

Restaurant_Data_Analysis

June 20, 2023

```
[1]: from yelpapi import YelpAPI
import requests
import pandas as pd
import json
import sys
import re
import warnings
import matplotlib.patches as mpatches
warnings.filterwarnings('ignore')
from datetime import date
from shapely.geometry import Point
import geopandas as gpd
import contextily as ctx
import matplotlib.pyplot as plt
import seaborn as sns
import matplotlib.colors as colors
current_date = date.today().strftime('%Y-%m-%d')

city = 'Fargo'
state = 'nd'
```

```
[2]: %run yelp_data_scrape.py fargo nd
```

```
[3]: df = pd.read_csv("./data/"+city+"_Restaurants_"+current_date+".csv")
df = df[['name', 'review_count', 'rating', 'transactions', 'price', 'phone', 'display_phone', 'display_address', 'latitude', 'longitude', 'foodtype']]
df.head()
```

```
[3]:
```

	name	review_count	rating	transactions	price	\
0	Mezzaluna	356	4.5	['delivery']	\$\$\$	
1	Brew Bird	111	4.5	['pickup']	\$\$	
2	Little Brother	12	5.0	['delivery']	NaN	
3	The Tavern Grill - Fargo	102	4.0	['delivery']	NaN	
4	Maxwells Restaurant & Bar	123	4.5	['delivery']	\$\$\$	

	phone	display_phone	display_address	\
0	1.701365e+10	(701) 364-9479	['309 Roberts St N', 'Fargo, ND 58102']	

```

1  1.701205e+10  (701) 205-0238  ['30 N University Dr', 'Fargo, ND 58102']
2  1.701532e+10  (701) 532-1980  ['117 Broadway N', 'Fargo, ND 58102']
3  1.701532e+10  (701) 532-0777  ['4504 32nd Ave S', 'Fargo, ND 58104']
4  1.701278e+10  (701) 277-9463  ['1380 9th St E', 'West Fargo, ND 58078']

```

```

      latitude longitude      foodtype
0  46.879410 -96.788710  newamerican
1  46.877202 -96.798648  newamerican
2  46.877707 -96.787376  asianfusion
3  46.832187 -96.863257  tradamerican
4  46.860901 -96.883655  newamerican

```

```

[17]: #Plot a map of Restaurants
geometry = [Point(xy) for xy in zip(df['longitude'],df['latitude'])]

wardlink = "./geodata/Fargo-Moorhead_Area-polygon.shp"

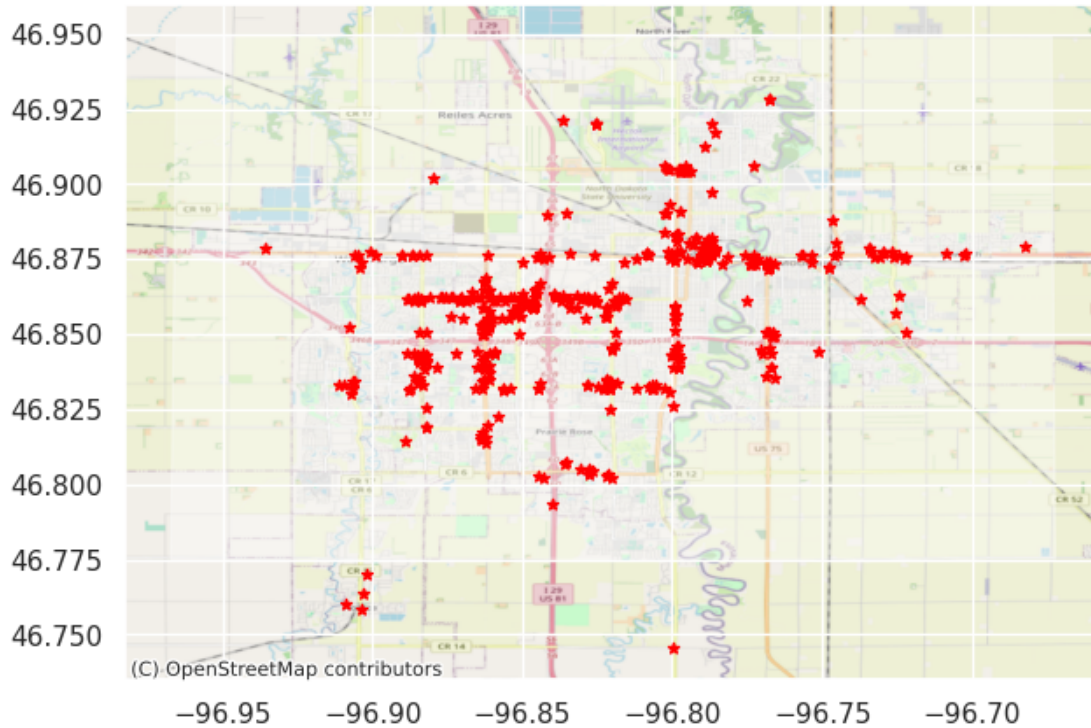
ward = gpd.read_file(wardlink, bbox=None, mask=None, rows=None)
geo_df = gpd.GeoDataFrame(geometry = geometry)

ward.crs = {'init':"epsg:4326"}
geo_df.crs = {'init':"epsg:4326"}

ax = ward.plot(alpha=0.35, color='#ffffff', zorder=1)
ax = geo_df.plot(ax = ax, markersize = 20, color = 'red',marker = '*',label =_
↳city, zorder=3)
ctx.add_basemap(ax, crs=geo_df.crs.to_string(), source=ctx.providers.
↳OpenStreetMap.Mapnik)
print("Total Number of Restaurants in "+city+": "+str(len(df)))
plt.show()

```

Total Number of Restaurants in Fargo: 488



```
[5]: ratings = df.sort_values(['rating', 'review_count'], ascending=[False, False])
ratings = ratings[ratings['review_count'] != 0]
print("Top Ten highest rated restaurants in "+city+":")
ratings.head(10)
```

Top Ten highest rated restaurants in Fargo:

```
[5]:
```

	name	review_count	rating	\
13	GP's Greek Kitchen	75	5.0	
84	Madina Cuisine	57	5.0	
30	ThaiKota	39	5.0	
227	Tea and Crepe	30	5.0	
45	Newroz Kebab	19	5.0	
155	Mehl's Gluten-Free Bakery	18	5.0	
152	Jay's Smokin' BBQ	17	5.0	
2	Little Brother	12	5.0	
230	Hi-Ho Burgers & Brews	8	5.0	
25	Tati's Mediterranean Saveur	6	5.0	

	transactions	price	phone	display_phone	\
13	['delivery', 'pickup']	\$\$	1.701640e+10	(701) 639-7232	
84	['delivery']	\$	1.701235e+10	(701) 235-0504	
30	['delivery']	NaN	1.701212e+10	(701) 212-4851	

227	['delivery', 'pickup']	NaN	1.701541e+10	(701)	540-6737
45	['delivery', 'pickup']	NaN	1.218228e+10	(218)	227-5019
155	['']	\$\$	1.701205e+10	(701)	205-4174
152	['delivery']	\$\$	1.701478e+10	(701)	478-1112
2	['delivery']	NaN	1.701532e+10	(701)	532-1980
230	['delivery']	\$	1.218287e+10	(218)	287-2975
25	['delivery', 'pickup']	NaN	1.701532e+10	(701)	532-4545

	display_address	latitude	longitude	\
13	['2553 Kirsten Ln S', 'Ste 206', 'Fargo, ND 58...]	46.832010	-96.821465	
84	['2225 13th Ave S', 'Fargo, ND 58103']	46.862019	-96.817610	
30	['1201 1st Ave N', 'Fargo, ND 58102']	46.877716	-96.797468	
227	['72 Broadway N', 'Fargo, ND 58102']	46.876738	-96.787950	
45	['2501 8th St S', 'Moorhead, MN 56560']	46.850661	-96.768806	
155	['1404 33rd St S', 'Ste H', 'Fargo, ND 58103']	46.858765	-96.831940	
152	['1322 Main Ave', 'Fargo, ND 58103']	46.878791	-96.733997	
2	['117 Broadway N', 'Fargo, ND 58102']	46.877707	-96.787376	
230	['10 Center Ave E', 'Dilworth, MN 56529']	46.876820	-96.702270	
25	['3150 Sheyenne St', 'Ste 170', 'West Fargo, N...]	46.834110	-96.906160	

	foodtype
13	greek
84	african
30	thai
227	icecream
45	kebab
155	cupcakes
152	tradamerican
2	asianfusion
230	burgers
25	lebanese

```
[6]: print("Top Ten lowest rated restaurants in "+city+":")
ratings.tail(10)
```

Top Ten lowest rated restaurants in Fargo:

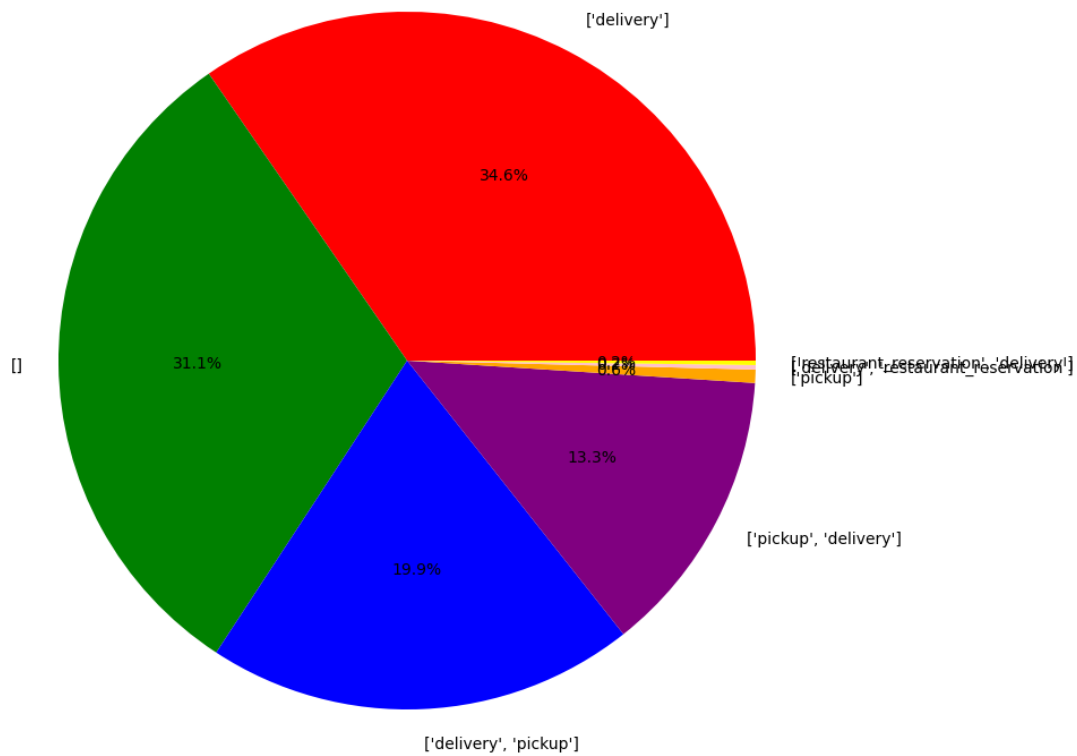
```
[6]:
```

	name	review_count	rating	\
400	Casey's	2	1.0	
402	Subway	2	1.0	
415	Papa Johns Pizza	2	1.0	
313	New Gyro	1	1.0	
318	Casey's	1	1.0	
368	Sbc Deli	1	1.0	
416	Red River Lanes Bowling Center	1	1.0	
424	Wendy's	1	1.0	
483	Papa Johns Pizza	1	1.0	

	Subway	1	1.0
400	transactions price	phone	display_phone \
402	['delivery']	NaN	1.701277e+10 (701) 277-4389
415	['delivery', 'pickup']	NaN	1.701356e+10 (701) 356-0920
313	['delivery']	NaN	1.701233e+10 (701) 232-7272
318	['delivery']	NaN	NaN NaN NaN
368	['delivery']	NaN	1.701315e+10 (701) 314-5860
416	['delivery']	NaN	1.701373e+10 (701) 373-0028
424	['delivery']	NaN	1.701235e+10 (701) 235-1171
483	['pickup', 'delivery']	\$	1.701239e+10 (701) 239-0356
485	['pickup', 'delivery']	\$	1.701238e+10 (701) 237-9999
	['delivery']	\$	1.218234e+10 (218) 233-5972
	display_address	latitude	longitude \
400	['4405 45th St S', 'Fargo, ND 58104']	46.814130	-96.862301
402	['3757 55th Ave S', 'Fargo, ND 58104']	46.802265	-96.842661
415	['5675 26th Ave S', 'Ste 148', 'Fargo, ND 58104']	46.840844	-96.882088
313	['855 45th St S', 'Ste A2', 'Fargo, ND 58103']	46.867755	-96.862778
318	['3545 25th St S', 'Fargo, ND 58104']	46.824972	-96.820428
368	['122 23rd St S', 'Fargo, ND 58103']	46.874146	-96.816124
416	['707 28th Ave N', 'Fargo, ND 58102']	46.912524	-96.789123
424	['311 13th Ave S', 'Fargo, ND 58102']	46.861127	-96.774954
483	['1100 19th Ave N', 'Unit N', 'Fargo, ND 58102']	46.904170	-96.795103
485	['201 34th St N', 'Moorhead, MN 56560']	46.877612	-96.726425
	foodtype		
400	pizza		
402	sandwiches		
415	pizza		
313	food_court		
318	pizza		
368	delis		
416	bowling		
424	burgers		
483	pizza		
485	sandwiches		

```
[7]: transactions_df = df["transactions"].value_counts()
transactions_df.plot.pie(figsize=(15, 10), autopct='%1.1f%%', colors=['red', 'green', 'blue', 'purple', 'orange', 'pink', 'yellow'])
plt.title("Transaction Types for Restaurants in "+city, fontdict={'size': 15, 'weight': 'bold'})
plt.ylabel("")
plt.show()
```

Transaction Types for Restaurants in Fargo



```
[8]: #convert food types
def map_foodtypes(foodtype):
    if foodtype == "restaurants":
        return 'miscellaneous'
    elif foodtype == "tacos":
        return 'mexican'
    elif foodtype == "burgers" or foodtype == "chicken_wings" or foodtype == "tradamerican" or foodtype == "newamerican":
        return 'american'
    if foodtype == "sandwiches" or foodtype == "soup":
        return 'soup_sandwich'
    elif foodtype == "breakfast_brunch":
        return 'breakfast'
    if foodtype == "sportsbars" or foodtype == "cocktailbars" or foodtype == "wine_bars":
        return 'bars'
    elif foodtype == "ramen":
        return 'noodles'
```

```

elif foodtype == "irish_pubs" or foodtype == "gastropubs":
    return 'pubs'
elif foodtype == "bagels":
    return 'bakeries'
elif foodtype == "cupcakes" or foodtype == "donuts":
    return 'desserts'
elif foodtype == "asianfusion":
    return 'asian'
elif foodtype == "egyptian" or foodtype == "lebanese":
    return 'mideastern'
elif foodtype == "cheesesteaks":
    return 'steak'
elif foodtype == "danceclubs" or foodtype == "nightclubs":
    return 'nightlife'
else:
    return foodtype

# apply the function to create the new column
df["foodtype"] = df["foodtype"].apply(map_foodtypes)

```

```

[9]: #create pie chart of food types
foodtype_count = df["foodtype"].value_counts()

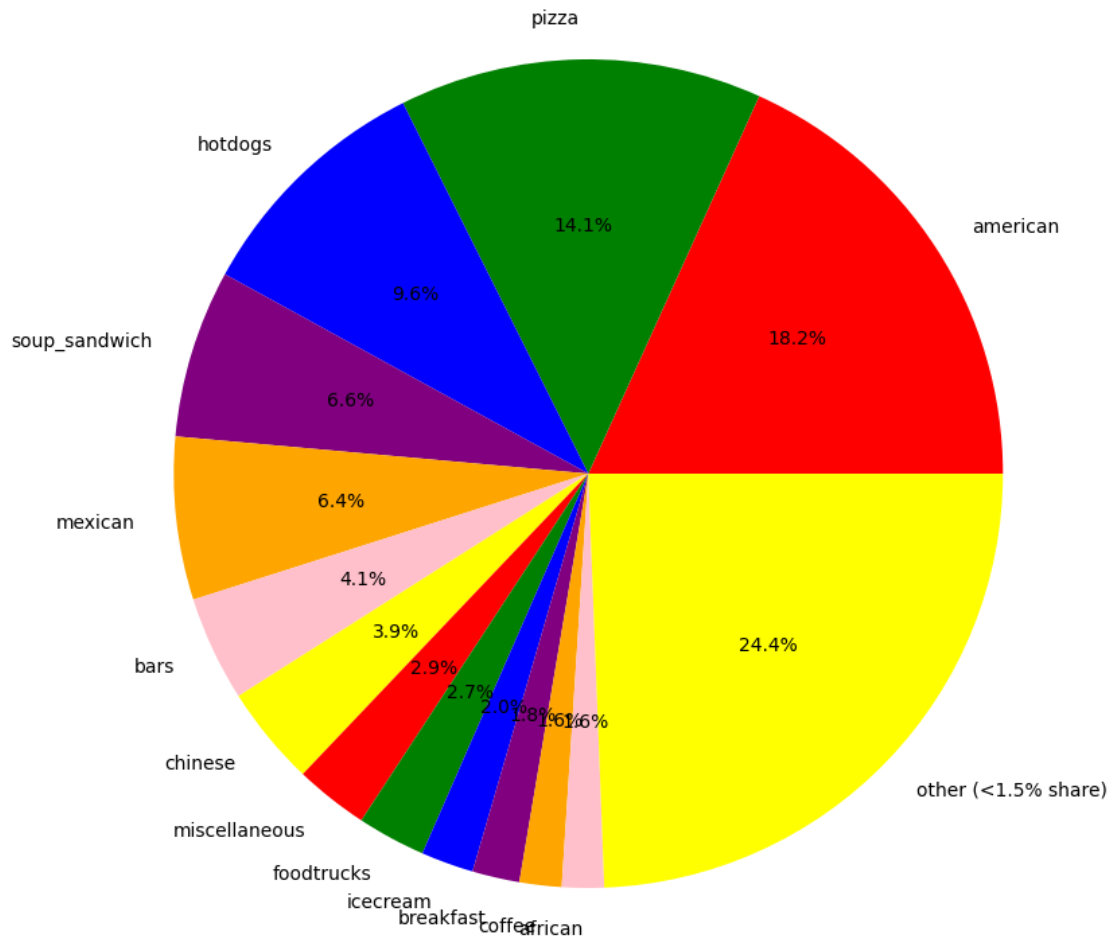
# create new category that groups builders making up <2% of total
total = foodtype_count.sum()
threshold = 0.015

foodtype_percent = foodtype_count/foodtype_count.sum()
other_percent = foodtype_percent[foodtype_percent < threshold].sum()
foodtype_percent = foodtype_percent[foodtype_percent >= threshold]
foodtype_percent["other (<1.5% share)"] = other_percent

foodtype_percent.plot.pie(figsize=(15, 10), autopct='%1.1f%%', colors=['red', 'green', 'blue', 'purple', 'orange', 'pink', 'yellow'])
plt.title("Restaurants Food Types in "+city, fontdict={'size': 15, 'weight': 'bold'})
plt.ylabel("")
plt.show()

```

Restaurants Food Types in Fargo



```
[10]: colormap = {
    'american': 'red',
    'italian': 'blue',
    'chinese': 'green',
    'mexican': 'yellow',
    'thai': 'orange',
    'indian': 'purple',
    'greek': 'brown',
    'pizza': 'gray',
    'bars': 'teal',
    'foodtrucks': 'pink',
    'icecream': 'violet',
    'breakfast': 'beige',
    'coffee': 'turquoise',
}
```



```

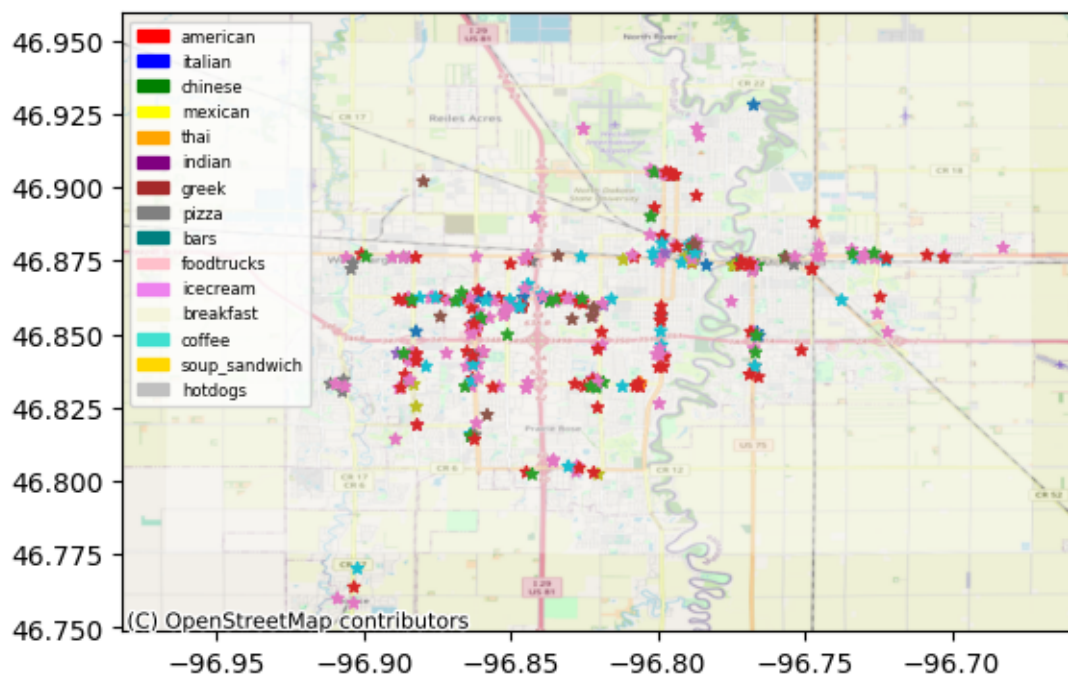
'soup_sandwich': 'gold',
'hotdogs': 'silver'
}

geo_df['color'] = df['foodtype'].map(colormap)

legend_patches = [mpatches.Patch(color=color, label=food_type) for food_type,
    ↪color in colormap.items()]

ax = ward.plot(alpha=0.35, color='#ffffff', zorder=1)
ax = geo_df.plot(ax=ax, markersize=20, column='color', marker='*', label='city',
    ↪zorder=3)
ctx.add_basemap(ax, crs=geo_df.crs.to_string(), source=ctx.providers.
    ↪OpenStreetMap.Mapnik)
plt.legend(handles=legend_patches, loc="upper left", prop={'size': 6})
plt.show()

```



```

[11]: #convert price to word format
def map_price(price):
    if price == "$":
        return 'Low'
    elif price == "$$":
        return 'Medium'

```

```

elif price == "$$$":
    return 'High'
elif price == "$$$$":
    return 'Very High'
elif price == "None":
    return 'Unlisted'
else:
    return price

# apply the function to create the new column
df["price_val"] = df["price"].apply(map_price)
price_count = df["price_val"].value_counts()
price_count

```

```

[11]: Low          150
      Medium       135
      High          8
      Very High     1
      Name: price_val, dtype: int64

```

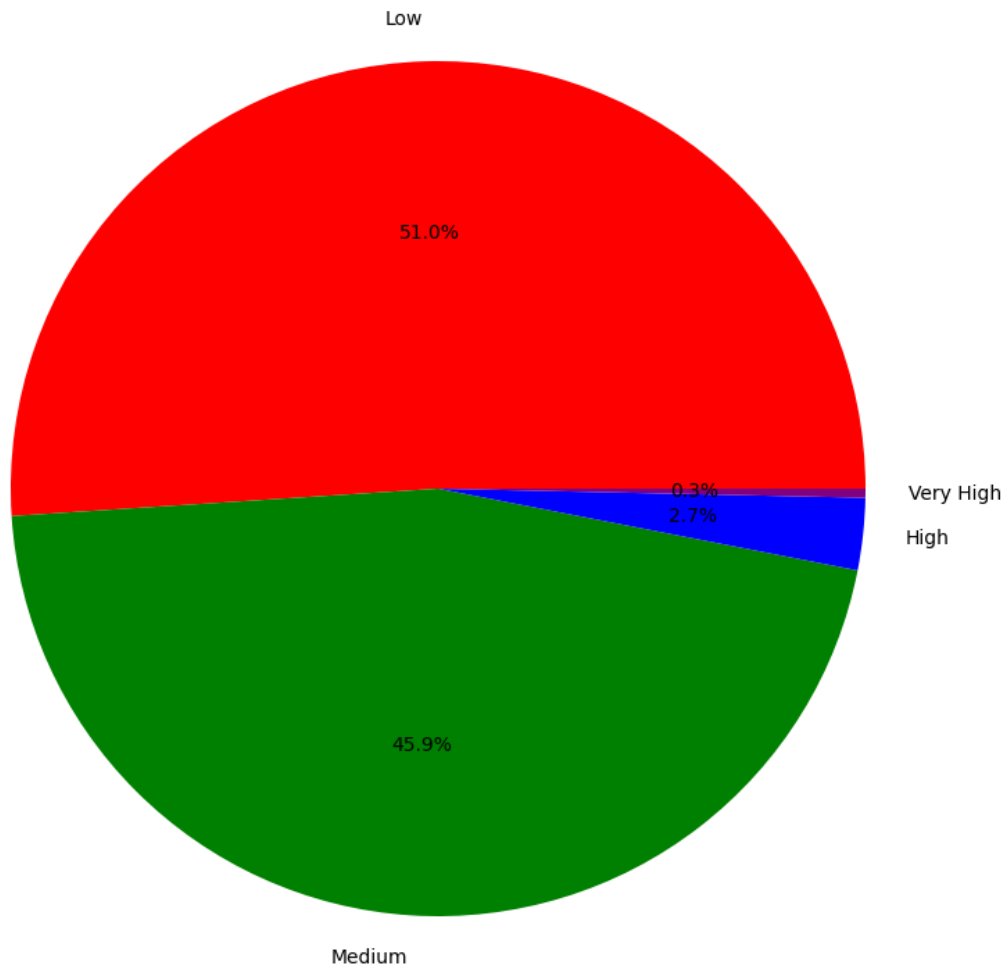
```

[12]: price_count.plot.pie(figsize=(15, 10), autopct='%1.1f%%', colors=['red', 'green', 'blue', 'purple', 'orange', 'pink', 'yellow'])
      plt.title("Restaurants Prices in "+city, fontdict={'size': 15, 'weight': 'bold'})
      plt.ylabel("")
      print("Note: This chart doesn't include restaurants where the price wasn't listed")
      plt.show()

```

Note: This chart doesn't include restaurants where the price wasn't listed

Restaurants Prices in Fargo



```
[13]: # Group by foodtype and calculate the mean rating
average_rating = df.groupby('foodtype')['rating'].mean()
average_rating = pd.DataFrame(average_rating)
average_rating = pd.merge(average_rating, df.
    ↳groupby('foodtype')['review_count'].sum(), on='foodtype')
average_rating = average_rating[average_rating['review_count'] != 0]
average_rating = average_rating.sort_values(['rating'], ascending=[False])

restaurant_count = df["foodtype"].value_counts()
restaurant_count = pd.DataFrame(restaurant_count)
restaurant_count
```

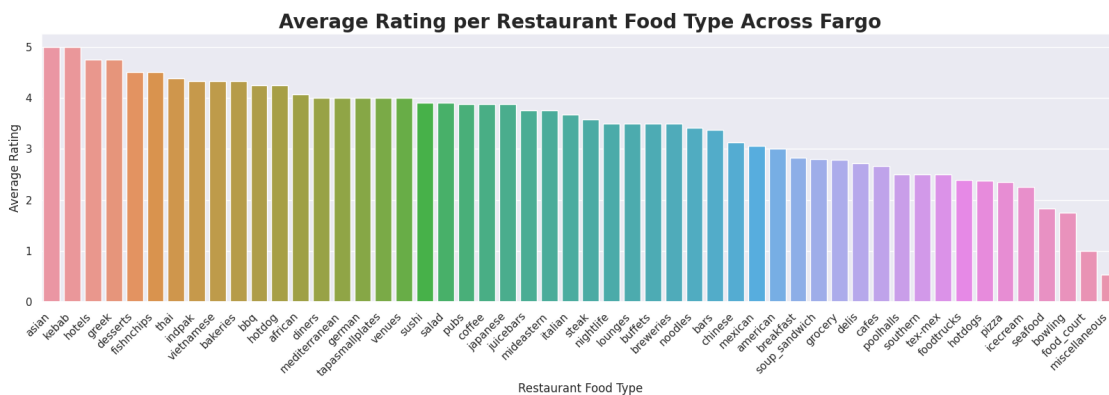
```
average_rating = pd.merge(average_rating, restaurant_count, left_index=True,
    ↪right_index=True)
average_rating = average_rating.rename(columns={'foodtype': 'restaurant_count'})
average_rating
```

```
[13]:
```

	rating	review_count	restaurant_count
asian	5.000000	12	1
kebab	5.000000	19	1
hotels	4.750000	4	2
greek	4.750000	122	2
desserts	4.500000	299	4
fishnchips	4.500000	325	3
thai	4.375000	228	4
indpak	4.333333	466	3
vietnamese	4.333333	224	3
bakeries	4.333333	299	3
bbq	4.250000	53	4
hotdog	4.250000	3	2
african	4.062500	115	8
diners	4.000000	48	1
mediterranean	4.000000	33	1
german	4.000000	547	2
tapasmallplates	4.000000	237	1
venues	4.000000	11	2
sushi	3.900000	327	5
salad	3.900000	159	5
pubs	3.875000	324	4
coffee	3.875000	366	8
japanese	3.875000	270	4
juicebars	3.750000	24	2
mideastern	3.750000	12	4
italian	3.666667	143	3
steak	3.583333	242	6
nightlife	3.500000	14	2
lounges	3.500000	48	2
buffets	3.500000	39	1
breweries	3.500000	215	1
noodles	3.416667	174	6
bars	3.375000	846	20
chinese	3.131579	552	19
mexican	3.064516	1107	31
american	3.005618	3313	89
breakfast	2.833333	309	9
soup_sandwich	2.796875	454	32
grocery	2.785714	49	7
delis	2.714286	131	7
cafes	2.666667	28	3

poolhalls	2.500000	60	1
southern	2.500000	4	1
tex-mex	2.500000	34	1
foodtrucks	2.384615	11	13
hotdogs	2.372340	624	47
pizza	2.355072	1296	69
icecream	2.250000	87	10
seafood	1.833333	135	6
bowling	1.750000	21	2
food_court	1.000000	1	1
miscellaneous	0.535714	3	14

```
[14]: sns.set(rc={"figure.figsize":(20, 5)})
rating_barplot = sns.barplot(x = average_rating.index, y = 'rating', data =
    ↪average_rating)
plt.xlabel('Restaurant Food Type')
plt.ylabel('Average Rating')
rating_barplot.set_xticklabels(rating_barplot.get_xticklabels(), rotation=45,
    ↪horizontalalignment='right')
plt.title('Average Rating per Restaurant Food Type Across ' + city,
    ↪fontdict={'size': 20, 'weight': 'bold'})
plt.show()
```



```
[15]: average_rating = average_rating.sort_values(['restaurant_count'],
    ↪ascending=[False])
sns.set(rc={"figure.figsize":(20, 5)})
rating_barplot = sns.barplot(x = average_rating.index, y = 'restaurant_count',
    ↪data = average_rating)
plt.xlabel('Restaurant Food Type')
plt.ylabel('Number of Locations')
rating_barplot.set_xticklabels(rating_barplot.get_xticklabels(), rotation=45,
    ↪horizontalalignment='right')
```

Restaurant Count per Food Type Across Fargo

Restaurant Food Type	Number of Locations
american	88
pizza	68
hotdogs	46
soup	31
sandwich	30
mexican	20
taqueria	18
chinese	13
merchandise	12
foodtrucks	9
korean	8
breakfast	7
coffee	6
african	6
grocery	6
deli	5
seafood	5
noodles	4
steak	4
sushi	4
salad	3
mideastern	3
thai	2
desserts	2
donut	2
japanese	2
pulso	2
italian	1
ethiopian	1
czech	1
indian	1
vietnamese	1
bakeries	1
korean	1
bowling	1
greek	1
hondian	1
german	1
burgers	1
nightlife	1
juicery	1
venues	1
diners	1
bayesian	1
mediterranean	1
breweries	1
pofohalls	1
southern	1
tex mex	1
burritos	1
kebab	1
food court	1
asian	1

Total Review Count per Food Type Across Fargo

Restaurant Food Type	Number of Reviews (Approximate)
american	3200
pizza	1250
mexican	1050
bars	800
hotdogs	600
chinese	550
german	520
indian	480
soup	450
sandwich	400
coffee	350
sushi	300
fishnchips	280
pubs	280
breakfast	280
desserts	280
bakeries	250
japanese	220
steak	200
tapas	180
mollies	180
italian	150
seafood	120
deli	100
greek	80
african	70
kebab	60
poutine	50
bbq	40
grocery	30
burgers	20
diner	15
buffet	10
brunch	5
mediterranean	5
cafes	5
juicebars	5
bowling	5
karaoke	5
nightlife	5
middleeastern	5
asian	5
foodtrucks	5
southern	5
hoteles	5
miscellaneous	5
hodon	5
food_court	5

```
[18]:
```

	name	review_count	rating	transactions \
0	Mezzaluna	356	4.5	['delivery']
1	Brew Bird	111	4.5	['pickup']
2	Little Brother	12	5.0	['delivery']
3	The Tavern Grill - Fargo	102	4.0	['delivery']
4	Maxwells Restaurant & Bar	123	4.5	['delivery']
..
483	Papa Johns Pizza	1	1.0	['pickup', 'delivery']
484	Ils Wayport	0	0.0	[]
485	Subway	1	1.0	['delivery']
486	Dairy Queen Grill & Chill	0	0.0	[]
487	Casey's	0	0.0	['delivery']

	price	phone	display_phone \
0	\$\$\$	1.701365e+10	(701) 364-9479
1	\$\$	1.701205e+10	(701) 205-0238
2	NaN	1.701532e+10	(701) 532-1980
3	NaN	1.701532e+10	(701) 532-0777
4	\$\$\$	1.701278e+10	(701) 277-9463
..
483	\$	1.701238e+10	(701) 237-9999
484	NaN	1.701293e+10	(701) 293-0801
485	\$	1.218234e+10	(218) 233-5972
486	NaN	1.701532e+10	(701) 532-3082
487	NaN	1.218233e+10	(218) 233-3846

	display_address	latitude	longitude \
0	['309 Roberts St N', 'Fargo, ND 58102']	46.879410	-96.788710
1	['30 N University Dr', 'Fargo, ND 58102']	46.877202	-96.798648
2	['117 Broadway N', 'Fargo, ND 58102']	46.877707	-96.787376
3	['4504 32nd Ave S', 'Fargo, ND 58104']	46.832187	-96.863257
4	['1380 9th St E', 'West Fargo, ND 58078']	46.860901	-96.883655
..
483	['1100 19th Ave N', 'Unit N', 'Fargo, ND 58102']	46.904170	-96.795103
484	['1220 19th Ave N', 'Fargo, ND 58102']	46.904247	-96.797379
485	['201 34th St N', 'Moorhead, MN 56560']	46.877612	-96.726425
486	['7875 Jacks Way', 'Horace, ND 58047']	46.770194	-96.902107
487	['1 Center Ave E', 'Dilworth, MN 56529']	46.876087	-96.702703

	foodtype	price_val
0	american	High
1	american	Medium
2	asian	NaN
3	american	NaN
4	american	High
..
483	pizza	Low

```

484 miscellaneous      NaN
485 soup_sandwich      Low
486      icecream      NaN
487      pizza        NaN

```

[488 rows x 12 columns]

```

[24]: df = df.sort_values(['price'], ascending=[False])
      print("Top Ten most expensive restaurants in "+city+":")
      df.head(10)

```

Top Ten most expensive restaurants in Fargo:

```

[24]:
      name  review_count  rating \
259      Papa Murphy's          7    3.5
4      Maxwells Restaurant & Bar      123    4.5
7      Rustica Eatery & Tavern      156    4.5
58      Cork 'N Cleaver          57    2.5
66      Urban 42          37    3.0
333      Taco John's          10    2.0
287      Hornbacher's Foods          6    3.0
0      Mezzaluna      356    4.5
185      O'kelly's Tastes & Toddies          8    3.0
146      Silver Dollar Bar & The Flying Pig Grill      11    3.5

      transactions price      phone \
259      []  $$$$  1.701366e+10
4      ['delivery']  $$$  1.701278e+10
7      ['delivery', 'restaurant_reservation']  $$$  1.218228e+10
58      ['delivery']  $$$  1.701238e+10
66      ['pickup']  $$$  1.701282e+10
333      ['delivery']  $$$  1.701232e+10
287      []  $$$  1.701280e+10
0      ['delivery']  $$$  1.701365e+10
185      ['delivery']  $$$  1.701277e+10
146      ['delivery']  $$  1.701281e+10

      display_phone      display_address \
259      (701) 365-8282  ['4501 15th Avenue South', 'Suite 111', 'Fargo...
4      (701) 277-9463  ['1380 9th St E', 'West Fargo, ND 58078']
7      (218) 227-5388  ['315 Main Ave', 'Moorhead, MN 56560']
58      (701) 237-6790  ['3301 S University Dr', 'Fargo, ND 58104']
66      (701) 281-7105  ['1635 42nd St S', 'Fargo, ND 58103']
333      (701) 232-0551  ['2201 S 13th Ave', 'Fargo, ND 58103']
287      (701) 280-1999  ['1532 32nd Ave S', 'Ste 3', 'Fargo, ND 58103']
0      (701) 364-9479  ['309 Roberts St N', 'Fargo, ND 58102']
185      (701) 277-1880  ['3800 Main Ave', 'Fargo, ND 58103']

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146 (701) 281-0715 ['221 Sheyenne St', 'West Fargo, ND 58078']

	latitude	longitude	foodtype	price_val
259	46.858880	-96.863200	pizza	Very High
4	46.860901	-96.883655	american	High
7	46.873564	-96.774261	soup_sandwich	High
58	46.830587	-96.801064	steak	High
66	46.856350	-96.852390	american	High
333	46.861950	-96.815730	mexican	High
287	46.832104	-96.802655	grocery	High
0	46.879410	-96.788710	american	High
185	46.874910	-96.842810	bars	High
146	46.874050	-96.903620	bars	Medium

[]:

[]: