PyData Talk

Replicating Google Correlate with Wikipedia Data

The Project

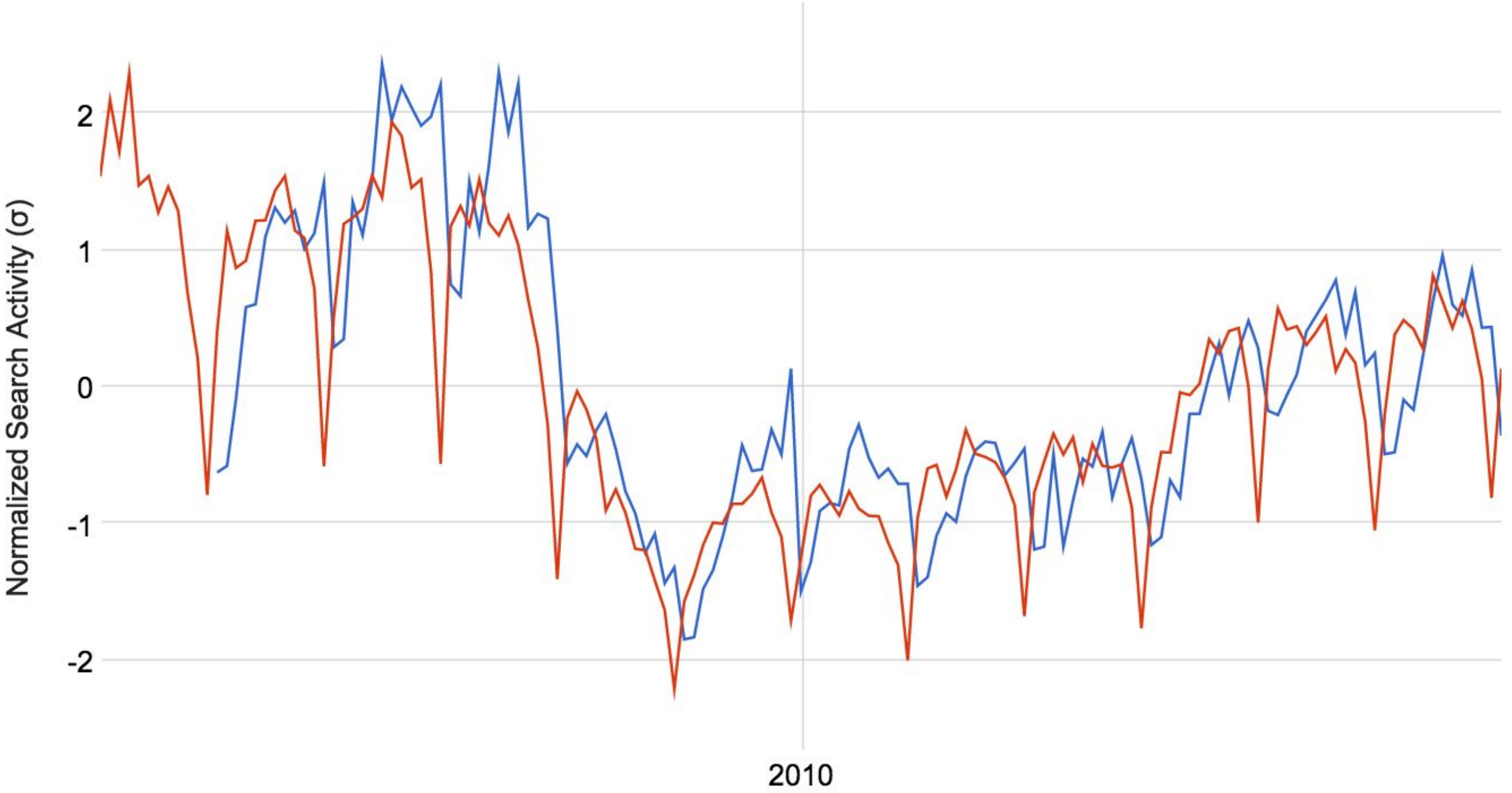
- Data Issues in Macroeconomics
- Many theories, little data – Overfitting models
- Fortunately everything we do is tracked

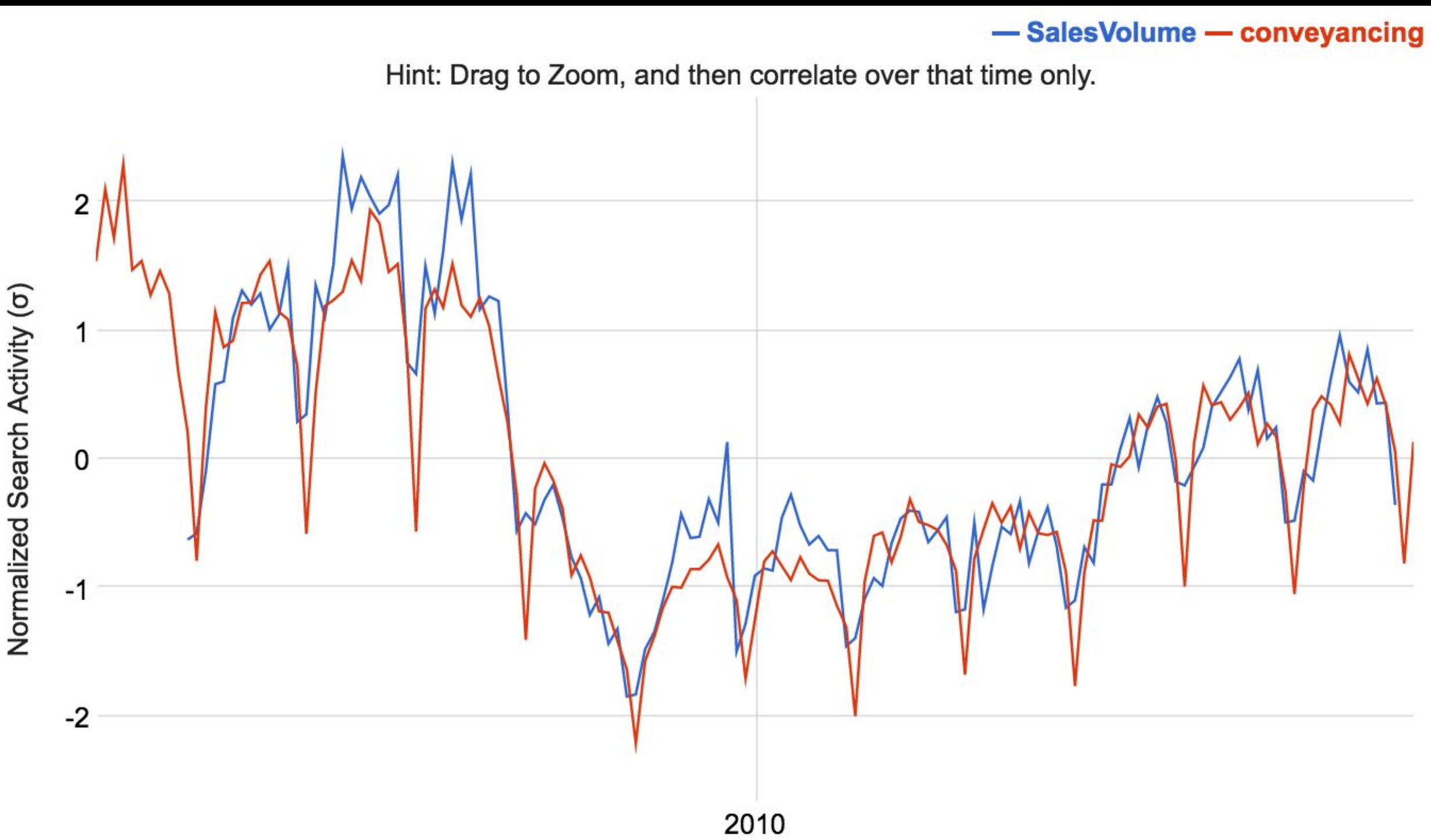
Google Correlate

- Google has lots of data
- Trends/correlate is one of the few places to get a view
- Pick an indicator and test it
- Monthly data, available, significant… Housing

— SalesVolume — conveyancing

Hint: Drag to Zoom, and then correlate over that time only.




— SalesVolume — conveyancing
Hint: Drag to Zoom, and then correlate over that time only.
Normalized Search Activity (σ)
2
1
0
-1
-2
2010

Wikidata

- Google data is private – Wikimedia Foundation publish theirs
- Page Views, by the hour;
- RDF context, SPARQL search;
- Supporting tools, APIs and documentation

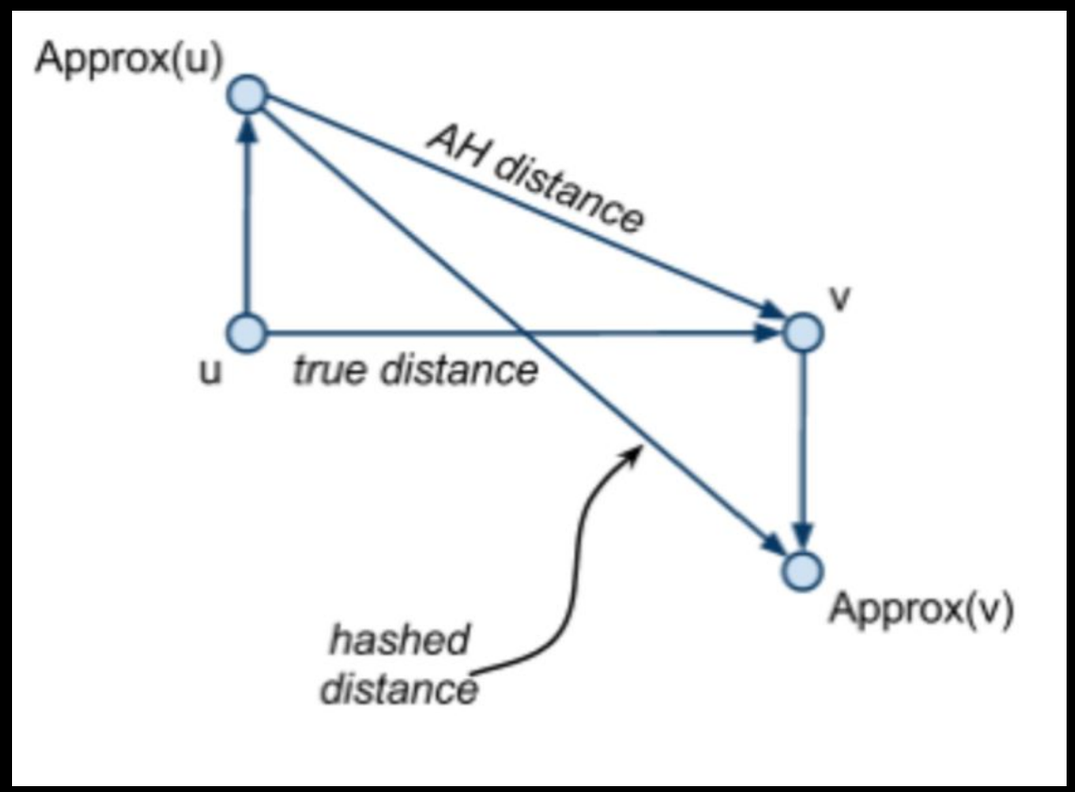
"Nearest Neighbor Search in Google Correlate"

- Google published paper, by D Vanderkam et al, 2013

- Correlation – How similar two things are

- Pearsons ($\in$ [-1, 1]) and Euclidian

- Quantise everything, precalculate



Practically

- Single language site – Loading Swedish data into pandas
- df.pivot, into a single time-series table
- df.transform to normalise, $\mu=0$ $\sigma=1$

- Create a pd.Series for approximation values
- Build an index table for nearest approximation for each value
- Distance mapping table for series
- Hash incoming series, lookup per date with index value and sum distances

Fast and Accurate

- Quantise based on distribution (KDE scipy.stats or Harrell-Davis Quantiles scipy.stats.mstats.hdquantiles)
- Minimise loss with different distribution per period or collection of periods
- Early exit
- 2nd pass with Pearson’s with original values

Results

- Poor implementation - slower for than just using pandas.corrwith

- Plausible results
  - Cars, Accounting, Computing and Biosciences

- Not possible to prove – Autocorrelation, small dataset

- $R^2 = 0.985$ for Konfirmeringsbias, so maybe not.