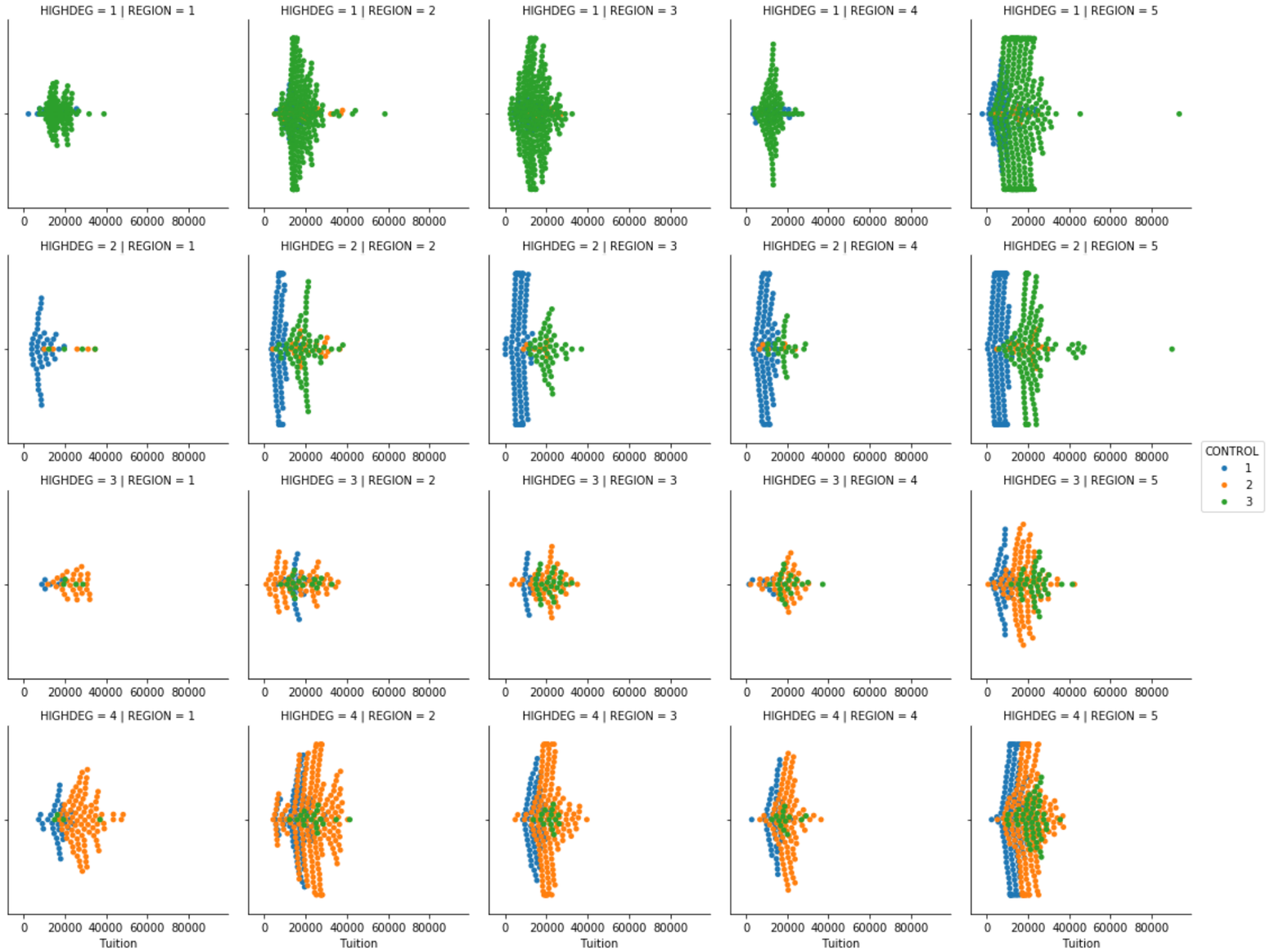
Using FacetGrid, factorplot and lmplot

INTERMEDIATE DATA VISUALIZATION WITH SEABORN

Chris Moffitt
Instructor


HIGHDEG = 1 | REGION = 1
HIGHDEG = 1 | REGION = 2
HIGHDEG = 1 | REGION = 3
HIGHDEG = 1 | REGION = 4
HIGHDEG = 1 | REGION = 5
HIGHDEG = 2 | REGION = 1
HIGHDEG = 2 | REGION = 2
HIGHDEG = 2 | REGION = 3
HIGHDEG = 2 | REGION = 4
HIGHDEG = 2 | REGION = 5
HIGHDEG = 3 | REGION = 1
HIGHDEG = 3 | REGION = 2
HIGHDEG = 3 | REGION = 3
HIGHDEG = 3 | REGION = 4
HIGHDEG = 3 | REGION = 5
HIGHDEG = 4 | REGION = 1
HIGHDEG = 4 | REGION = 2
HIGHDEG = 4 | REGION = 3
HIGHDEG = 4 | REGION = 4
HIGHDEG = 4 | REGION = 5
0 20000 40000 60000 80000
Tuition
CONTROL
1
2
3

Tidy data

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

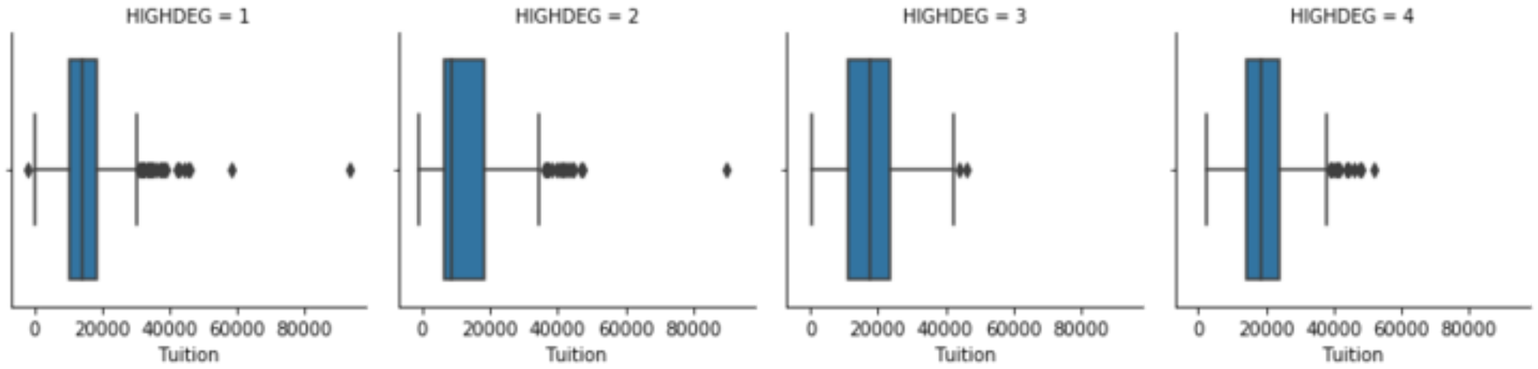
	INSTNM	OPEID	REGION	SAT_AVG_ALL	PCTPELL	PCTFLOAN	ADM_RATE_ALL	UG	AVGFACSAL	COMPL_RPY_5YR_RT	DEBT_MDN
0	Alabama A & M University	100200	5	850.0	0.7249	0.8159	0.653841	4380.0	7017.0	0.477631579	14600
1	University of Alabama at Birmingham	105200	5	1147.0	0.3505	0.5218	0.604275	10331.0	10221.0	0.673230442	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

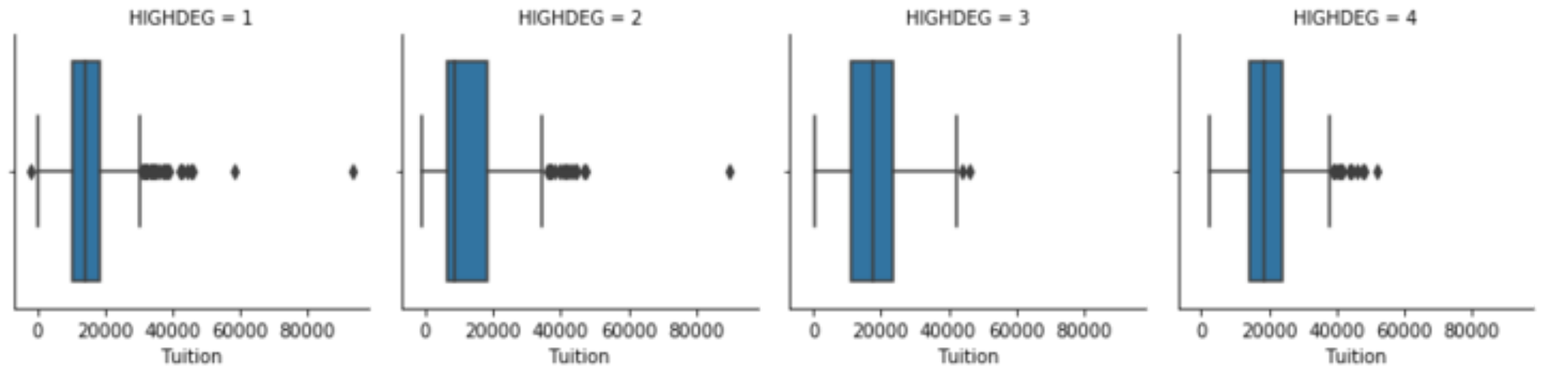
```
g = sns.FacetGrid(df, col="HIGHDEG")
g.map(sns.boxplot, 'Tuition',
      order=['1', '2', '3', '4'])
```



factorplot()

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

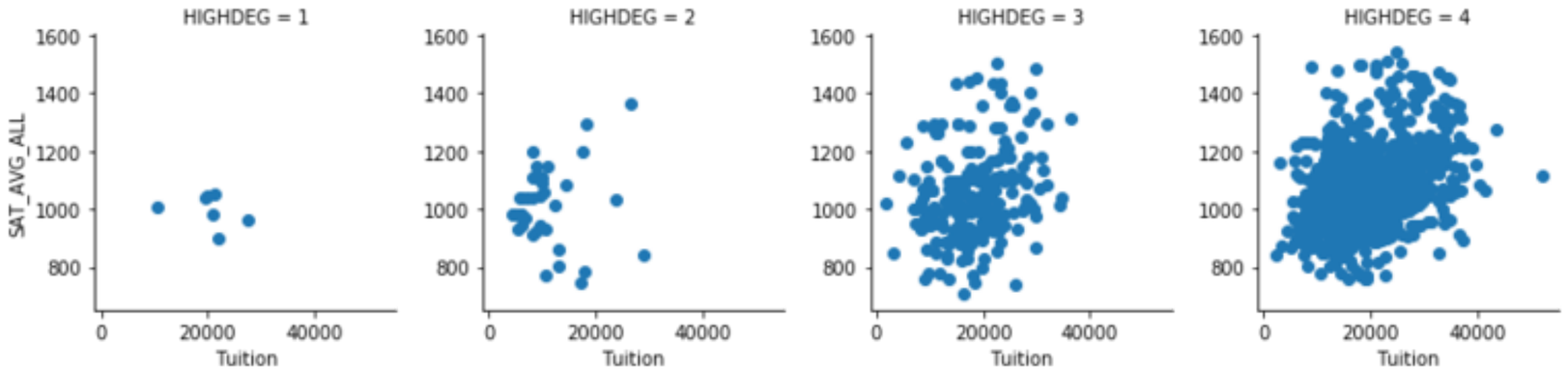
```
sns.factorplot(x="Tuition", data=df,
               col="HIGHDEG", kind='box')
```



FacetGrid for regression

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

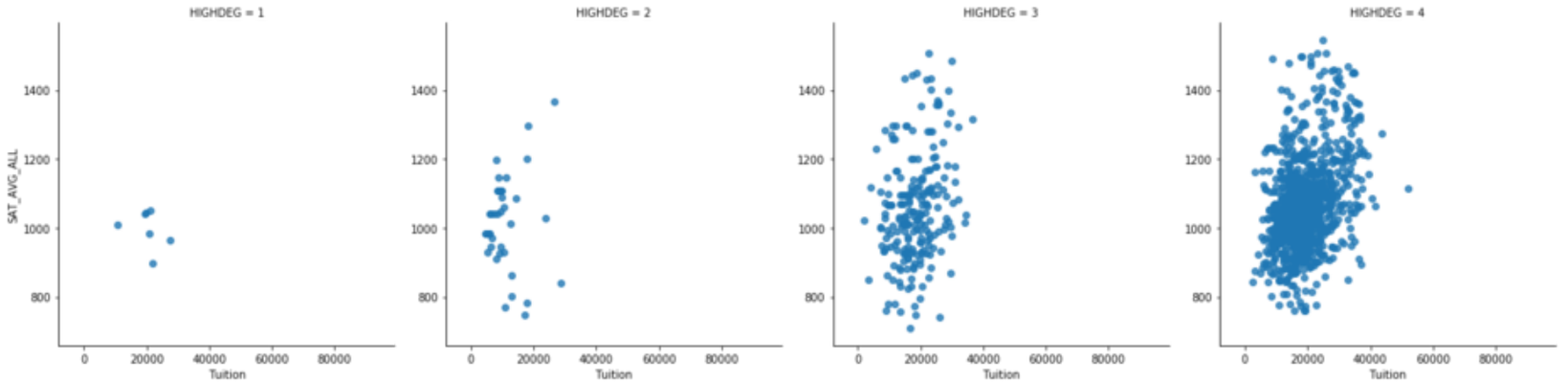
```
g = sns.FacetGrid(df, col="HIGHDEG")
g.map(plt.scatter, 'Tuition', 'SAT_AVG_ALL')
```



lmplot

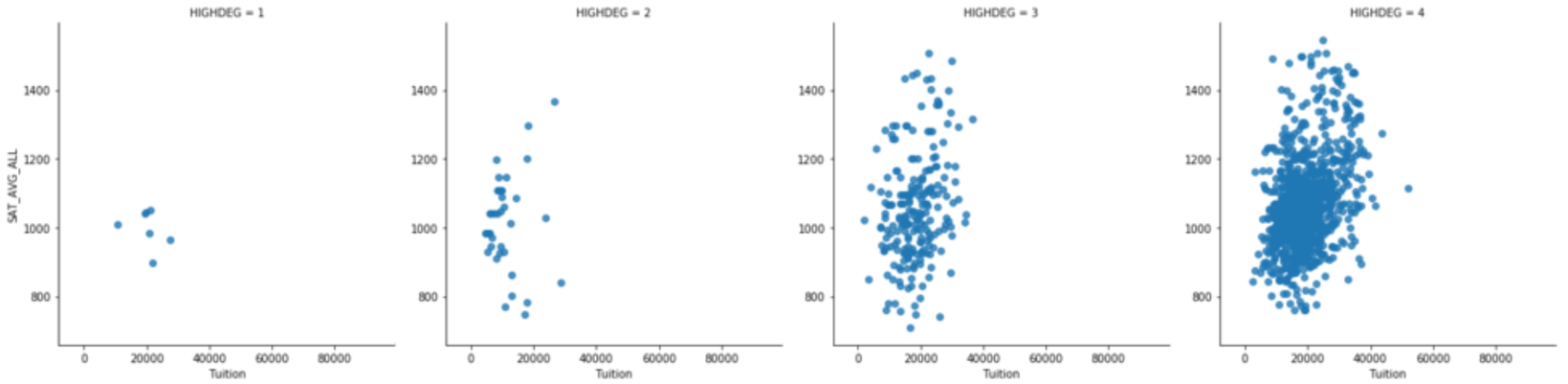
- `lmplot` plots scatter and regression plots on a `FacetGrid`

```
sns.lmplot(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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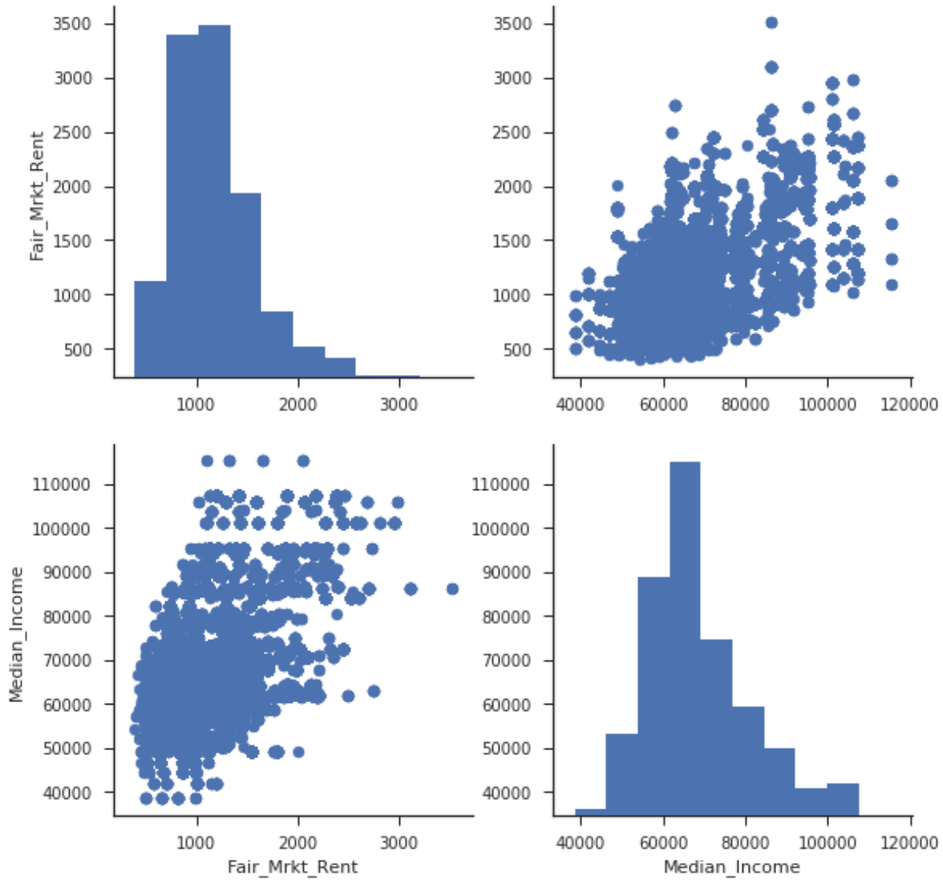
Instructor

Pairwise relationships

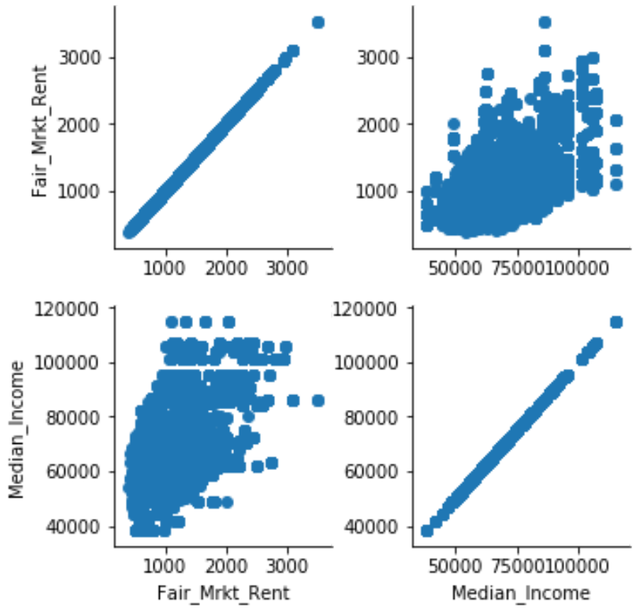
- `PairGrid` shows pairwise relationships between data elements



Creating a PairGrid

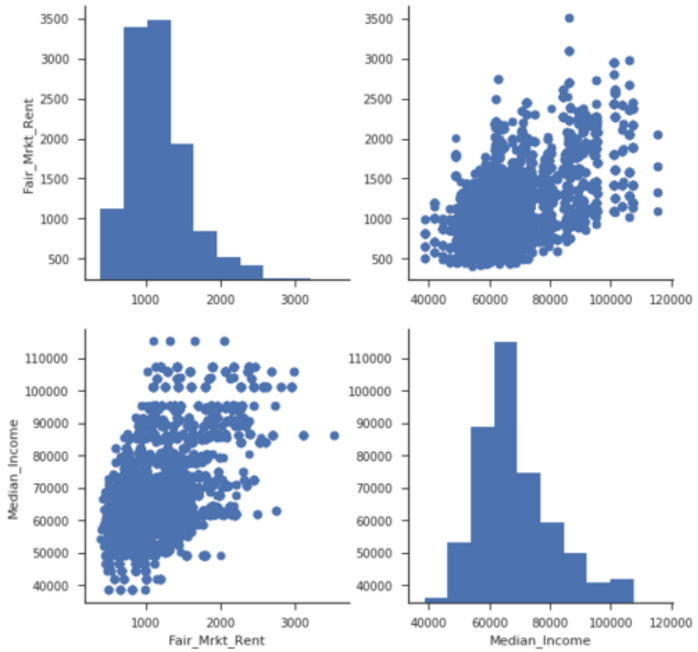
- The `PairGrid` follows similar API to FacetGrid

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



Customizing the PairGrid diagonals

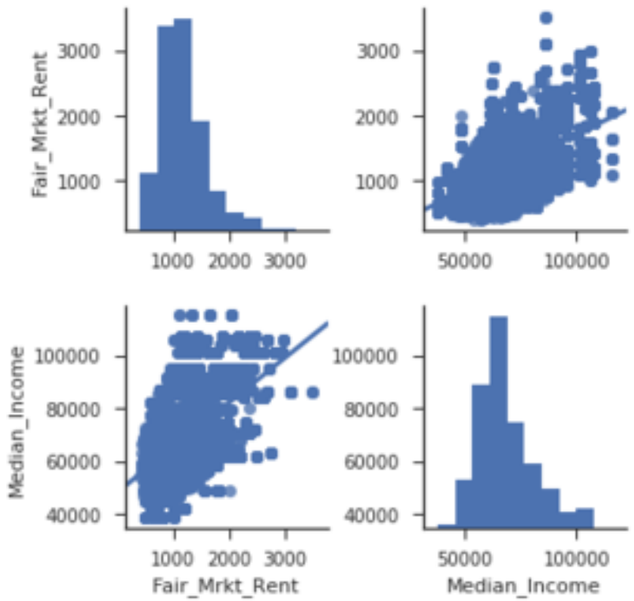
```
g = sns.PairGrid(df, vars=["Fair_Mrkt_Rent",
                           "Median_Income"])
g = g.map_diag(plt.hist)
g = g.map_offdiag(plt.scatter)
```



Pairplot

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

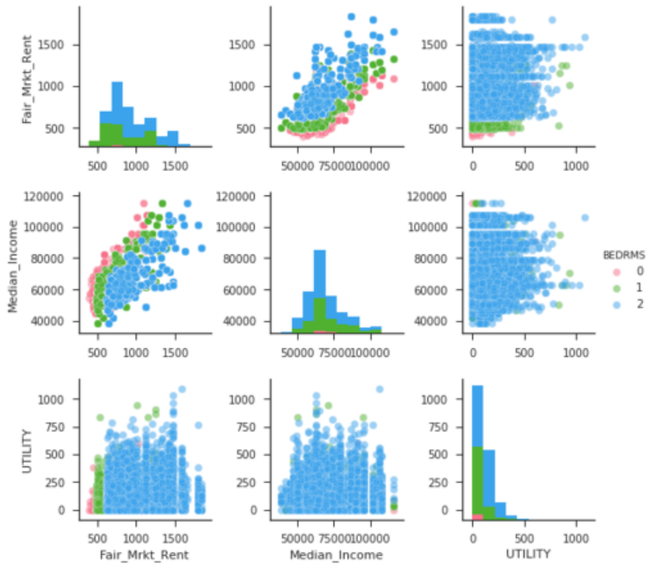
```
sns.pairplot(df, vars=["Fair_Mrkt_Rent",
             "Median_Income"], kind='reg',
             diag_kind='hist')
```



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})
```

x_vars
y_vars



Let's practice!

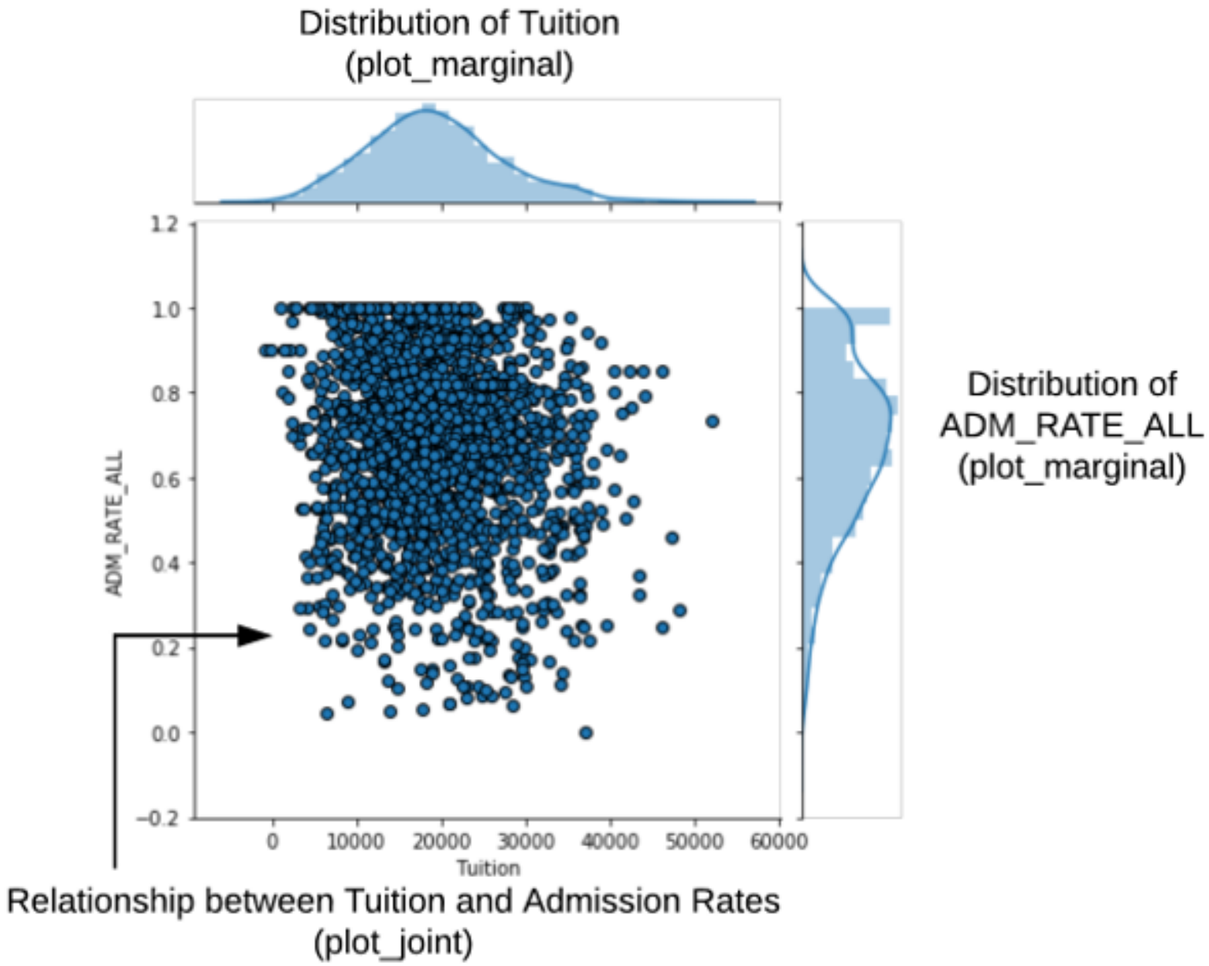
INTERMEDIATE DATA VISUALIZATION WITH SEABORN

Using JointGrid and jointplot

INTERMEDIATE DATA VISUALIZATION WITH SEABORN

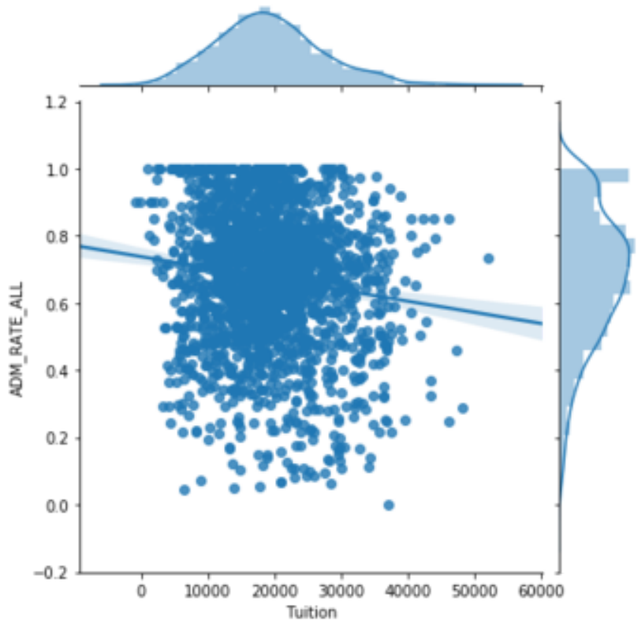
Chris Moffitt
Instructor

JointGrid() Overview



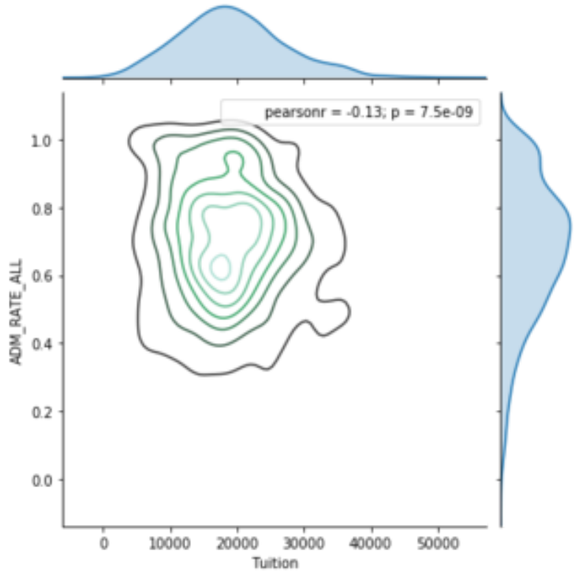
Basic JointGrid

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



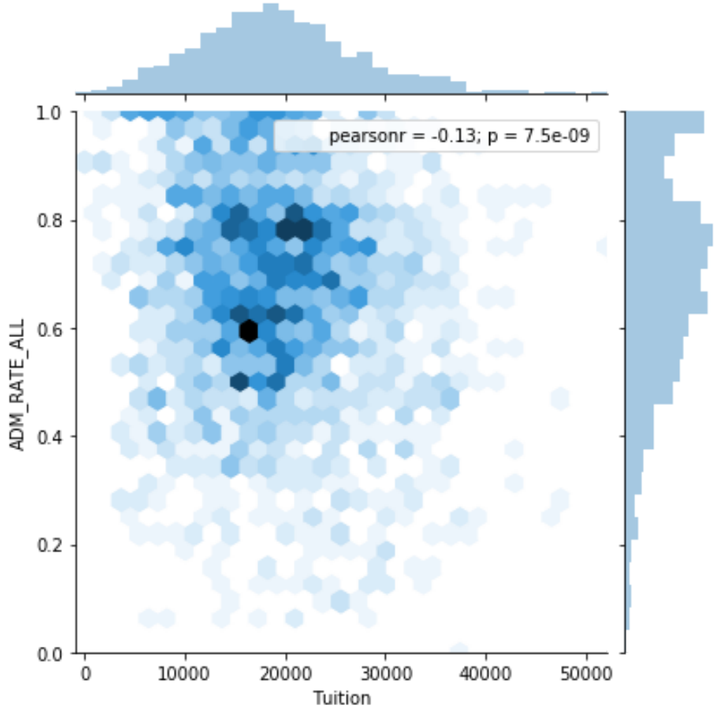
Advanced JointGrid

```
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()

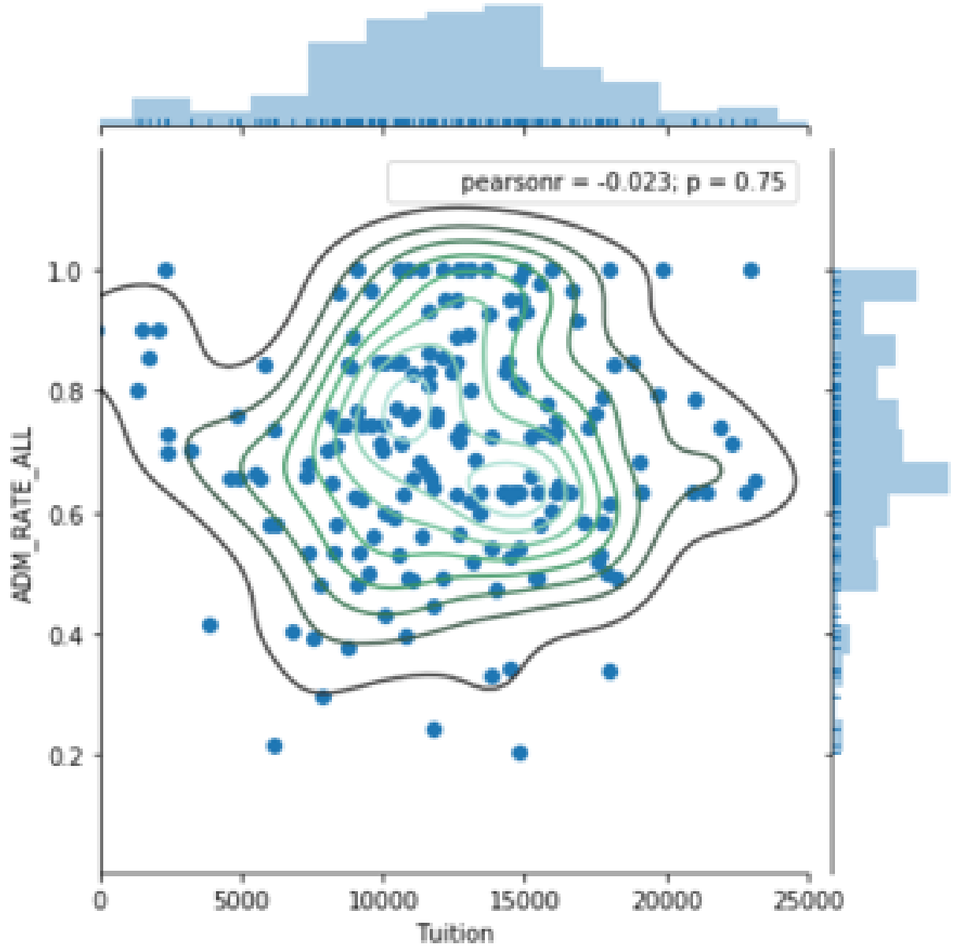
```
sns.jointplot(data=df, x="Tuition",
              y="ADM_RATE_ALL", kind='hex')
```



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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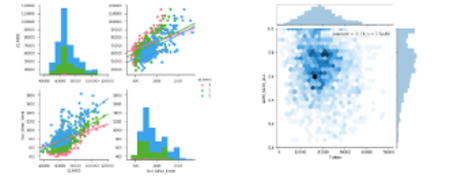
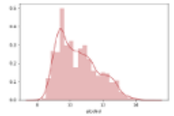
Instructor



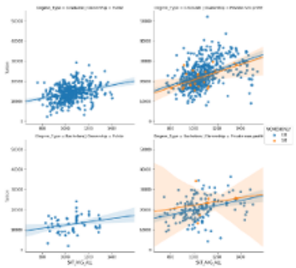
pairplot

jointplot

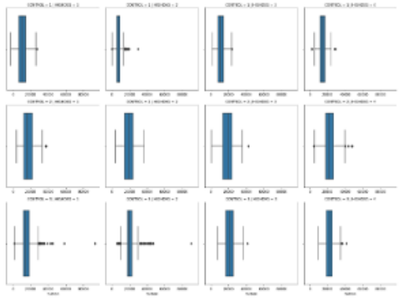
PairGrid || JointGrid



distplot

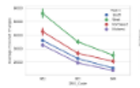


lmplot



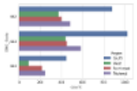
factorplot

FacetGrid



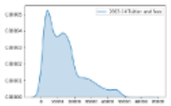
pointplot

barplot

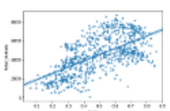


countplot

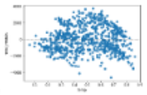
rugplot



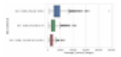
kdeplot



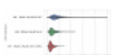
regplot



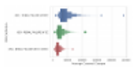
residplot



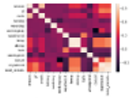
boxplot



violinplot

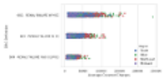


lvplot

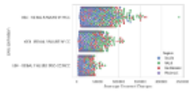


heatmap

palplot



stripplot

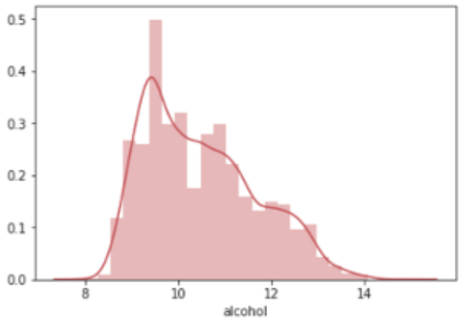


swarmplot

matplotlib

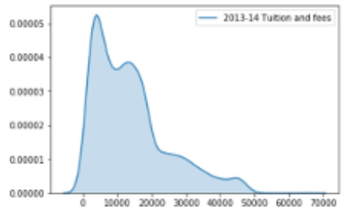
Univariate Distribution Analysis

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



distplot

rugplot



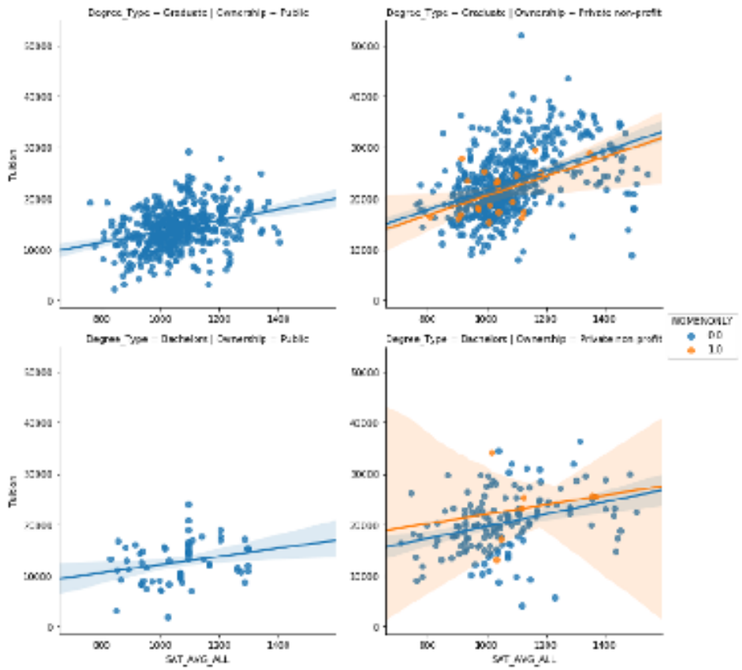
kdeplot

plt.hist()

matplotlib

Regression Analysis

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

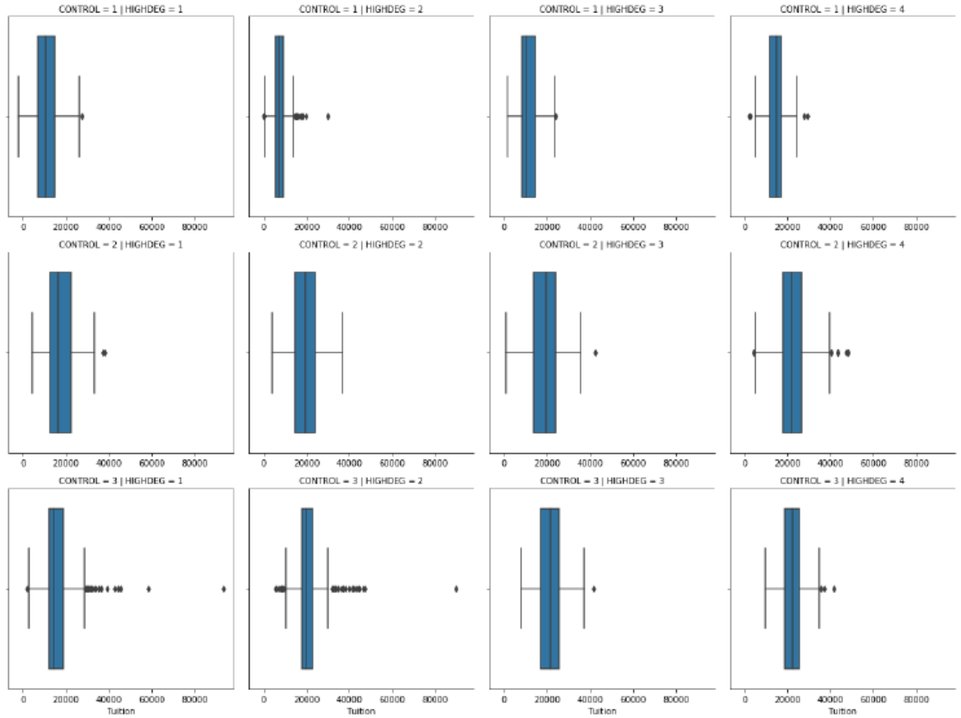


lmplot

FacetGrid

Categorical Plots

- Explore data with the categorical plots and facet with

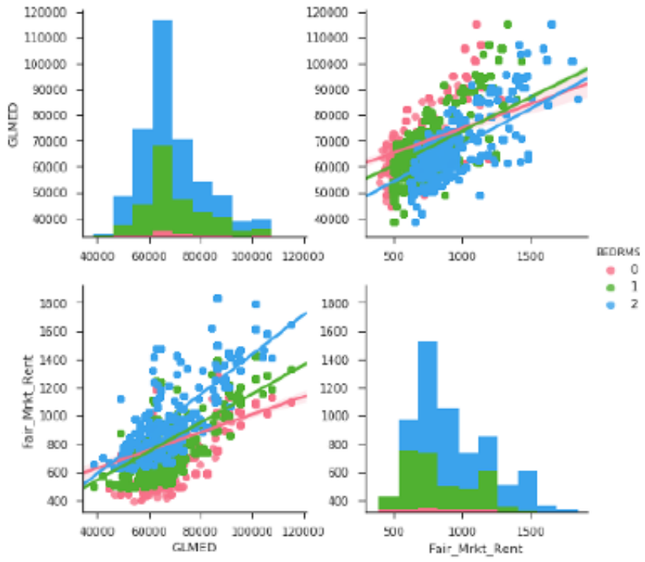


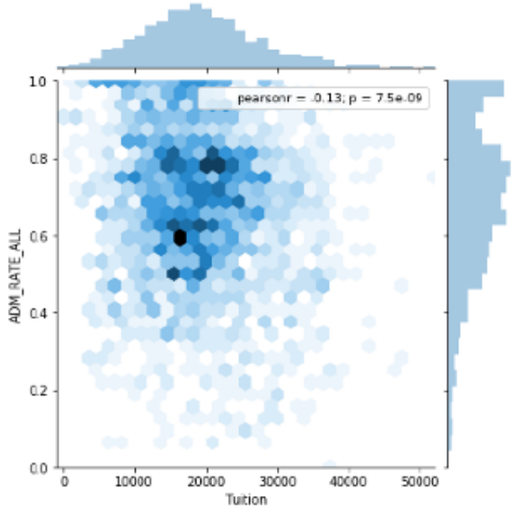
factorplot

FacetGrid

pairplot() and jointplot()

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





pairplot

jointplot

PairGrid

JointGrid

Thank You!

INTERMEDIATE DATA VISUALIZATION WITH SEABORN