

Concurrency Based Unidirectional Correlations

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The Question

I wanted to look at pairs of bibliographical items that were borrowed together and measurement that can be established based on this concurrency. I believe this is interesting as it will review circulation history and correlate items even though they have irrelevant metadata. From an agent-based modelling perspective, I'm more interested in creating unidirectional correlations and measure concurrence frequency based on Dewey class and subjects.

The Approach

In order to find items that were borrowed together, I assumed that items that had the same checkout and checkin timestamp were likely to be checked out by the same person. It should be noted that it is possible that

- 1) two individuals checked in/out books at the exact same time
- 2) librarians hold books at a rotation interval, so batches of books checked in/out by different person at different time may have same timestamp
- 3) processing time by the same librarian can lead to a few minutes difference on the timestamp
- 4) someone checked out multiple books but did not return them all at the same time

The Query

In order to perform the search, I looked at the cartesian product of the inraw table with itself and selected bibliographical items that had the same checkout and checkin times as pairs. To measure concurrence frequency, I also looked at 3-digit Dewey class, which contains 1) main class; 2) division; 3) section; and subjects, which are retrieved as a concatenated string from the subject table.

```
SELECT
  t1.bibNumber AS A_bib,
  FLOOR(t1.deweyClass) AS A_dewey,
  t3.subject AS subject,
  t2.bibNumber AS B_bib,
  FLOOR(t2.deweyClass) AS B_dewey,
  t4.subject AS subject
```

```
FROM
  (SELECT
    bibNumber,
    GROUP_CONCAT(subject
      SEPARATOR ';') AS subject
  FROM
    spl_2016.subject
  WHERE
    spl_2016.subject.subject != ''
  GROUP BY bibNumber) AS t3,
```

```
(SELECT
```

