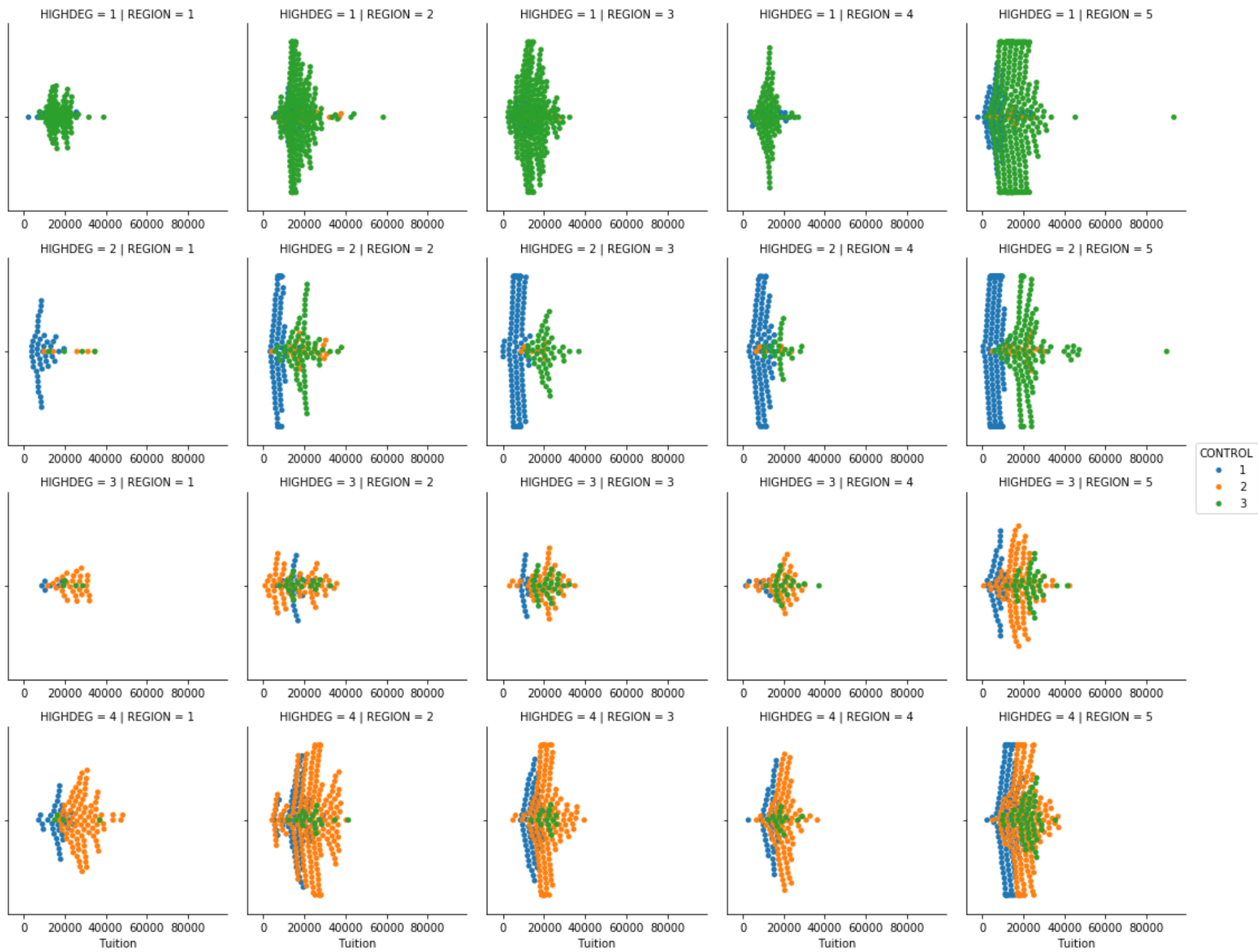


Using FacetGrid, factorplot and Implot

INTERMEDIATE DATA VISUALIZATION WITH SEABORN



Chris Moffitt
Instructor



Tidy data

- Seaborn's grid plots require data in "tidy format"
- One observation per row of data

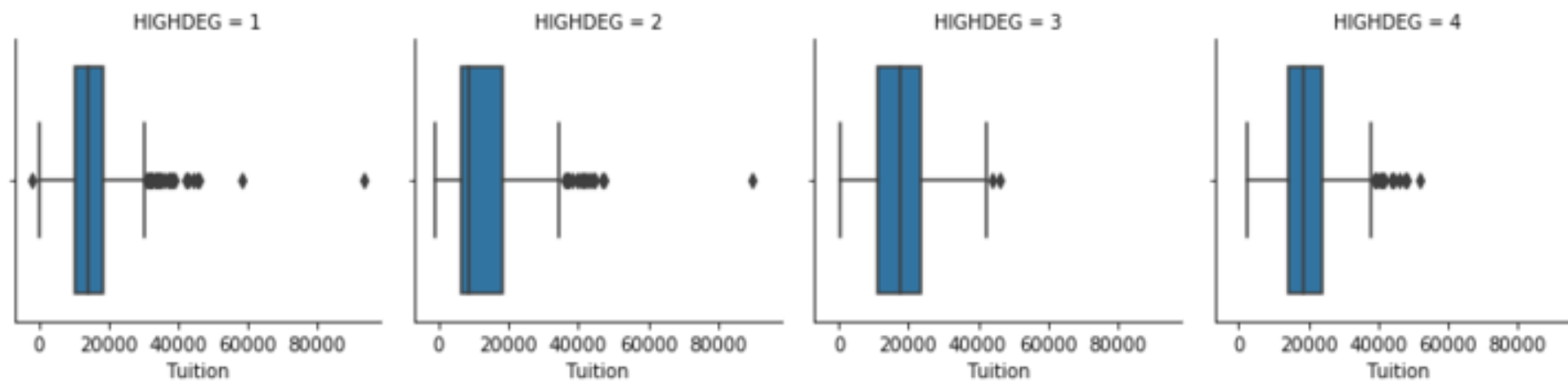
| | INSTNM | OPEID | REGION | SAT_AVG_ALL | PCTPELL | PCTFLOAN | ADM_RATE_ALL | UG | AVGFACSAL | COMPL_RPY_5YR_RT | DEBT_MDN |
|---|-------------------------------------|---------|--------|-------------|---------|----------|--------------|---------|-----------|------------------|----------|
| 0 | Alabama A & M University | 100200 | 5 | 850.0 | 0.7249 | 0.8159 | 0.653841 | 4380.0 | 7017.0 | 0.477631579 | 14600 |
| 1 | University of Alabama at Birmingham | 105200 | 5 | 1147.0 | 0.3505 | 0.5218 | 0.604275 | 10331.0 | 10221.0 | 0.673230442 | 14250 |
| 2 | Amridge University | 2503400 | 5 | NaN | 0.7455 | 0.8781 | NaN | 98.0 | 3217.0 | 0.636363636 | 11082 |
| 3 | University of Alabama in Huntsville | 105500 | 5 | 1221.0 | 0.3179 | 0.4589 | 0.811971 | 5220.0 | 9514.0 | 0.762222222 | 15000 |
| 4 | Alabama State University | 100500 | 5 | 844.0 | 0.7567 | 0.7692 | 0.463858 | 4348.0 | 7940.0 | 0.43006993 | 15274 |

FacetGrid

- The `FacetGrid` is foundational for many data aware grids
- It allows the user to control how data is distributed across columns, rows and hue
- Once a `FacetGrid` is created, the plot type must be mapped to the grid

FacetGrid Categorical Example

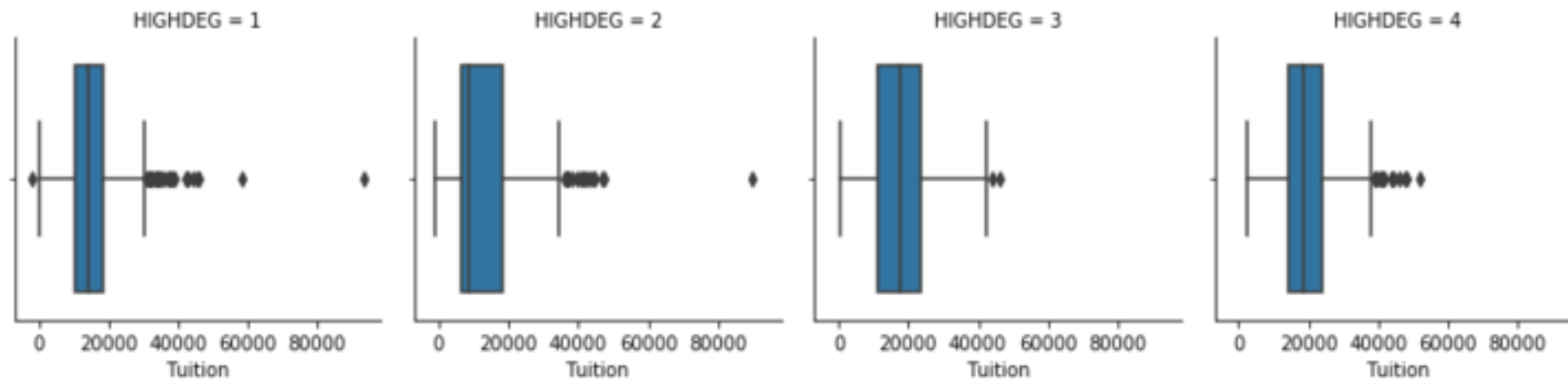
```
g = sns.FacetGrid(df, col="HIGHDEG")
g.map(sns.boxplot, 'Tuition',
      order=['1', '2', '3', '4'])
```



factorplot()

- The `factorplot` is a simpler way to use a `FacetGrid` for categorical data
- Combines the facetting and mapping process into 1 function

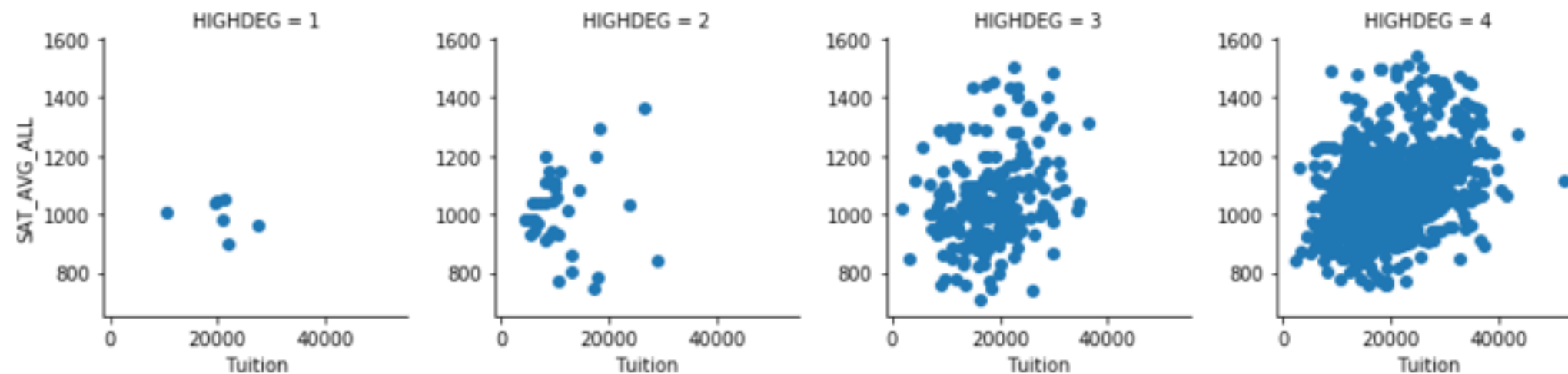
```
sns.factorplot(x="Tuition", data=df,  
               col="HIGHDEG", kind='box')
```



FacetGrid for regression

- `FacetGrid()` can also be used for scatter or regression plots

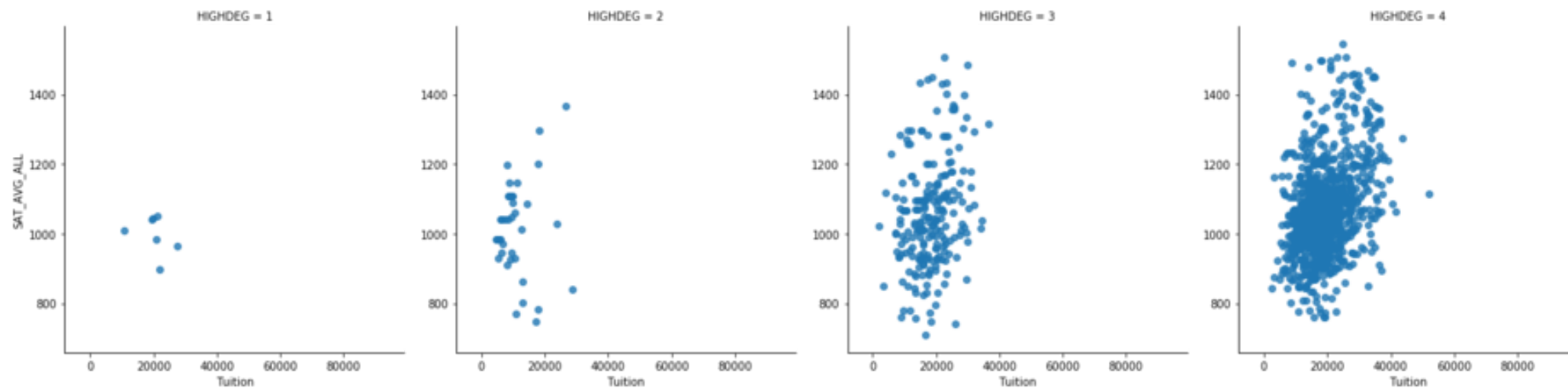
```
g = sns.FacetGrid(df, col="HIGHDEG")  
g.map(plt.scatter, 'Tuition', 'SAT_AVG_ALL')
```



Implot

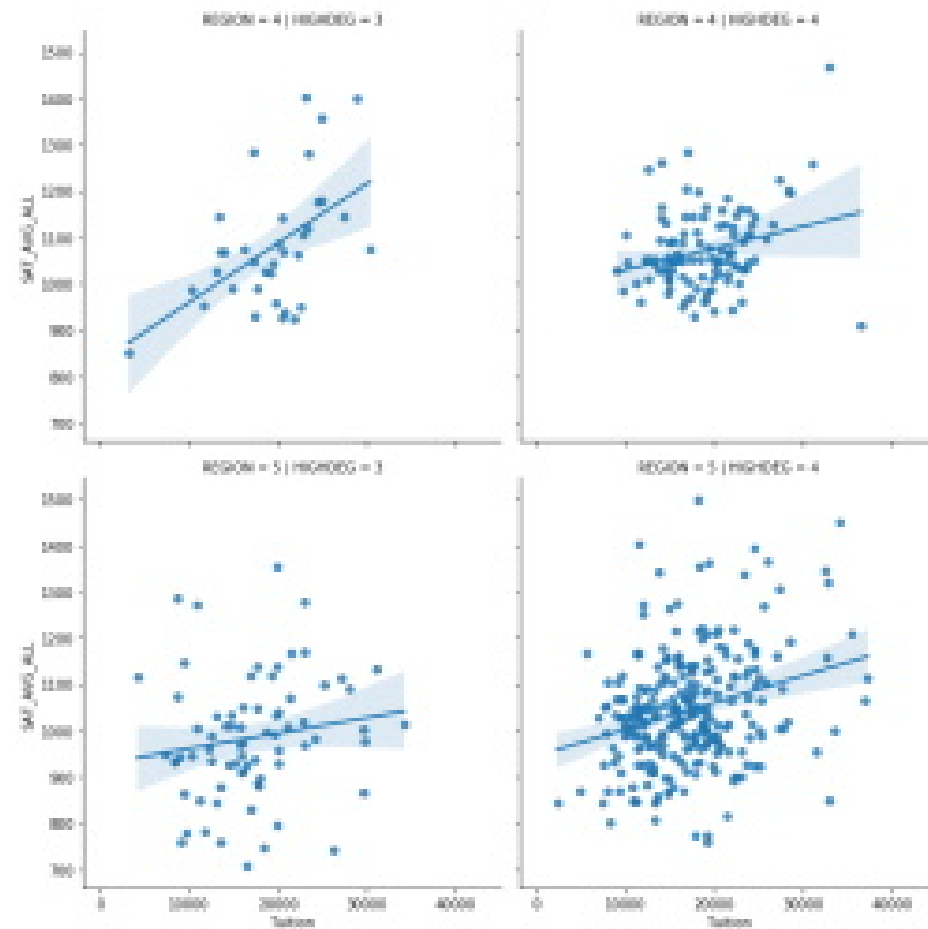
- `Implot` plots scatter and regression plots on a `FacetGrid`

```
sns.Implot(data=df, x="Tuition", y="SAT_AVG_ALL",  
           col="HIGHDEG", fit_reg=False)
```



Implot with regression

```
sns.lmplot(data=df, x="Tuition", y="SAT_AVG_ALL",  
          col="HIGHDEG", row='REGION')
```



Let's practice!

INTERMEDIATE DATA VISUALIZATION WITH SEABORN

Using PairGrid and pairplot

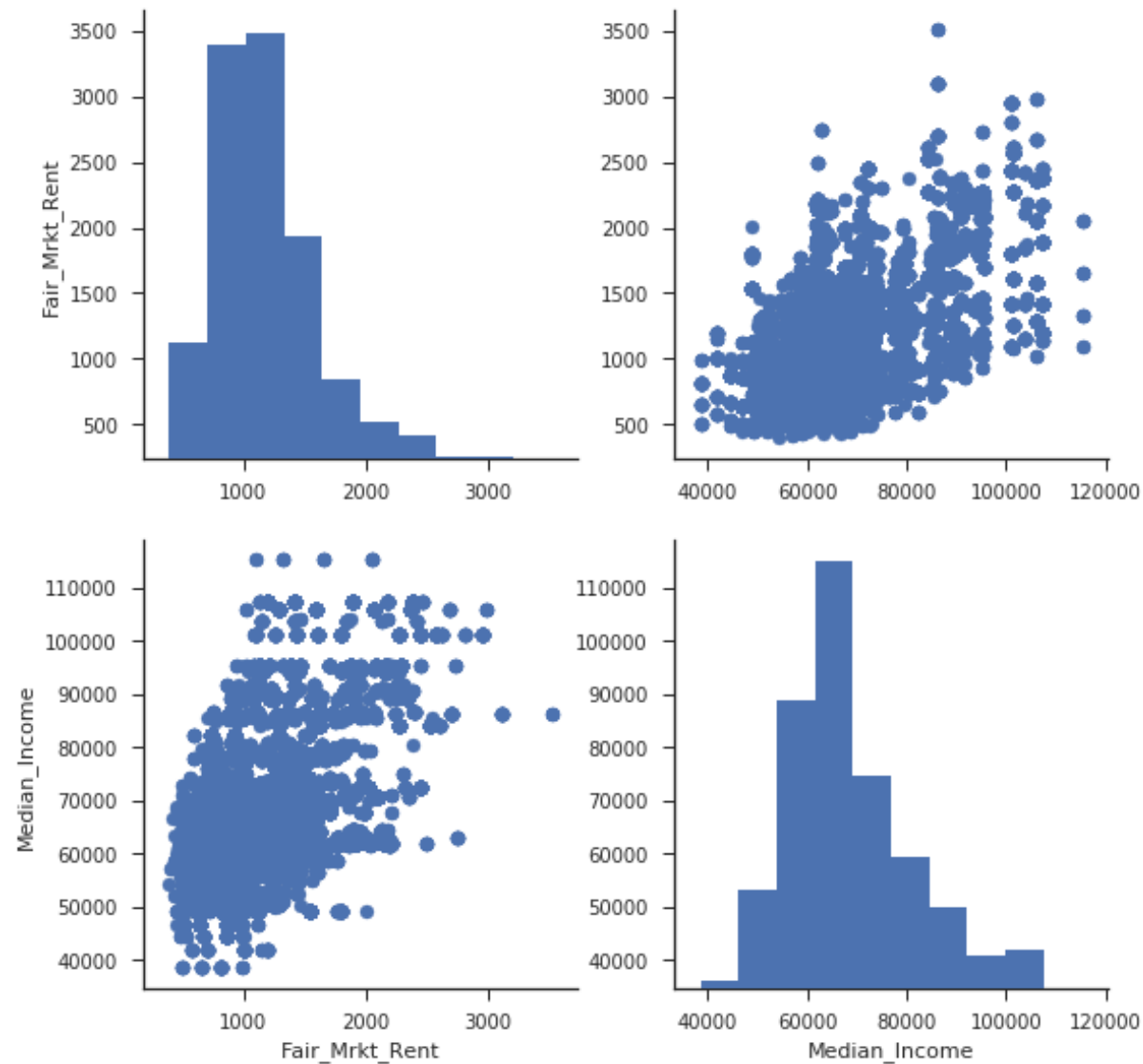
INTERMEDIATE DATA VISUALIZATION WITH SEABORN



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Pairwise relationships

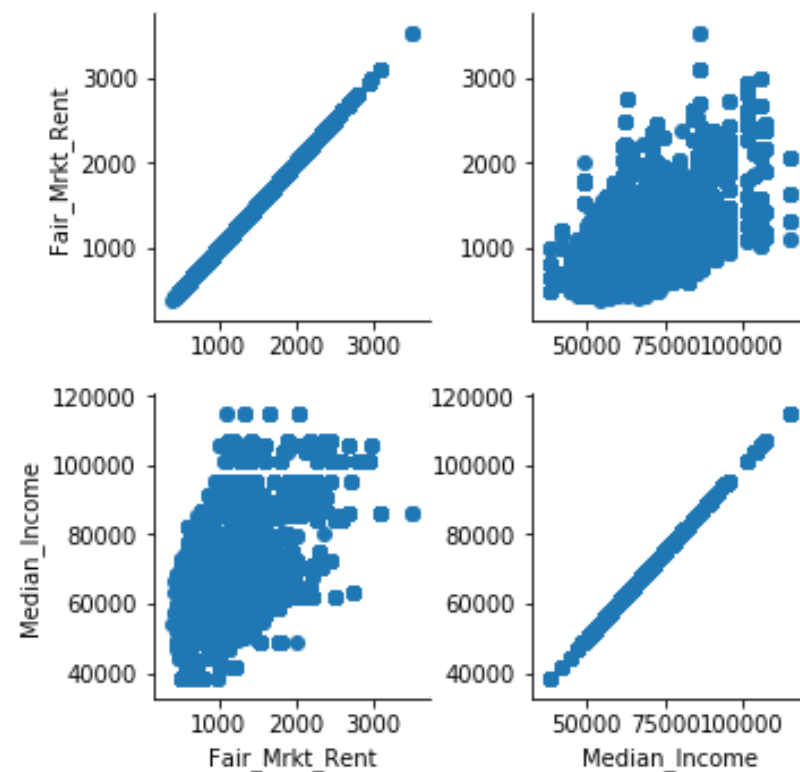
- PairGrid shows pairwise relationships between data elements



Creating a PairGrid

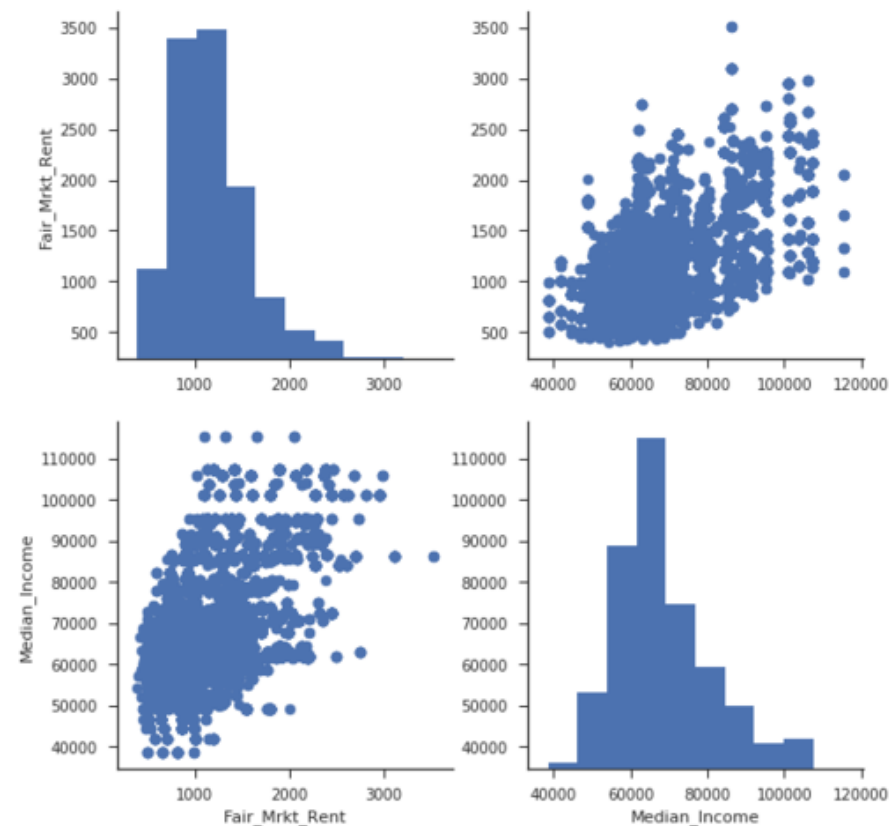
- The `PairGrid` follows similar API to `FacetGrid`

```
g = sns.PairGrid(df, vars=["Fair_Mrkt_Rent",  
                           "Median_Income"])  
g = g.map(plt.scatter)
```



Customizing the PairGrid diagonals

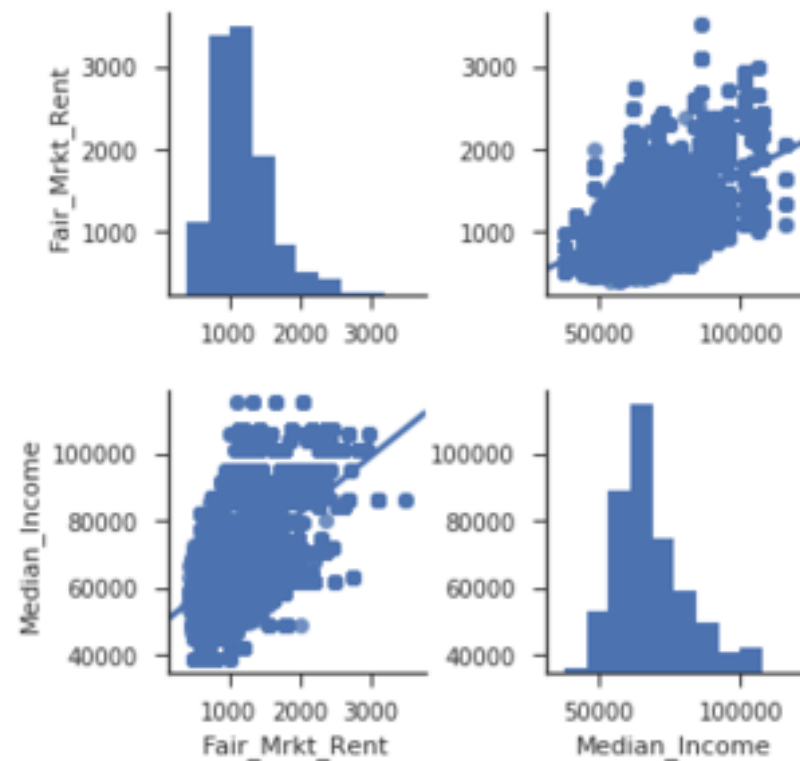
```
g = sns.PairGrid(df, vars=["Fair_Mrkt_Rent",  
                           "Median_Income"])  
  
g = g.map_diag(plt.hist)  
g = g.map_offdiag(plt.scatter)
```



Pairplot

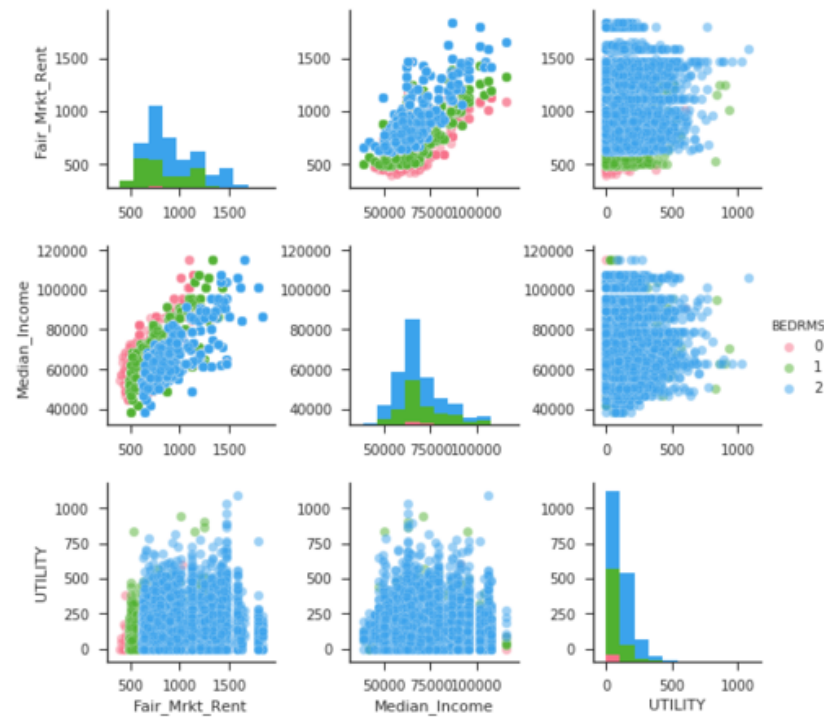
- `pairplot` is a shortcut for the `PairGrid`

```
sns.pairplot(df, vars=["Fair_Mrkt_Rent",  
                      "Median_Income"], kind='reg',  
             diag_kind='hist')
```



Customizing a pairplot

```
sns.pairplot(df.query('BEDRMS < 3'),  
             vars=["Fair_Mrkt_Rent",  
                  "Median_Income", "UTILITY"],  
             hue='BEDRMS', palette='husl',  
             plot_kws={'alpha': 0.5})
```



Let's practice!

INTERMEDIATE DATA VISUALIZATION WITH SEABORN

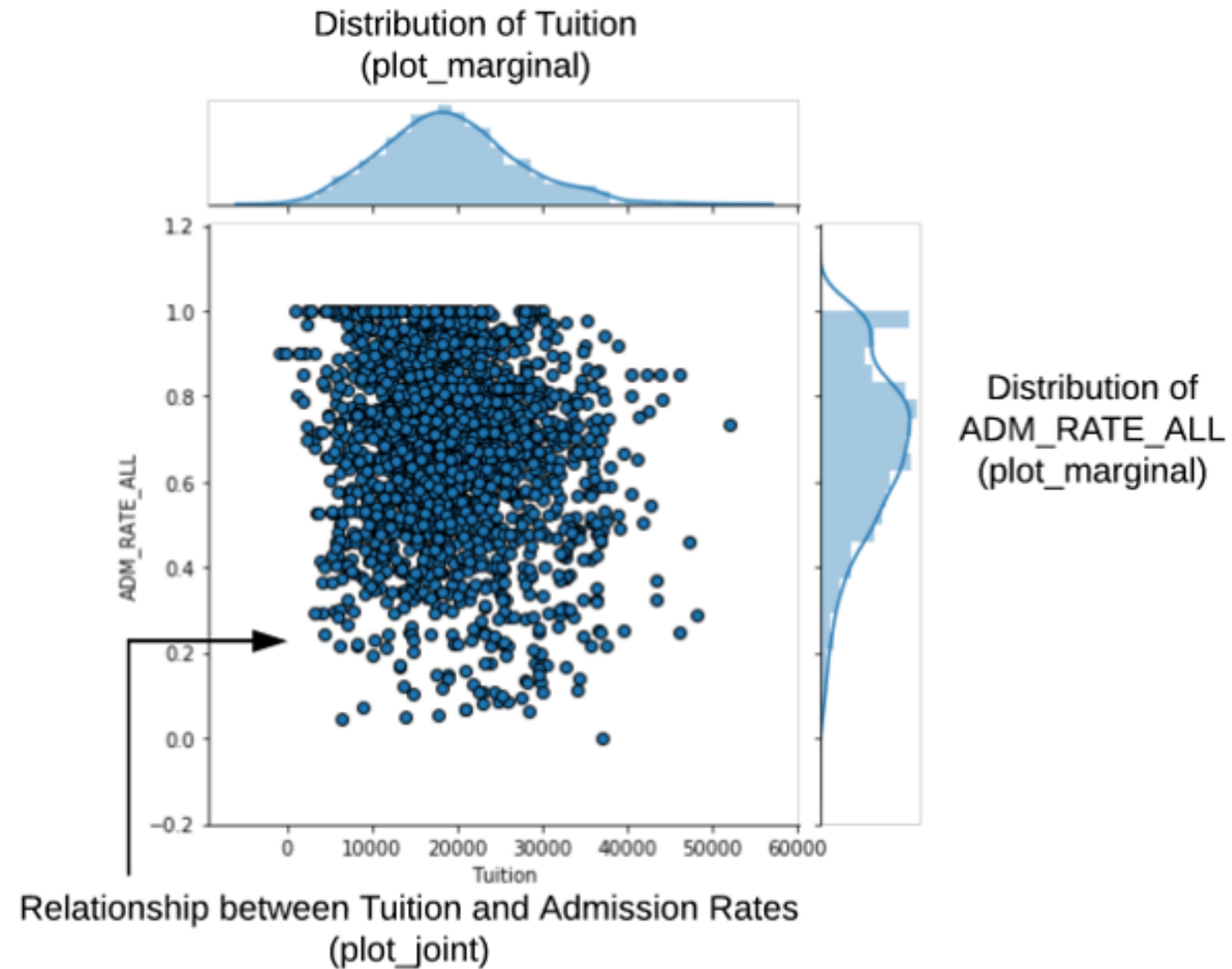
Using JointGrid and jointplot

INTERMEDIATE DATA VISUALIZATION WITH SEABORN



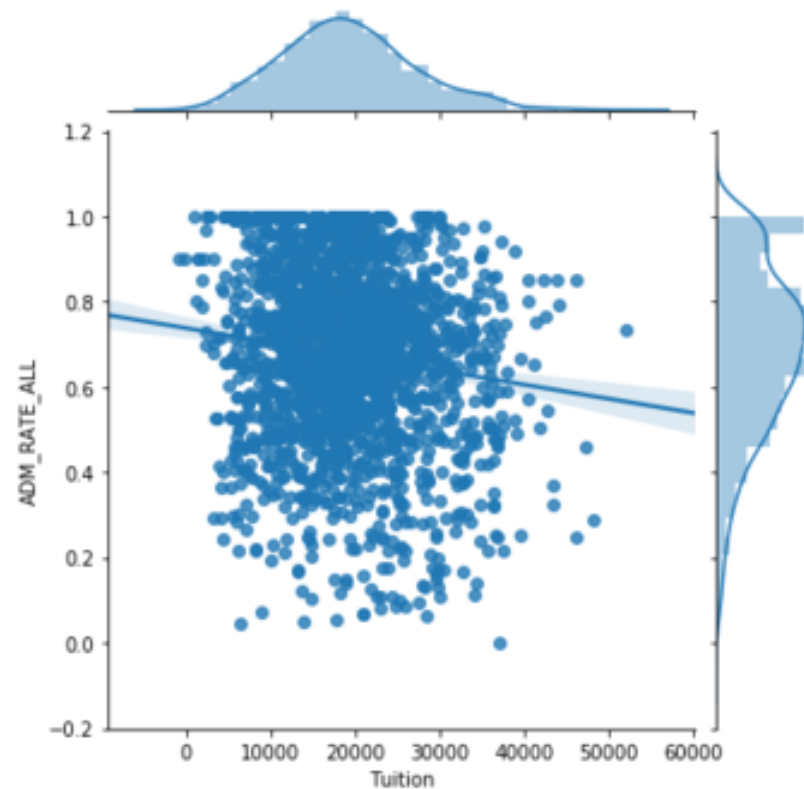
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JointGrid() Overview



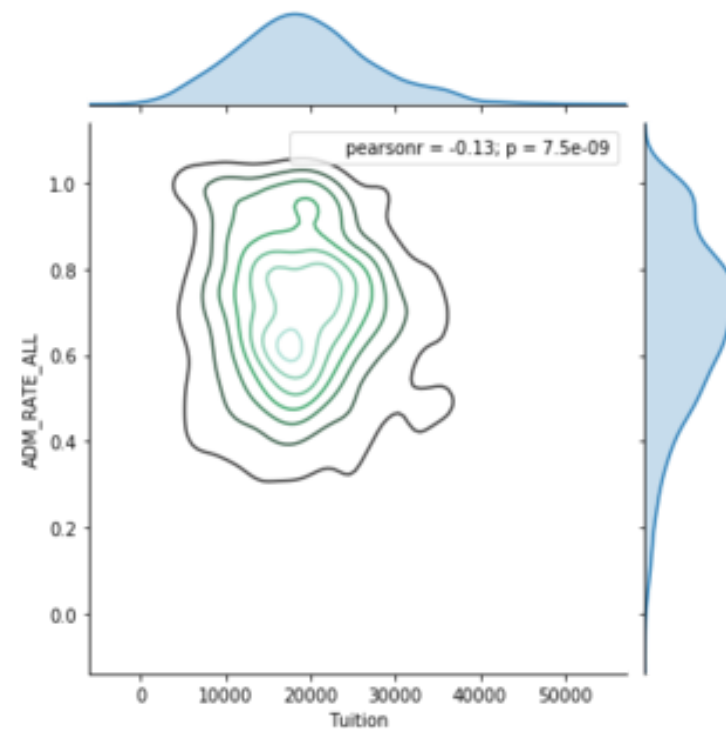
Basic JointGrid

```
g = sns.JointGrid(data=df, x="Tuition",  
                  y="ADM_RATE_ALL")  
g.plot(sns.regplot, sns.distplot)
```



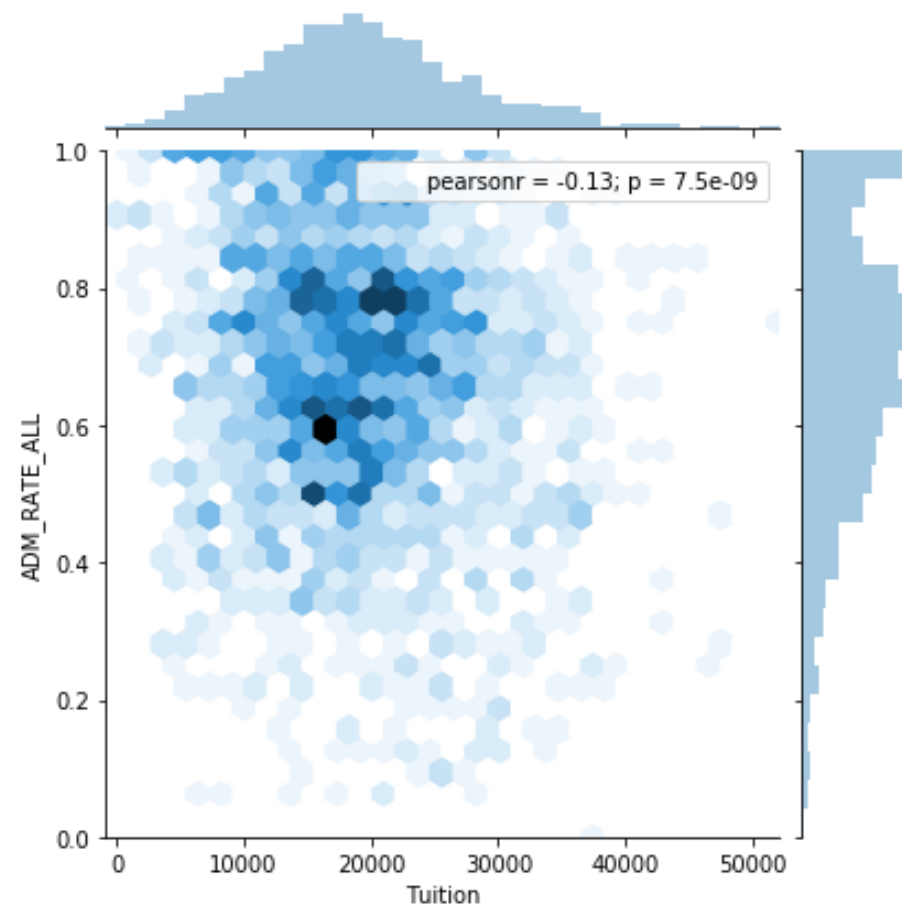
Advanced JointGrid

```
g = sns.JointGrid(data=df, x="Tuition",  
                  y="ADM_RATE_ALL")  
  
g = g.plot_joint(sns.kdeplot)  
g = g.plot_marginals(sns.kdeplot, shade=True)  
g = g.annotate(stats.pearsonr)
```



jointplot()

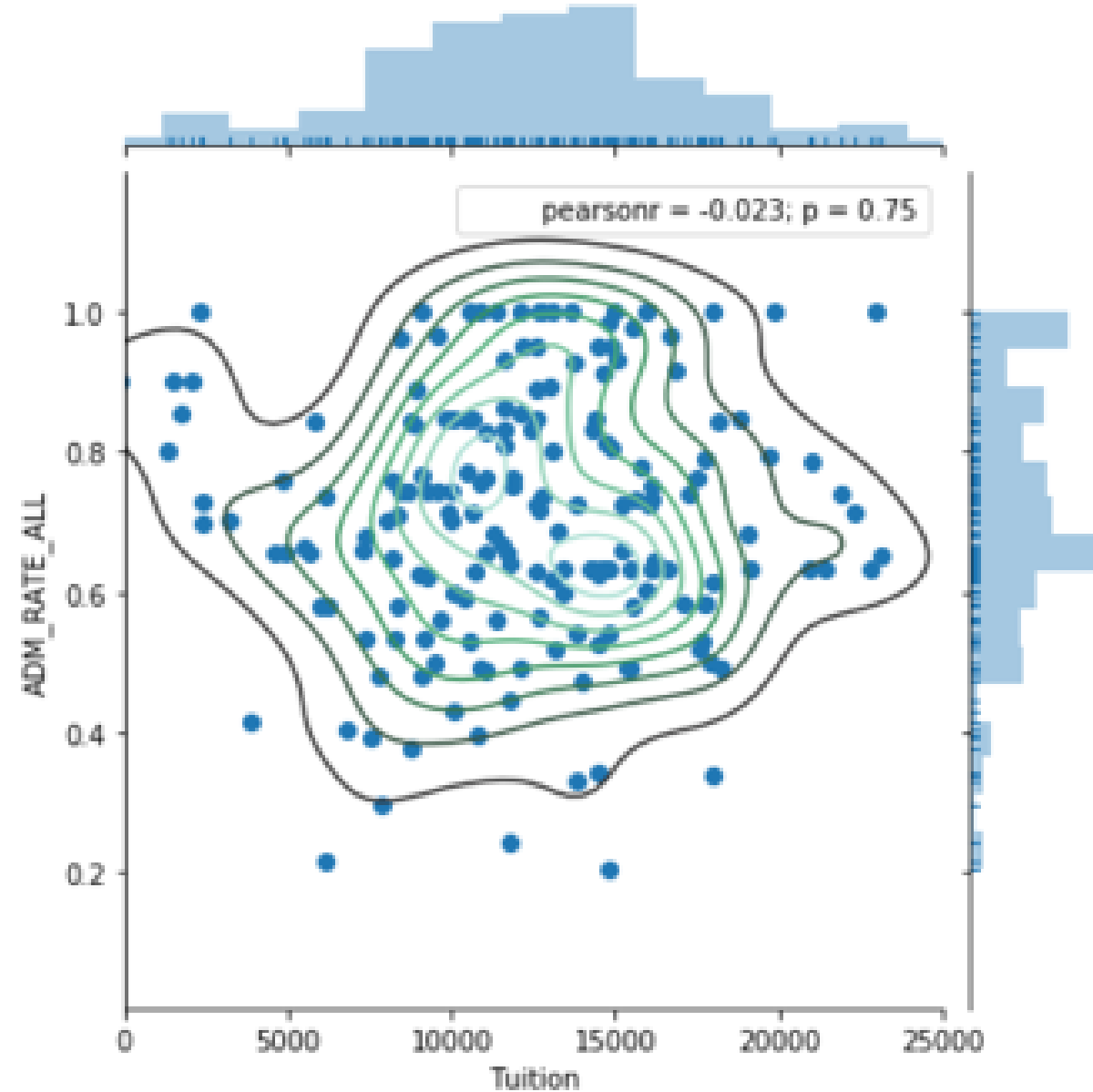
```
sns.jointplot(data=df, x="Tuition",  
              y="ADM_RATE_ALL", kind='hex')
```



Customizing a jointplot

```
g = (sns.jointplot(x="Tuition",
                  y="ADM_RATE_ALL", kind='scatter',
                  xlim=(0, 25000),
                  marginal_kws=dict(
                      bins=15, rug=True),
                  data=df.query('UG < 2500 &
                                Ownership == "Public"'))
     .plot_joint(sns.kdeplot))
```

Customizing a jointplot



Let's practice!

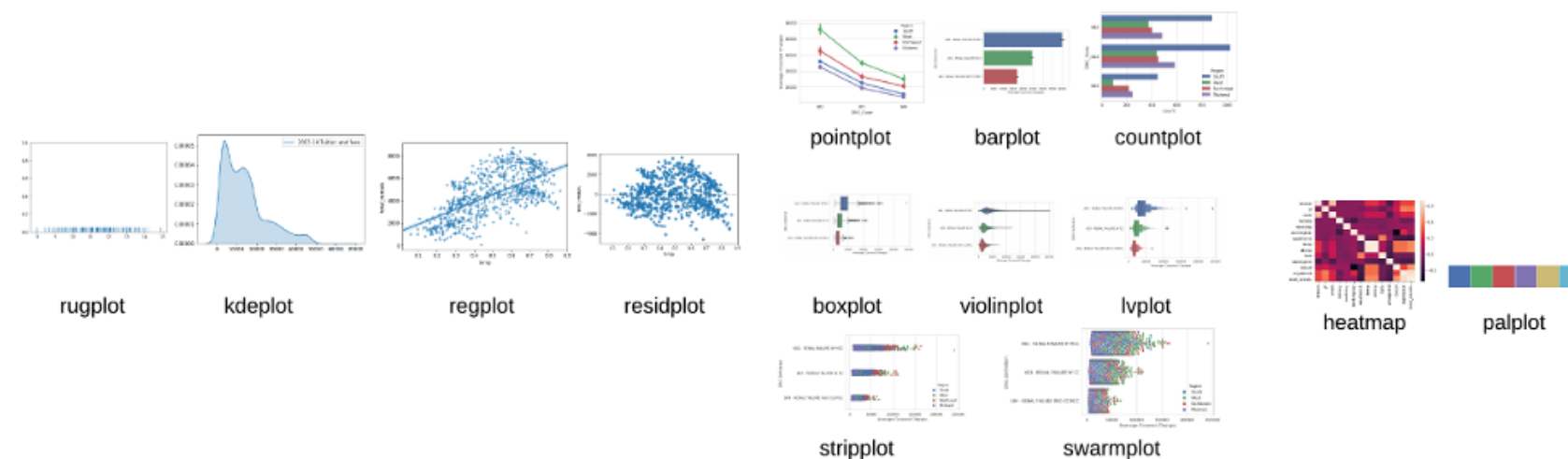
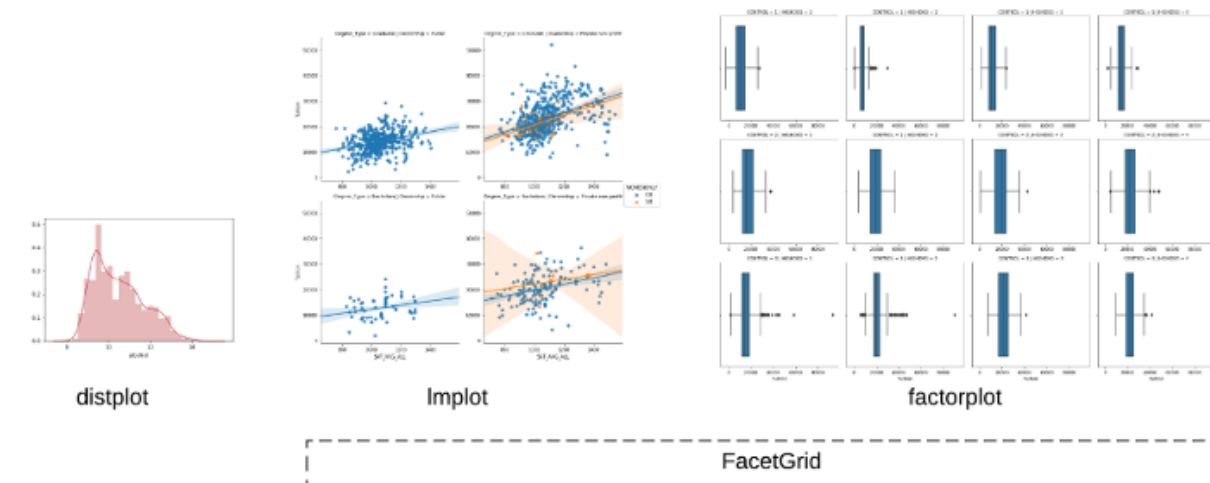
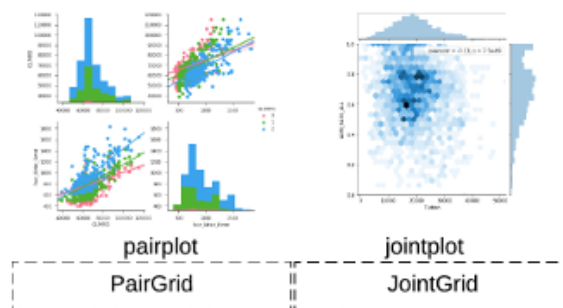
INTERMEDIATE DATA VISUALIZATION WITH SEABORN

Selecting Seaborn Plots

INTERMEDIATE DATA VISUALIZATION WITH SEABORN



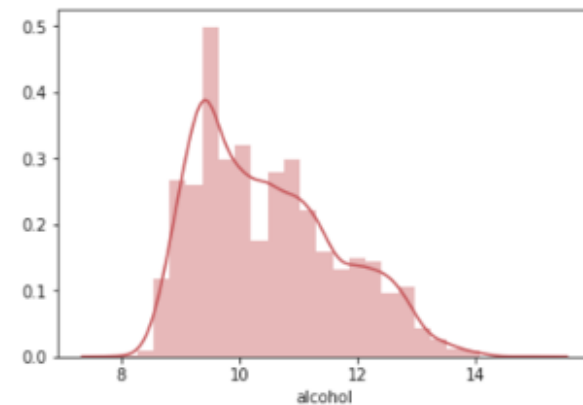
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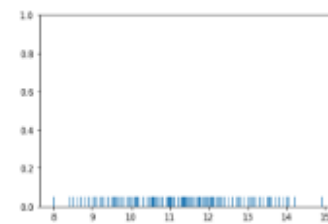
matplotlib

Univariate Distribution Analysis

- `distplot()` is the best place to start for this analysis
- `rugplot()` and `kdeplot()` can be useful alternatives



distplot



rugplot



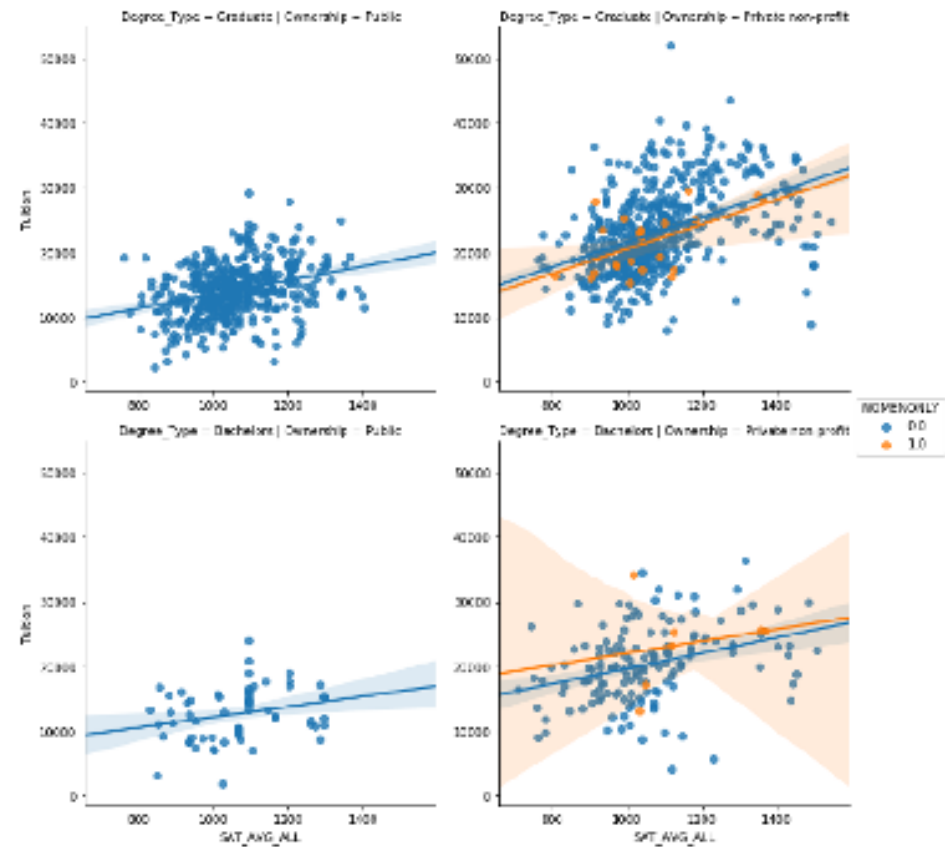
kdeplot

`plt.hist()`

matplotlib

Regression Analysis

- `lmplot()` performs regression analysis and supports facetting

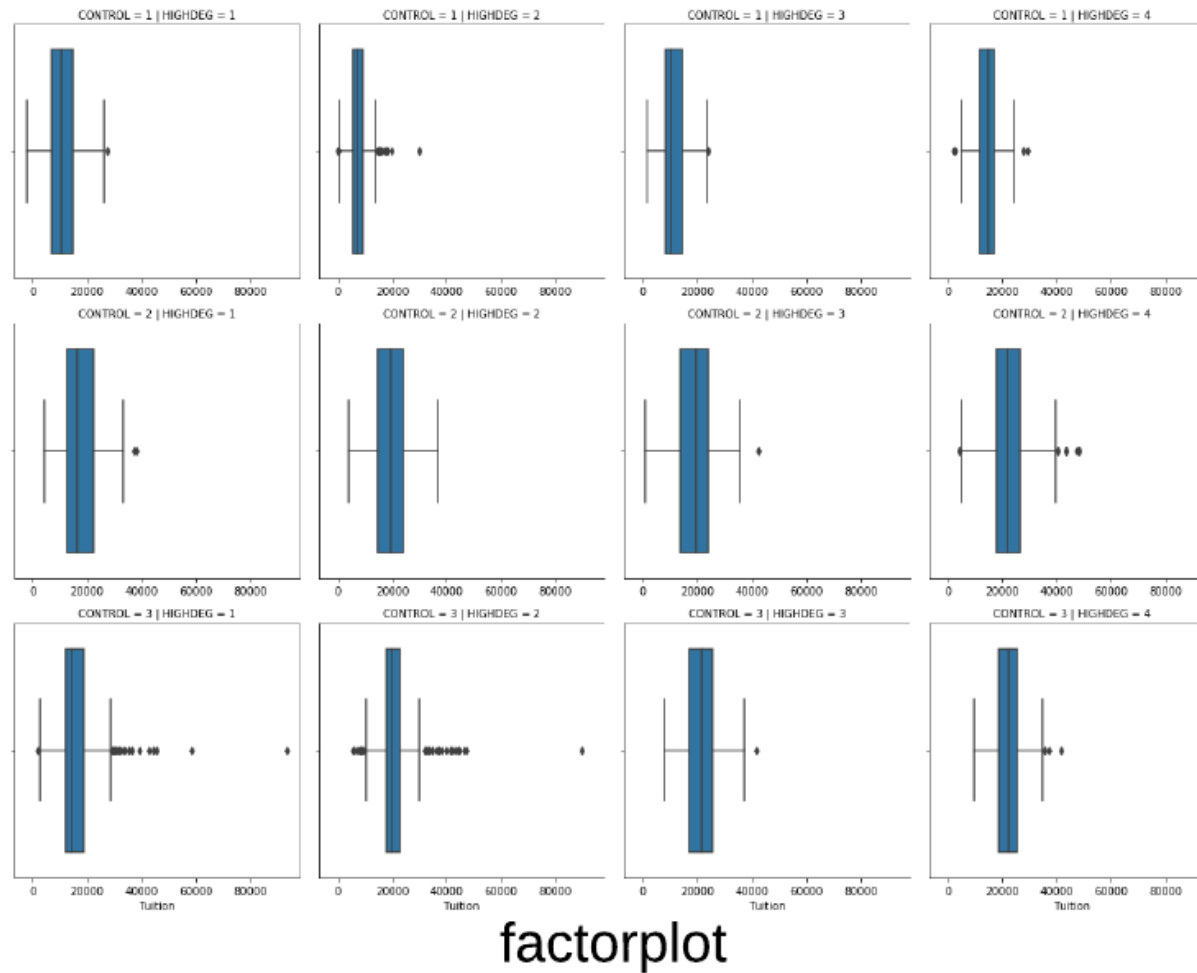


lmplot

FacetGrid

Categorical Plots

- Explore data with the categorical plots and facet with

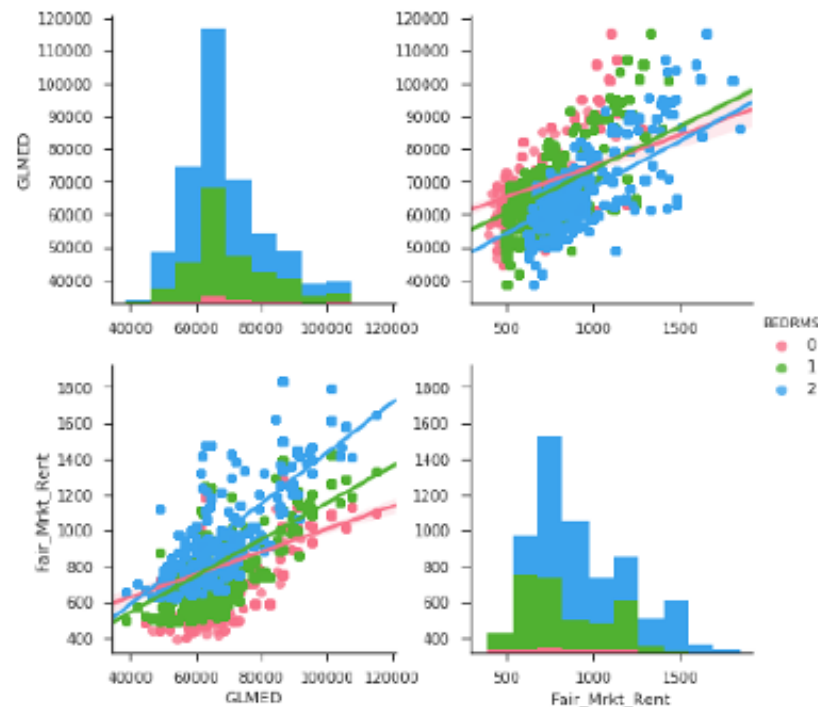


factorplot

FacetGrid

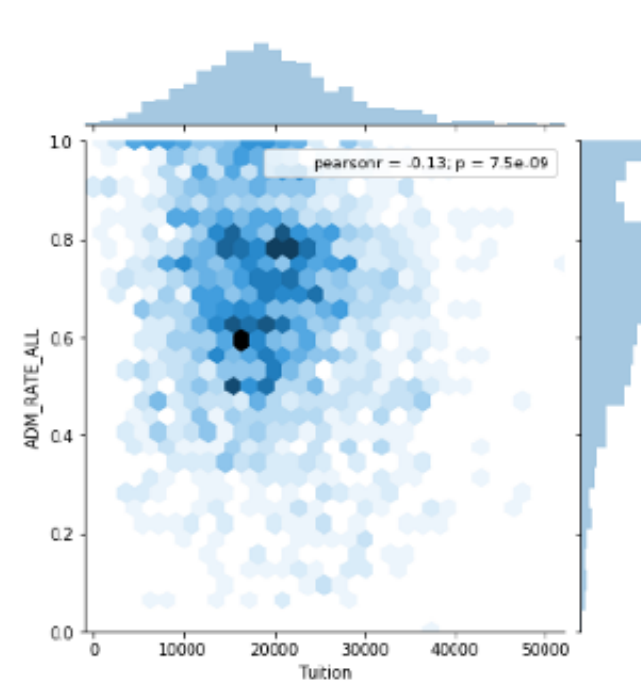
pairplot() and jointplot()

- Perform regression analysis with `lmplot`
- Analyze distributions with `distplot`



pairplot

PairGrid



jointplot

JointGrid

Thank You!

INTERMEDIATE DATA VISUALIZATION WITH SEABORN