Papers Insights

May 5, 2020

[349]:

```
import pandas as pd
import numpy as np
import scipy
import heapq
import scipy.stats
import matplotlib.pyplot as plt
```

[350]:

```
papers_filename = "/Users/jsennett/Code/top-k-insights/data/all-papers.csv"
p_df = pd.read_csv(papers_filename, encoding='mac_roman', dtype = {'school':␣
 ↪str})
p_df.fillna('', inplace=True)
p_df['M'] = 1
```

[351]:

```
print(len(p_df), "rows")
p_df.head()
```

```
2991406 rows
```

[351]:

```
   paperid                    venue_name  year school  venue_type  M
0     5389  Future Generation Comp. Syst.  2004                 0  1
1     5390  Future Generation Comp. Syst.  2010                 0  1
2     5407  Future Generation Comp. Syst.  2009                 0  1
3     5414  Future Generation Comp. Syst.  2001                 0  1
4     5449  Future Generation Comp. Syst.  2004                 0  1
```

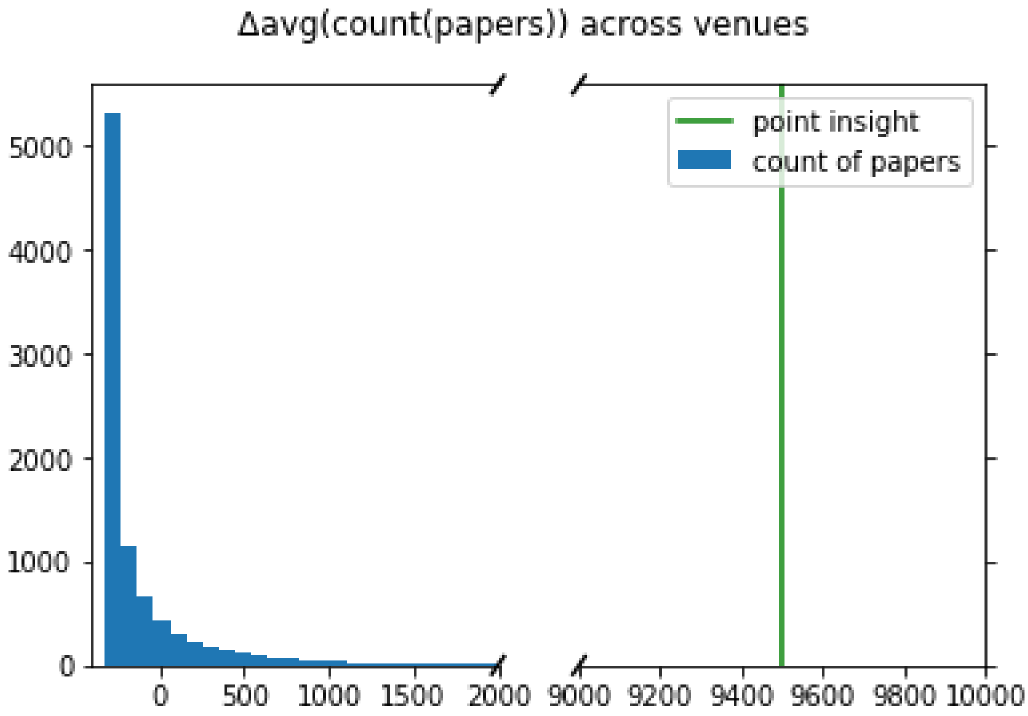
0.1 Powerlaw maximum point

INFO:root: [1.0] Aggregating pct of count over school, maximum point 99.77 stood out using powerlaw test, considering only the subspace {}.

[368]:

```
f1,(ax,ax2) = plt.subplots(1,2,sharey=True, facecolor='w')
ax.hist(rs['delta_avg'], bins=1000, label='count of papers')
ax2.hist(rs['delta_avg'], bins=1000, label='count of papers')
ax.set_xlim(-400,2000)
ax2.set_xlim(9000,10000)

ax.spines['right'].set_visible(False)
```

```
ax2.spines['left'].set_visible(False)

ax.yaxis.tick_left()
ax2.yaxis.tick_right()

# ax.tick_params(labelright='off')
# ax2.tick_params(labelleft='off')

d = .015 # how big to make the diagonal lines in axes coordinates
# arguments to pass plot, just so we don't keep repeating them
kwargs = dict(transform=ax.transAxes, color='k', clip_on=False)
ax.plot((1-d,1+d), (-d,+d), **kwargs)
ax.plot((1-d,1+d),(1-d,1+d), **kwargs)

kwargs.update(transform=ax2.transAxes)  # switch to the bottom axes
ax2.plot((-d,+d), (1-d,1+d), **kwargs)
ax2.plot((-d,+d), (-d,+d), **kwargs)

plt.axvline(9500, label='point insight', color='g')
plt.suptitle('Δavg(count(papers)) across venues')

plt.legend()
plt.savefig('./figs/papers-1.png', bbox_inches = "tight")
```



0.2 Shape Insight: rank of count over year

[0.99] Aggregating rank of count over year, negative slope -1.00 stood out using linear_shape test, considering only the subspace {}.

[355]:

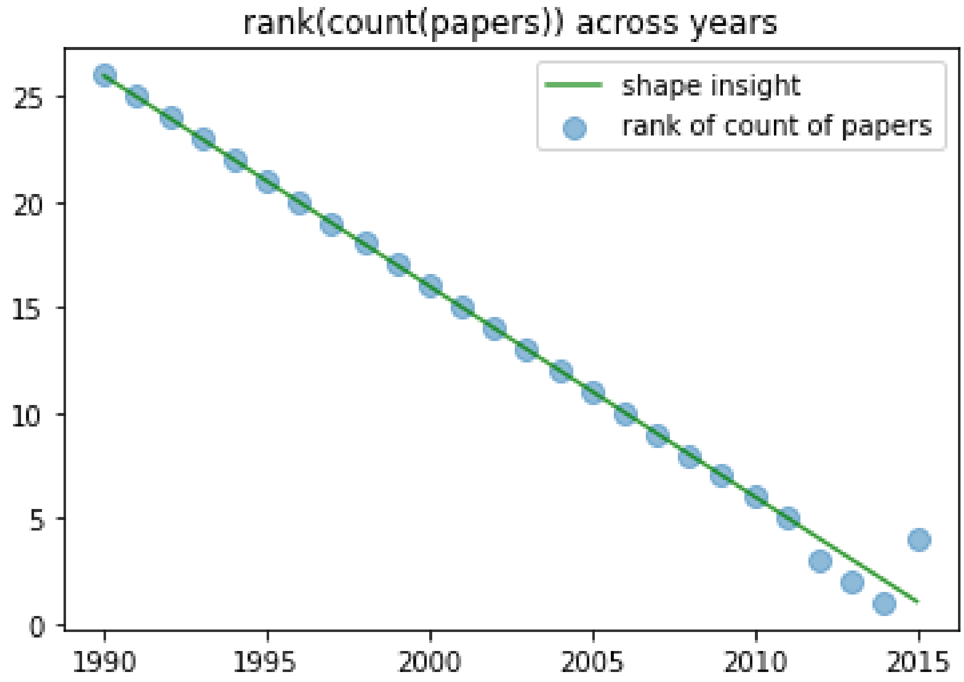
```
df2 = p_df.groupby('year').agg({'M':'sum'}).
 ↪reset_index(drop=False)[['year','M']]
df2['rank'] = df2['M'].rank(ascending=False, method='first')
df2.head()
```

[355]:

```
   year      M  rank
0  1990  20776  26.0
1  1991  23877  25.0
2  1992  27083  24.0
3  1993  33120  23.0
4  1994  37680  22.0
```

[358]:

```
f2 = plt.scatter(df2['year'], df2['rank'], alpha=.5, label='rank of count of␣
 ↪papers', s=64)
plt.title('rank(count(papers)) across years')

# Best fit line
from numpy.polynomial.polynomial import polyfit
b, m = polyfit(df2['year'], df2['rank'], 1)
plt.plot(df2['year'], b + m*df2['year'], '-', color='g', alpha=.8, label='shape␣
 ↪insight')
plt.legend()
plt.savefig('./figs/papers-2.png', bbox_inches = "tight")
```



1 Powerlaw Point

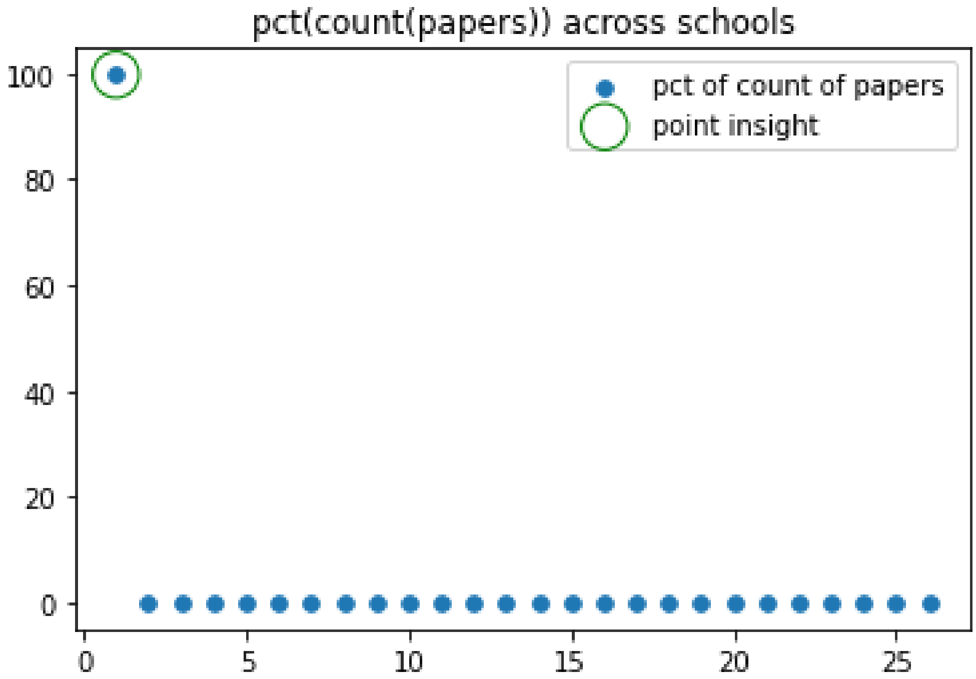
s=1.00 Aggregating pct of count over school, maximum point 99.77 stood out using powerlaw test, considering only the subspace {}.

[335]:

```
df3 = p_df.groupby('school').agg({'M':'sum'})
df3['pct'] = df3['M'] * 100 / df3['M'].sum()
df3['rank'] = df3['M'].rank(ascending=False, method='first')
```

[336]:

```
f3 = plt.scatter(df3['rank'], df3['pct'], s=32, label='pct of count of papers')
plt.scatter([1], max(df3['pct']), color="none", edgecolor="g", s=300, label='point insight')
plt.title('pct(count(papers)) across schools')
plt.legend()
plt.savefig('./figs/papers-3.png', bbox_inches = "tight")
```



2 Linear point test

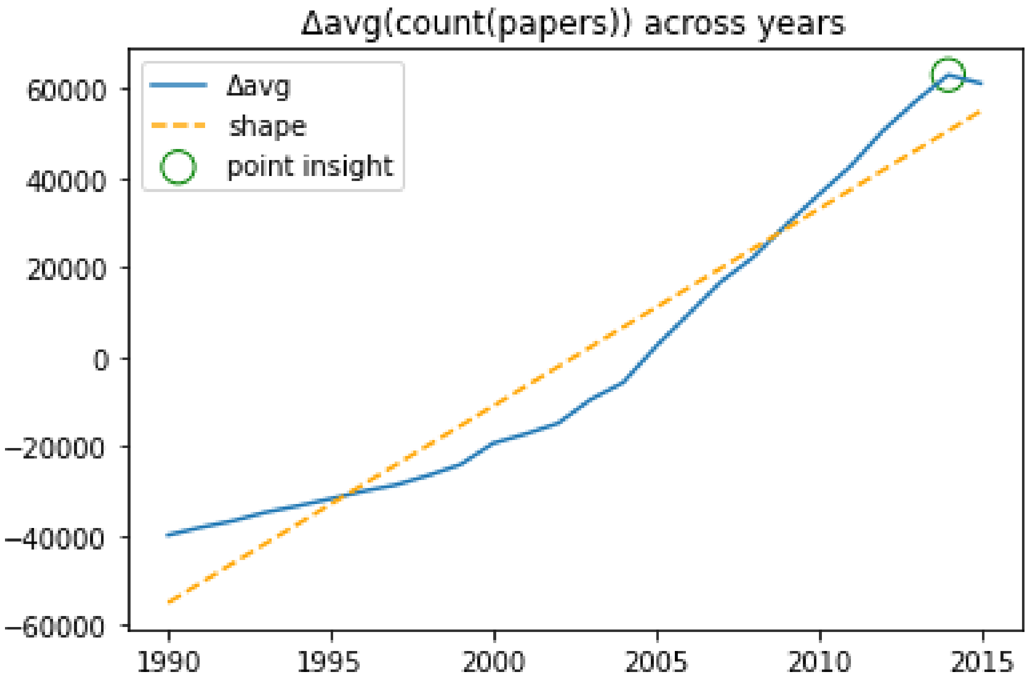
0.23 Aggregating delta_avg of count over year, year {2015} surprisingly high at {39042.33} stood out using linear_point test, considering only the subspace {'venue_type': 0}.

```
[337]: df4 = p_df[p_df['venue_type'] == 0].groupby('year').agg({'M':'sum'}).
        ↪reset_index(drop=False)
       df4['delta_avg'] = df4['M'] - df4['M'].mean()
       df4.head()
```

```
[337]:    year      M     delta_avg
       0  1990  10266 -39936.884615
       1  1991  11976 -38226.884615
       2  1992  13455 -36747.884615
       3  1993  15366 -34836.884615
       4  1994  16810 -33392.884615
```

```
[339]: b, m = polyfit(df4['year'], df4['delta_avg'], 1)
       f4 = plt.plot(df4['year'], df4['delta_avg'], '-', label='Δavg')
       plt.plot(df4['year'], b + m*df4['year'], '--', color='orange', label='shape')
       plt.scatter([2014], df4[df4['year'] == 2014]['delta_avg'], color='none',␣
        ↪edgecolor='green', s=150, label='point insight')
```

```
plt.legend()
plt.title('Δavg(count(papers)) across years')
plt.savefig('./figs/papers-4.png', bbox_inches = "tight")
```


Δavg(count(papers)) across years
Δavg
shape
point insight