Module 02

Matrix Plots

Data Science Developer

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Matrix Plots

Matrix plots allow you to plot data as color-encoded matrices and can also be used to indicate clusters within the data (later in the machine learning section we will learn how to formally cluster data).

Let's begin by exploring seaborn's heatmap and clutermap:

Imports

```
import seaborn as sns
%matplotlib inline
```

Data

```
flights = sns.load_dataset('flights')
```

```
tips = sns.load_dataset('tips')
```

```
tips.head()
```

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

```
flights.head()
```

	year	month	passengers
0	1949	January	112
1	1949	February	118
2	1949	March	132
3	1949	April	129
4	1949	May	121

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Heatmap

In order for a heatmap to work properly, your data should already be in a matrix form, the sns.heatmap function basically just colors it in for you. For example:

```
tips.head()
```

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

```
# Matrix form for correlation data
tips.corr()
```

	total_bill	tip	size
total_bill	1.000000	0.675734	0.598315
tip	0.675734	1.000000	0.489299
size	0.598315	0.489299	1.000000

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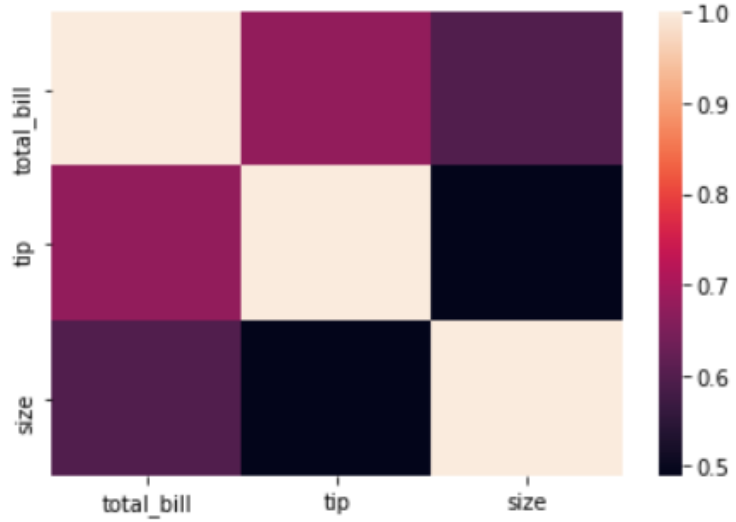
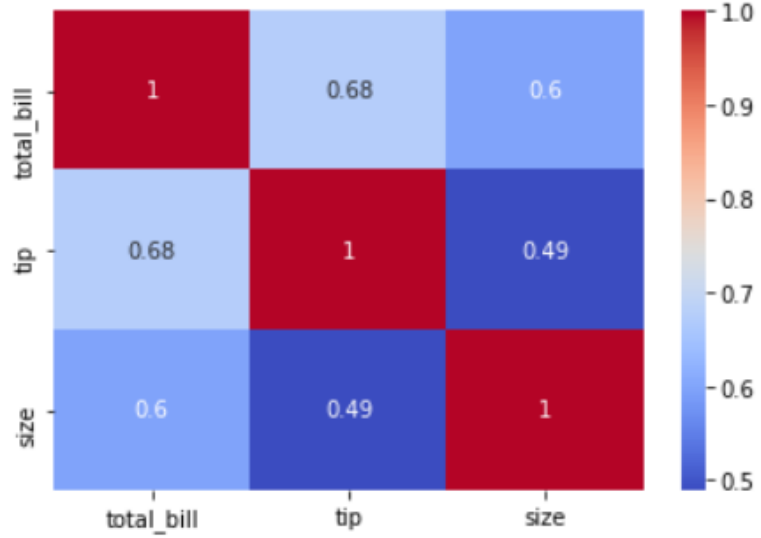
```
sns.heatmap(tips.corr())
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x1a8db5786a0>
```




```
sns.heatmap(tips.corr(),cmap='coolwarm',annot=True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x1a8db9287b8>
```



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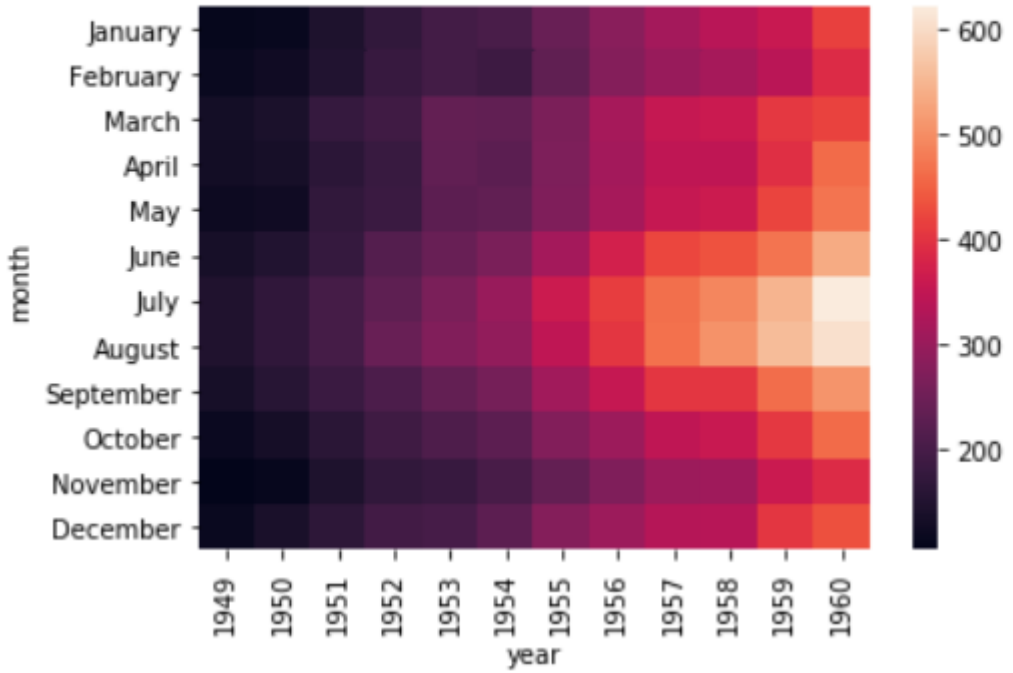
Or for the flights data:

```
flights.pivot_table(values='passengers',index='month',columns='year')
```

year	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
month												
January	112	115	145	171	196	204	242	284	315	340	360	417
February	118	126	150	180	196	188	233	277	301	318	342	391
March	132	141	178	193	236	235	267	317	356	362	406	419
April	129	135	163	181	235	227	269	313	348	348	396	461
May	121	125	172	183	229	234	270	318	355	363	420	472
June	135	149	178	218	243	264	315	374	422	435	472	535
July	148	170	199	230	264	302	364	413	465	491	548	622
August	148	170	199	242	272	293	347	405	467	505	559	606
September	136	158	184	209	237	259	312	355	404	404	463	508
October	119	133	162	191	211	229	274	306	347	359	407	461
November	104	114	146	172	180	203	237	271	305	310	362	390
December	118	140	166	194	201	229	278	306	336	337	405	432

```
pvflights = flights.pivot_table(values='passengers',index='month',columns='year')
sns.heatmap(pvflights)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x1a8dc9833c8>
```



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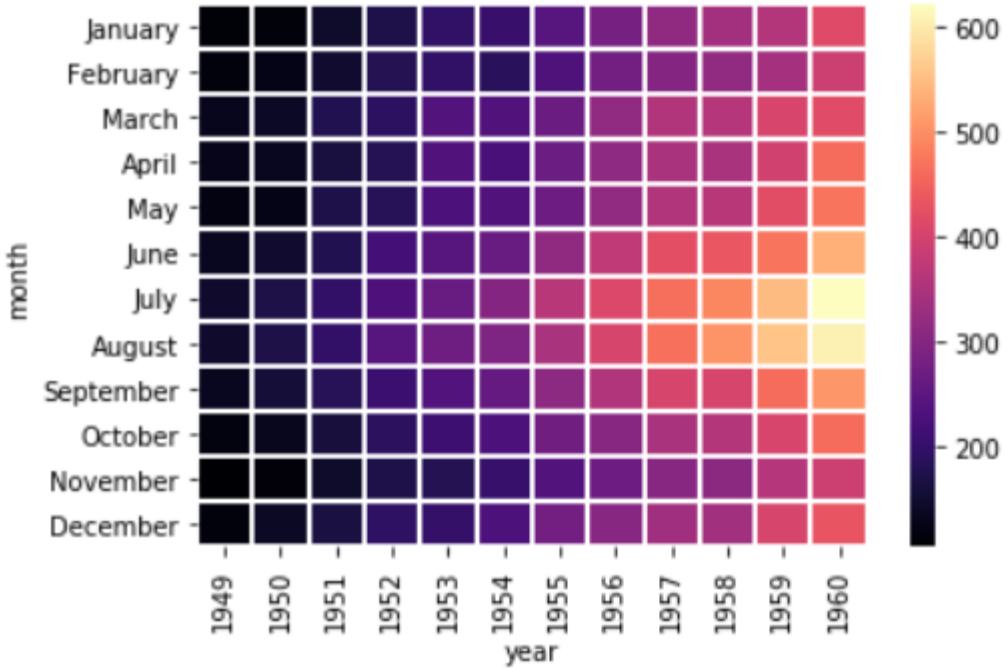
```
sns.heatmap(pvflights,cmap='magma',linecolor='white',linewidths=1)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x1a8dc9832e8>
```



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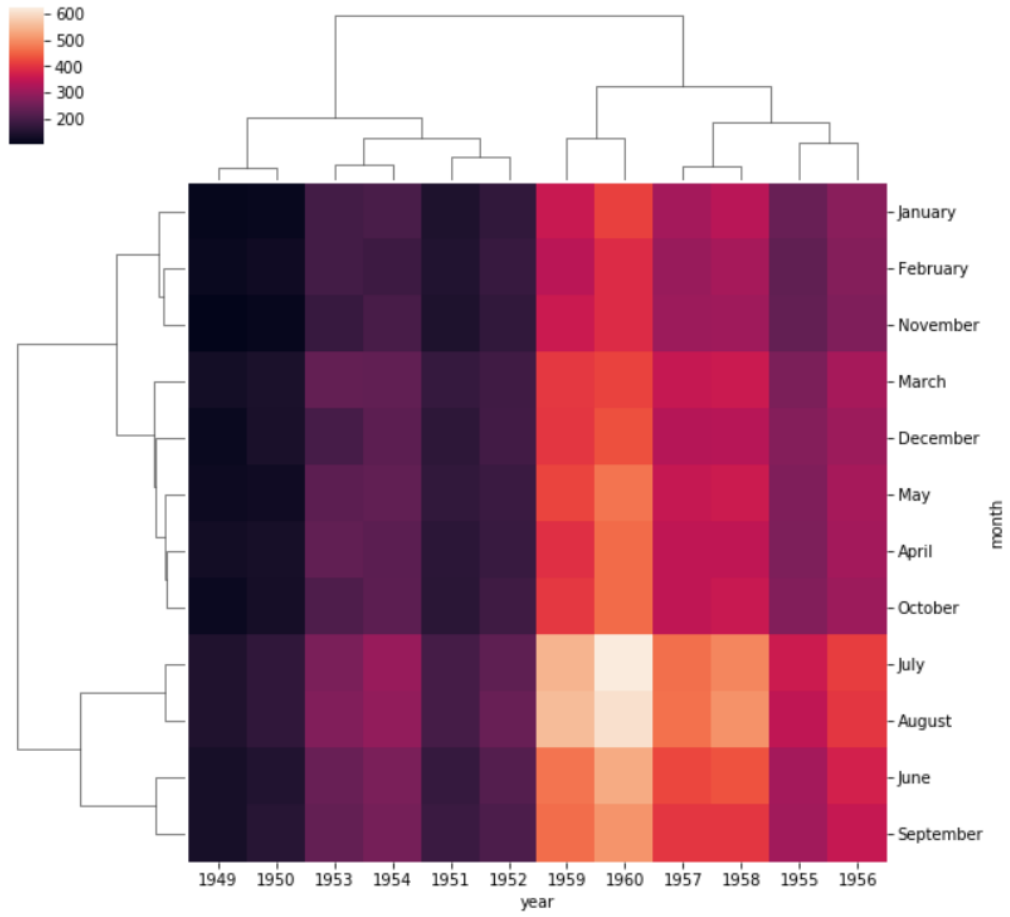
clustermap

The clustermap uses hierarchal clustering to produce a clustered version of the heatmap. For example:

```
sns.clustermap(pvflights)
```

```
<seaborn.matrix.ClusterGrid at 0x1a8dcab0550>
```



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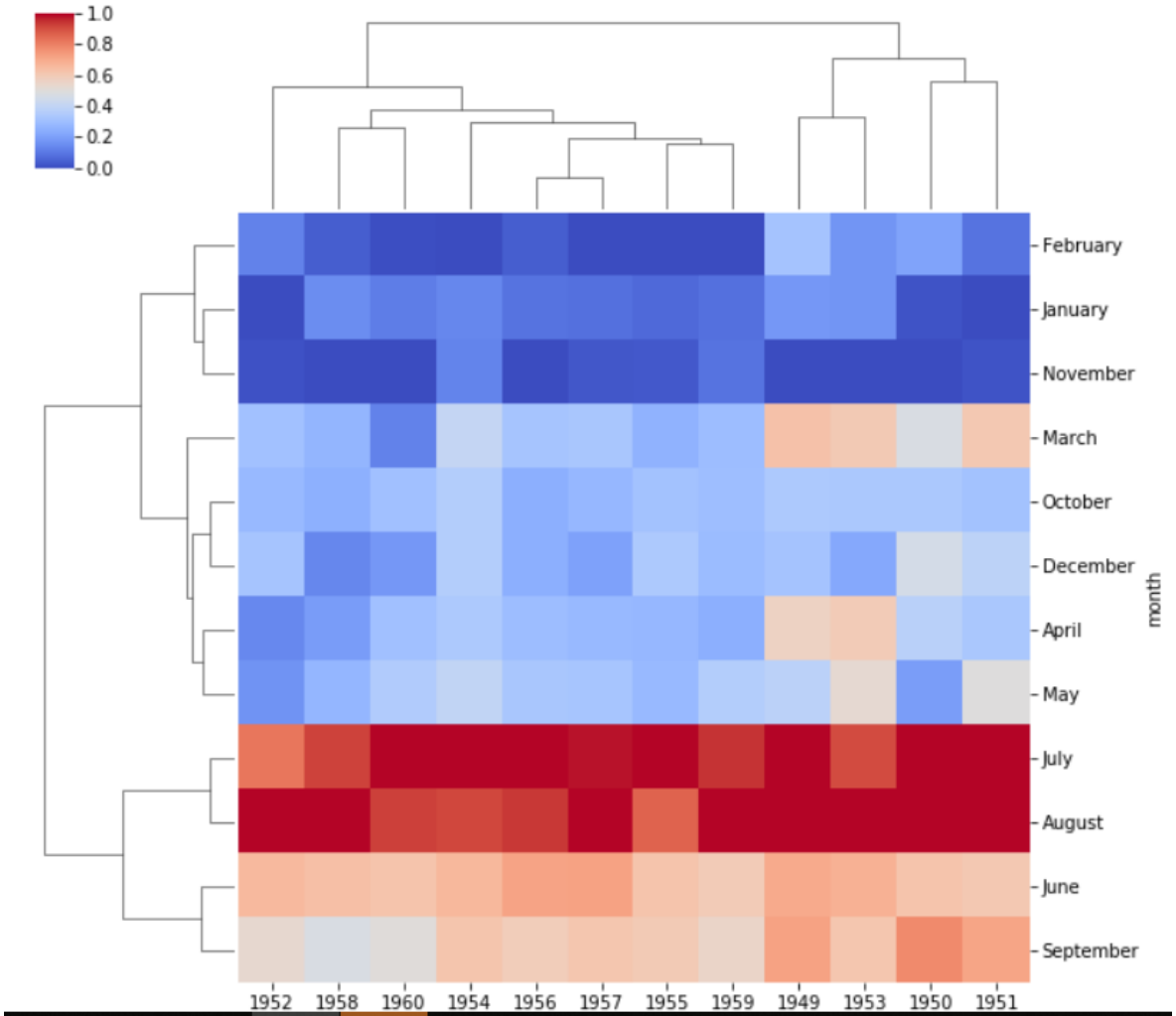
Notice now how the years and months are no longer in order, instead they are grouped by similarity in value (passenger count). That means we can begin to infer things from this plot, such as August and July being similar (makes sense, since they are both summer travel months)

```
# More options to get the information a little clearer like normalization
sns.clustermap(pvflights,cmap='coolwarm',standard_scale=1)
```

```
<seaborn.matrix.ClusterGrid at 0x1a8dcaedfd0>
```



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