            theta=categories,
            fill='toself',
            name=submitterName
        ))
```

```

fig.update_layout(
    title="Category of Person (%) for each Submitter",
    polar=dict(
        radialaxis=dict(
            visible=True,
            range=[0, 100]
        ),
        showlegend=True
    )
)
fig.show()

createSpiderPlot(all_df)

```

1.0.4 Findings:

```
[9]: createSpiderPlot(erin_df)
```

Erin: This graph made me realize I am lacking in effort towards my family. I also expected my conversations with work colleagues to be higher. I live with a friend and classified my partner as a friend, so I am not too surprised that this was my largest category. I am surprised I interacted with strangers more than family. I am glad to see that work and school are not overshadowing my conversations with other categories of people.

```
[10]: createSpiderPlot(jessie_df)
```

Jessie: This graph seems to closely align with the expectations of my interactions. The only thing that I'm really surprised about is the fact that I interacted with my friends almost half of the time (44%). I expected it to be school (32%) since most of my time is spent at school throughout the course of the week. After some retrospective reflecting, I realized that the week that we recorded the data wasn't as busy for me, so it makes sense that I had more time to socialize with friends.

```
[11]: createSpiderPlot(luke_df)
```

Luke: I have a well-diversified circle, although my family is a little lower than the others. This is because I am living by myself with my parents being in Winnipeg, and the only interaction we get is through video calls once a week. The Other category is above average in my spider web interaction, I was actively applying for job interviews and this exposed me to a lot of people, in addition, there were a couple of different types of people, I interacted with that we did not have a category for, like my fitness group I work out with each morning and my priest.

```
[12]: createSpiderPlot(shaina_df)
```

Shaina: In general, I did expect to have more interaction with my family more since I mostly do school from home most of the week so we have more opportunities for in person interactions.

Looking back, one of the data points was also during Thanksgiving Day, so my interaction amongst family was probably more than usual compared to other interactions with other people. Second highest would be friends as I do interact with them during school or through discord during that week.

1.0.5 Overall Patterns:

The top contenders for category of person were ‘Friend’ and ‘Family’, but it varies between the 4 of us. It is easy to make inferences about the results from the plot based on our personal situations. Shaina lives with her family, so she primarily interacts with them. Erin lives with a friend and chats with her friends online. The person with the highest number of interactions with people at school was Jessie. An interesting observation is that Luke is the only one that recorded interactions with the ‘Other’ category. This could be because of COVID-19, with most of us having more limited interactions, but it also could be attributed to different data recording styles between the 4 of us.

The observations made using this plot can help us see how we are balancing our interactions. We can see areas in which we can dedicate more time to certain categories, and categories that do not need as much focus.

1.0.6 Interactivity Explanation:

To implement interactivity in this plot, we included:

A legend click filter that can remove certain people from the visual. This allows more clarity when looking at certain areas that may have data points close together. We can also use this to just see one person’s data, which is helpful when analyzing on a personal level. This would be categorized with Ben Shneiderman’s taxonomy as ‘filter’.

A zoom option by range, using the mouse to select polar areas. This allows us to zoom in on the data closer to the center of the plot and see differences with more clarity. Shneiderman would classify this as “zoom” in his interaction operations.

We added the option to hover on data points to show more detail. For example, you can hover over a data point and see the person and the number value of the count of interaction with that category of person. This allows the reader to get some context of the values and have quantifiable numbers if they desire. Shneiderman would classify this as “details-on-demand”.

A fourth interaction we added was to allow the plot to be rotated. We think this allows the user to rotate to position the category they are interested in on the ‘North’ oriented spoke. Yi would classify this as “reconfigure”. By changing the orientation of the spokes, we can focus on different trends.

References:

Calbi, M., Langiulli, N., Ferroni, F. et al. The consequences of COVID-19 on social interactions: an online study on face covering. *Sci Rep* 11, 2601 (2021). <https://doi.org/10.1038/s41598-021-81780-w>