cereal

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1 HW 1 - Visualizing Cereals Dataset

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```
[1]: import warnings
     warnings.filterwarnings('ignore')

     import pandas as pd
     import numpy as np
     from plotnine import *
     from plotnine.data import mtcars
     import seaborn as sns
     from scipy import stats

     get_ipython().run_line_magic('matplotlib', 'inline')

     def r2(x, y):
         return stats.pearsonr(x, y)[0] ** 2
```

```
[2]: cereal = pd.read_csv("data\cereal.csv")
     cereal.head()
```

```
[2]:                         name mfr type  calories  protein  fat  sodium  fiber  \
     0                  100%_Bran   N    C        70        4    1     130   10.0
     1          100%_Natural_Bran   Q    C       120        3    5      15    2.0
     2                   All-Bran   K    C        70        4    1     260    9.0
     3  All-Bran_with_Extra_Fiber   K    C        50        4    0     140   14.0
     4             Almond_Delight   R    C       110        2    2     200    1.0

        carbo  sugars  potass  vitamins  shelf  weight  cups     rating
     0    5.0     6.0   280.0        25      3     1.0  0.33  68.402973
     1    8.0     8.0   135.0         0      3     1.0  1.00  33.983679
     2    7.0     5.0   320.0        25      3     1.0  0.33  59.425505
     3    8.0     0.0   330.0        25      3     1.0  0.50  93.704912
     4   14.0     8.0     NaN        25      3     1.0  0.75  34.384843
```

```
[3]: cereal.info()
     cereal.isnull().sum()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 77 entries, 0 to 76
Data columns (total 16 columns):
name        77 non-null object
mfr         77 non-null object
type        77 non-null object
calories    77 non-null int64
protein     77 non-null int64
fat         77 non-null int64
sodium      77 non-null int64
fiber       77 non-null float64
carbo       76 non-null float64
sugars      76 non-null float64
potass      75 non-null float64
vitamins    77 non-null int64
shelf       77 non-null int64
weight      77 non-null float64
cups        77 non-null float64
rating      77 non-null float64
dtypes: float64(7), int64(6), object(3)
memory usage: 9.8+ KB
```

[3]:

```
name        0
mfr         0
type        0
calories    0
protein     0
fat         0
sodium      0
fiber       0
carbo       1
sugars      1
potass      2
vitamins    0
shelf       0
weight      0
cups        0
rating      0
dtype: int64
```

[4]:

```
cereal[cereal.isna().any(axis=1)]
```

[4]:

```
                      name mfr type  calories  protein  fat  sodium  fiber  \
4           Almond_Delight   R    C       110        2    2     200    1.0
20  Cream_of_Wheat_(Quick)   N    H       100        3    0      80    1.0
57          Quaker_Oatmeal   Q    H       100        5    2       0    2.7
```

```
    carbo  sugars  potass  vitamins  shelf  weight  cups     rating
4    14.0     8.0     NaN        25      3     1.0  0.75  34.384843
20   21.0     0.0     NaN         0      2     1.0  1.00  64.533816
57    NaN     NaN   110.0         0      1     1.0  0.67  50.828392
```

```
[5]: cereal = cereal.fillna(0)
     cereal.describe()
```

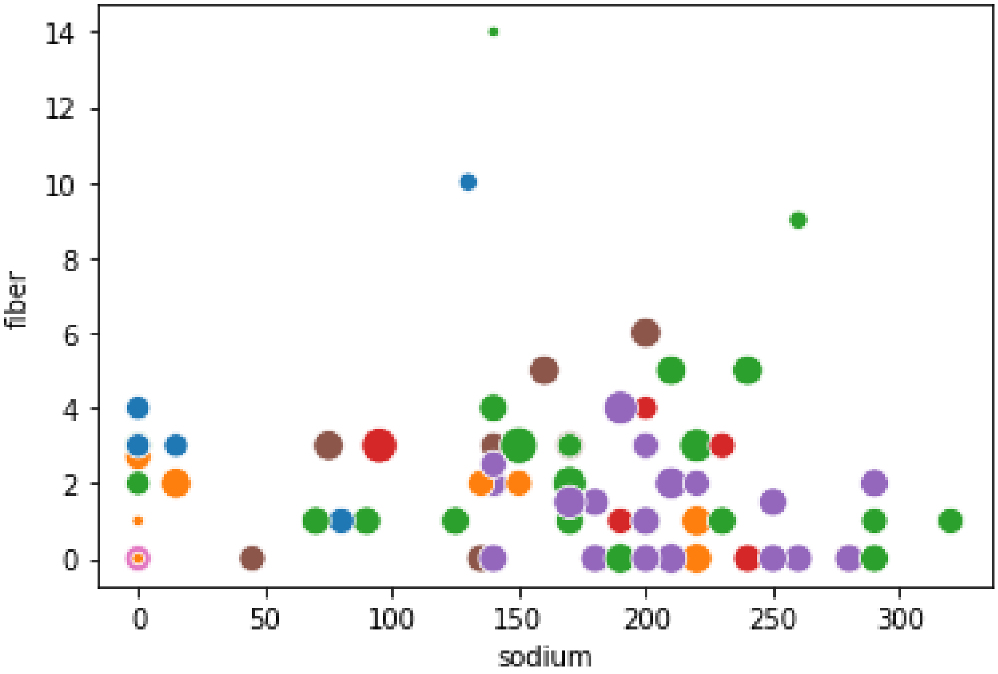
```
[5]:           calories    protein        fat      sodium      fiber      carbo  \
     count   77.000000  77.000000  77.000000   77.000000  77.000000  77.000000
     mean   106.883117   2.545455   1.012987  159.675325   2.151948  14.610390
     std     19.484119   1.094790   1.006473   83.832295   2.383364   4.232257
     min     50.000000   1.000000   0.000000    0.000000   0.000000   0.000000
     25%    100.000000   2.000000   0.000000  130.000000   1.000000  12.000000
     50%    110.000000   3.000000   1.000000  180.000000   2.000000  14.000000
     75%    110.000000   3.000000   2.000000  210.000000   3.000000  17.000000
     max    160.000000   6.000000   5.000000  320.000000  14.000000  23.000000

               sugars      potass    vitamins      shelf     weight       cups  \
     count  77.000000   77.000000   77.000000  77.000000  77.000000  77.000000
     mean    6.935065   96.103896   28.246753   2.207792   1.029610   0.821039
     std     4.422840   71.251147   22.342523   0.832524   0.150477   0.232716
     min     0.000000    0.000000    0.000000   1.000000   0.500000   0.250000
     25%     3.000000   40.000000   25.000000   1.000000   1.000000   0.670000
     50%     7.000000   90.000000   25.000000   2.000000   1.000000   0.750000
     75%    11.000000  120.000000   25.000000   3.000000   1.000000   1.000000
     max    15.000000  330.000000  100.000000   3.000000   1.500000   1.500000

               rating
     count  77.000000
     mean   42.665705
     std    14.047289
     min    18.042851
     25%    33.174094
     50%    40.400208
     75%    50.828392
     max    93.704912
```

```
[6]: #g = sns.pairplot(cereal)
```

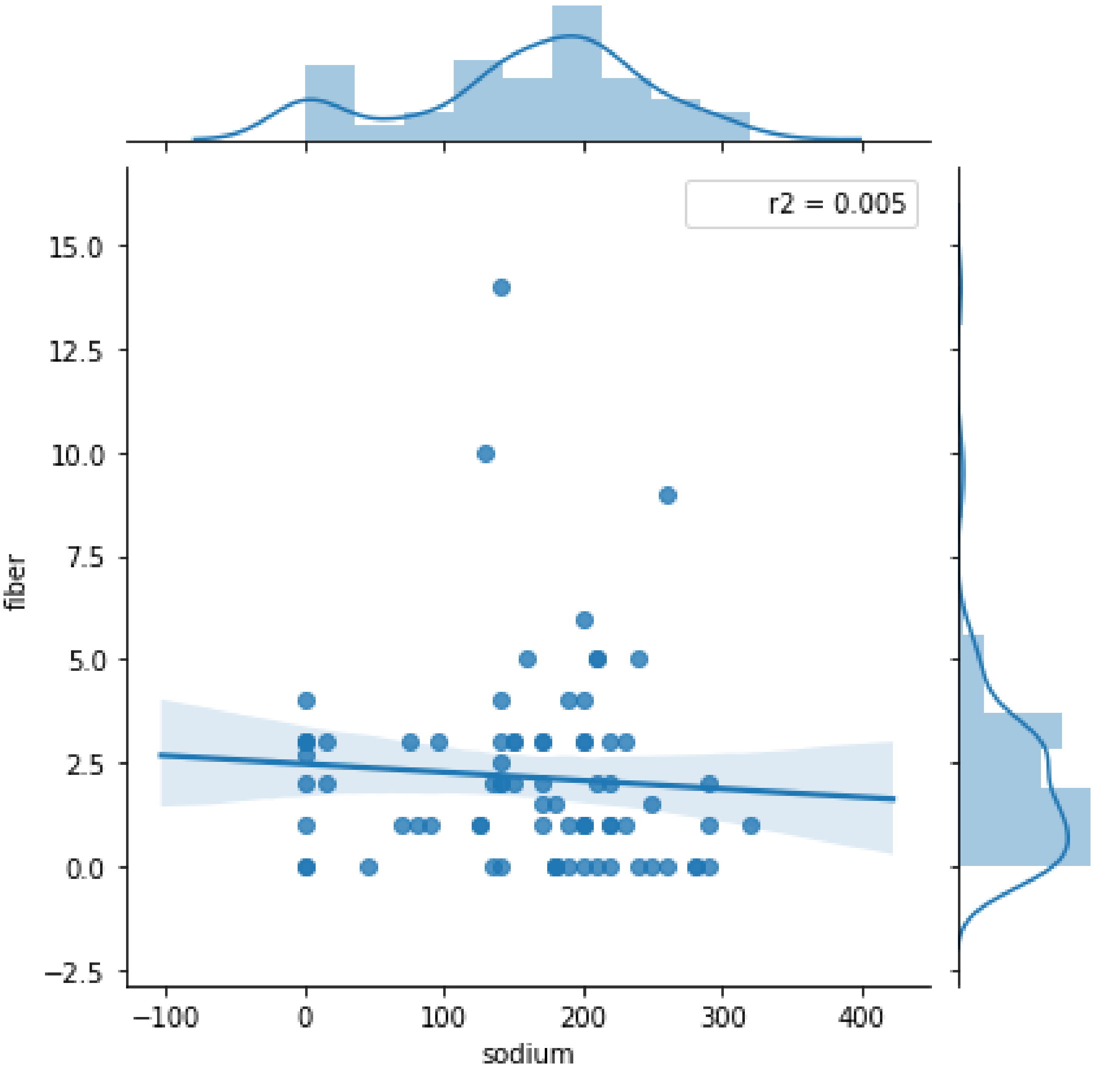
1.0.1 Relationship Between Fiber and Sodium

It appears that most cereals with low fiber have mid to high sodium values (150 - 300mg) as well as typically more calories, however there are observations of cereals with both low fiber and low sodium as seen on the left half of the scatterplot. Additionally, it does not seem that sodium and fiber have an immediate relationship based off of the regression plot and r2.

[7]:
```
g = sns.scatterplot(data = cereal,x = 'sodium', y = 'fiber', hue = "mfr", size␣
↪= "calories",
                       sizes=(20, 200), hue_norm=(0, 7), legend = False)
```



[8]:
```
#g = sns.regplot(data = cereal,x = 'sodium', y = 'fiber')
g = sns.jointplot(data = cereal,x = 'sodium', y = 'fiber', kind="reg",␣
↪stat_func=r2)
```



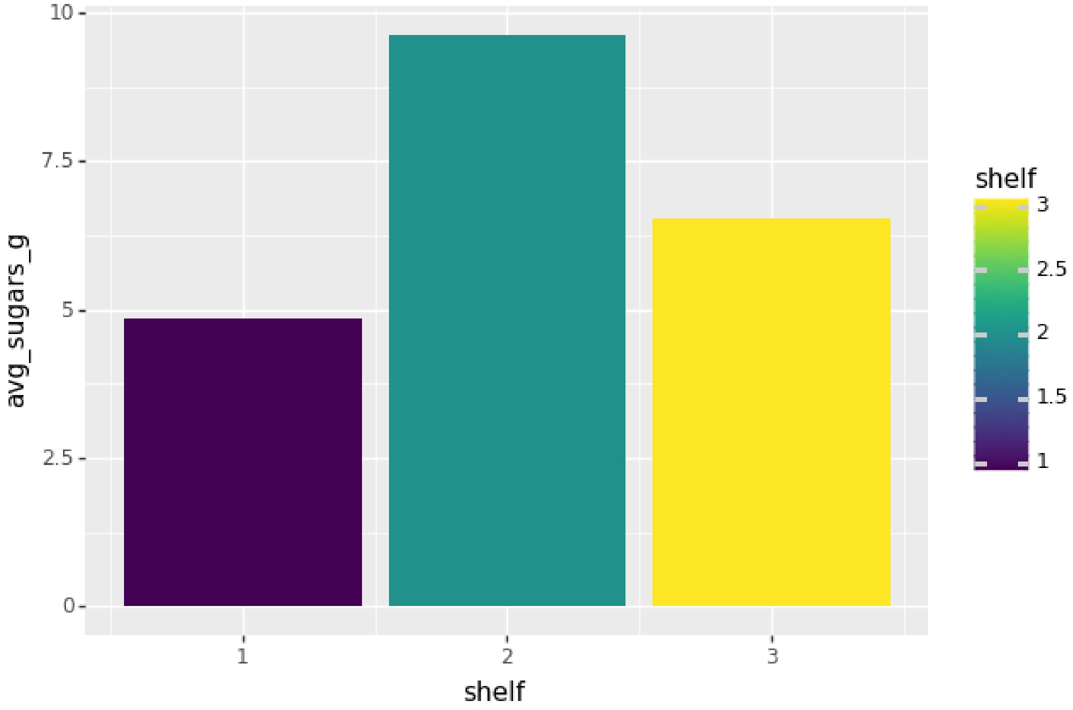
```
[9]: cereal_bar = cereal.groupby("shelf").agg({"sugars": ["mean", "std", "min"]})
     cereal_bar.columns = ["avg_sugars_g", "std", "min"]
     cereal_bar["shelf"] = cereal_bar.index #how you grab row names
     cereal_bar
```

```
[9]:        avg_sugars_g       std  min  shelf
     shelf
     1          4.850000  4.510514  0.0      1
     2          9.619048  4.128876  0.0      2
     3          6.527778  3.835817  0.0      3
```

1.0.2 Good cereals are usually on the 2nd or 3rd shelf

couldnt figure out how to fix legend

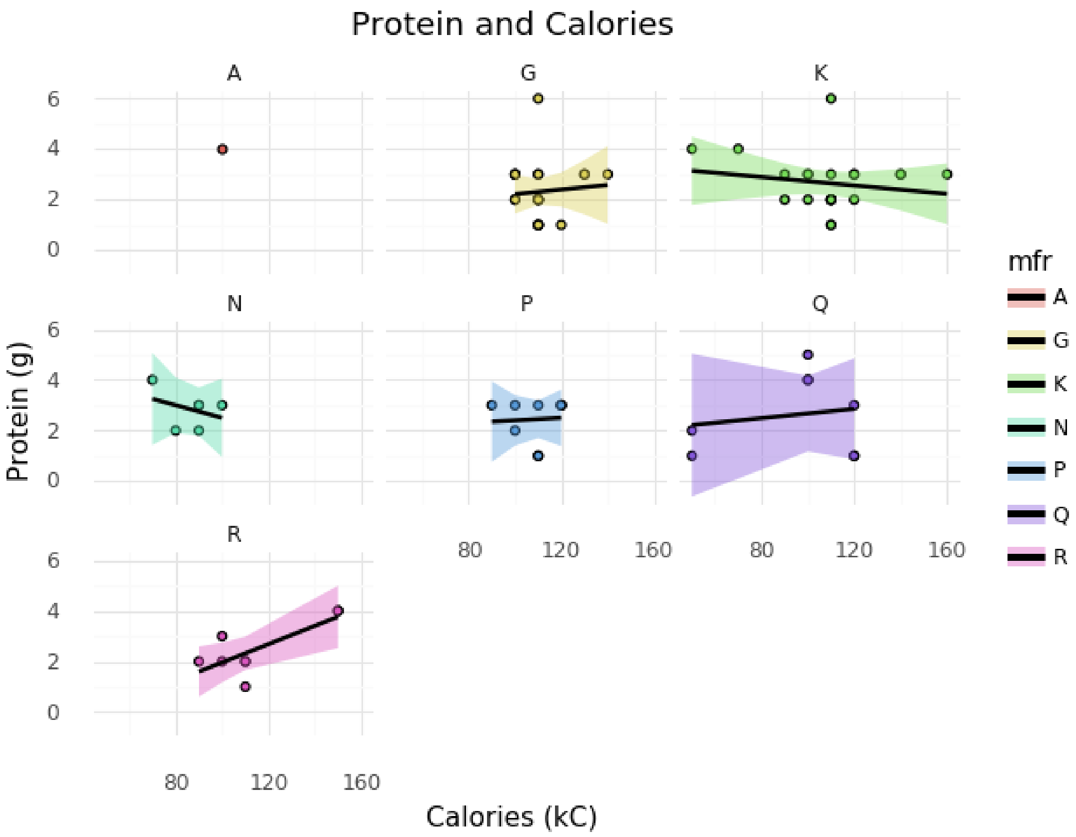
```
[10]: (ggplot(cereal_bar, aes( x = "shelf", y = "avg_sugars_g", fill = "shelf"))
      + geom_bar(stat = "identity"))
```



```
[10]: <ggplot: (-9223371927783853816)>
```

1.1 Protein and Calories by Manufacturer

```
[11]: (ggplot(cereal, aes( x = 'calories', y = 'protein'))
             +geom_point(aes(fill = 'mfr'), show_legend = False)
             +stat_smooth(aes(fill = 'mfr'),method = 'lm')
             +facet_wrap('~mfr')
             +labs(x = "Calories (kC)", y = "Protein (g)", title = "Protein and␣
       ↪Calories")
             +theme_minimal())
```


Protein and Calories
A
G
K
N
P
Q
R
Protein (g)
0
2
4
6
80
120
160
Calories (kC)
mfr
A
G
K
N
P
Q
R

```
[11]: <ggplot: (-9223371927783454356)>
```