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Academic Search in Response to Major Scientific Events

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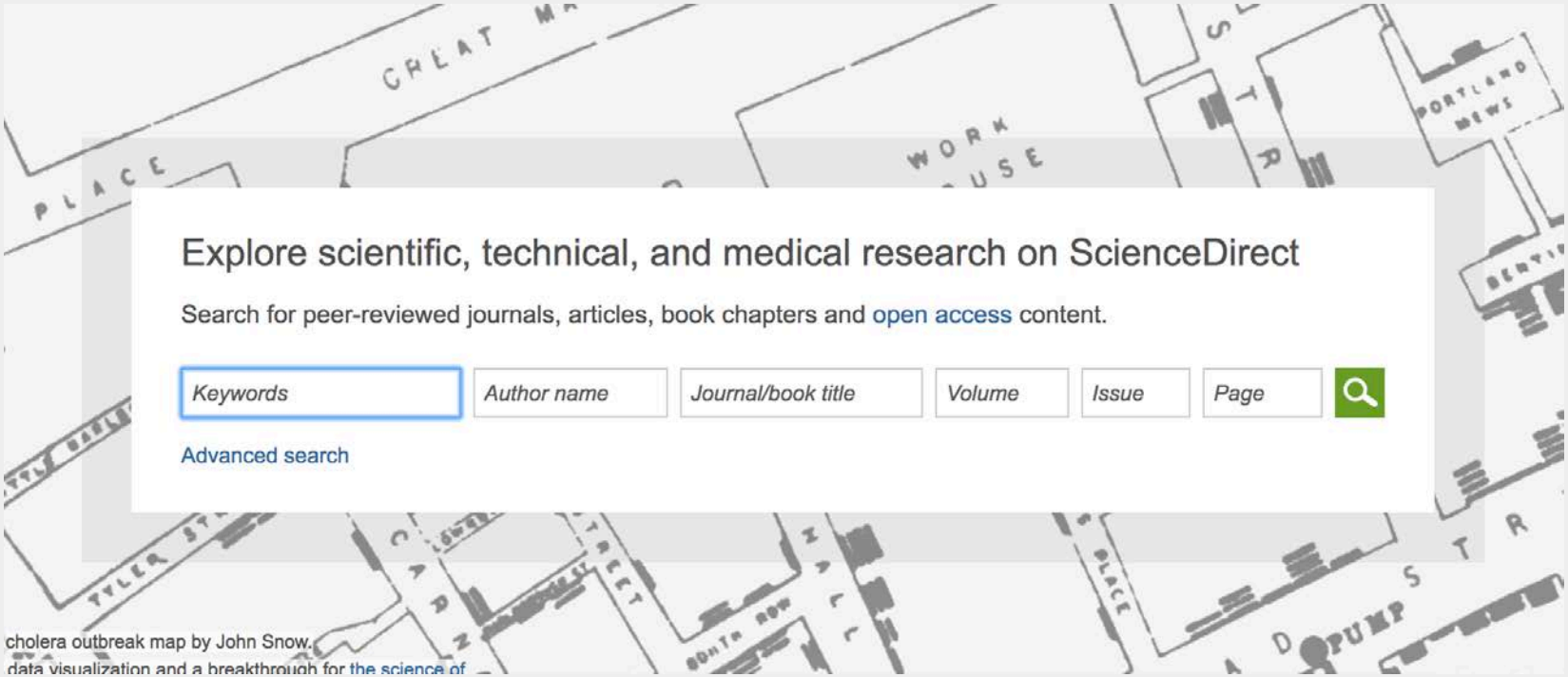
Outline

- Background
- Research question
- Methodology
- Analysis
- Take-home messages

Academic search

- Academic search concerns the retrieval and profiling of information objects in the domain of academic research.

Academic search



Academic search

- ScienceDirect search engine, which primarily covers physical sciences, engineering and life sciences.
- Collected from September 28, 2014 to March 5, 2015, the query log contains more than 39 million records of traffic。

Table 1: Query length statistics in word count. The AOL log statistics come from [2].

Category	#N	min	max	mean	median
AOL	21M	1	245	2.34	2
Sciencedirect	39M	1	419	3.77	3

Research question

- (1) Upon a major scientific event, what are the query patterns of academic searchers?
- (2) How is the trend in academic search compared to users on a web search engine?
- (3) How do the query trends of academic searchers with different topical interests compare?

Methodology

- Generate query candidates
- Study query trends
- Compare academic searchers and users of a web search engine

Generate query candidates

- Extracting bi-grams and tri-grams from news

> The Nobel Prize in Chemistry 2014 was awarded jointly to Eric Betzig, Stefan W. Hell and William E. Moerner *"for the development of super-resolved fluorescence microscopy"*.

Generate query candidates

- Filter candidates using Google Trend

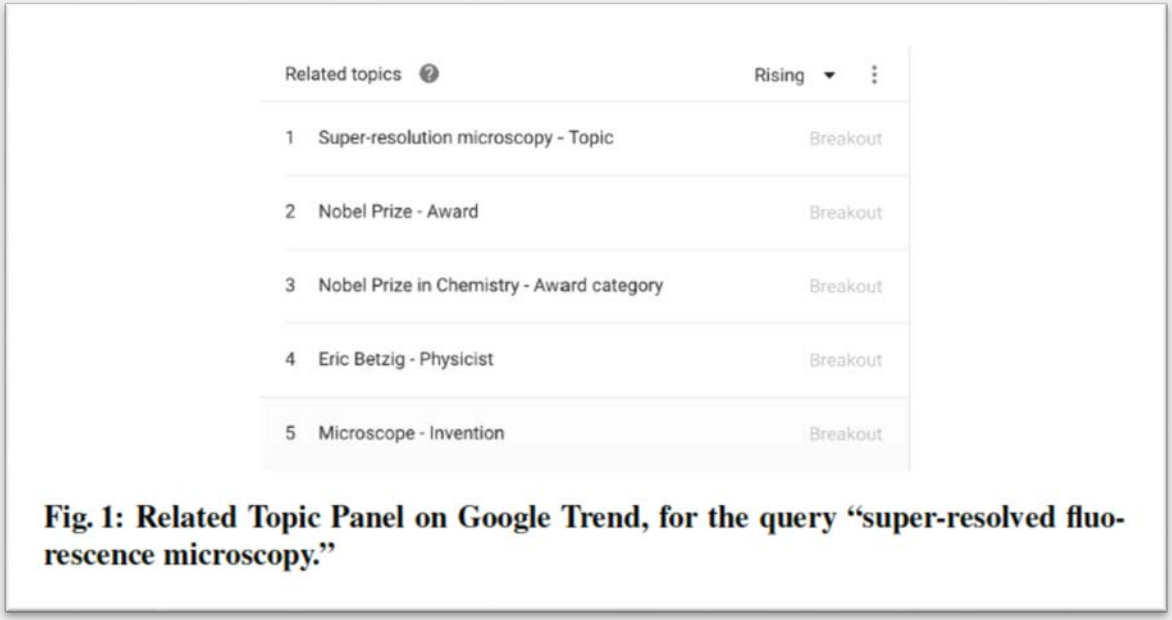
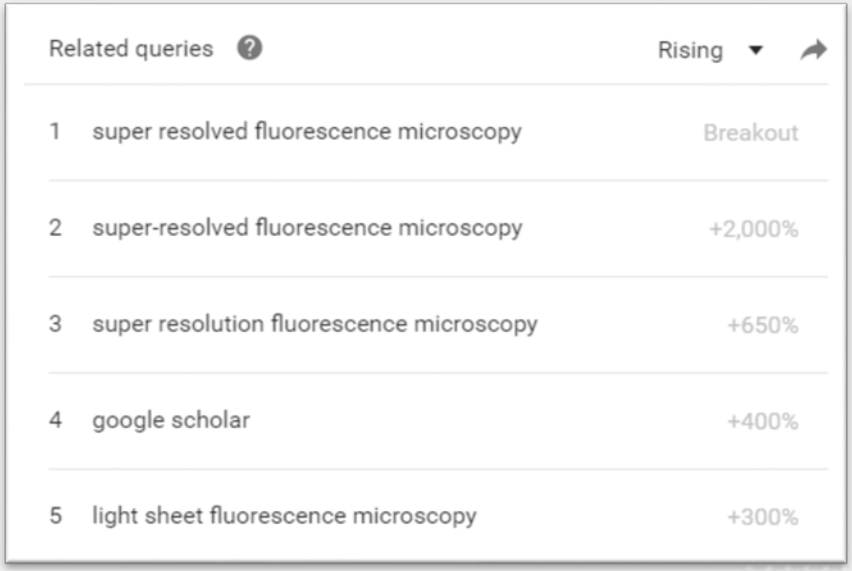


Fig. 1: Related Topic Panel on Google Trend, for the query "super-resolved fluorescence microscopy."

Generate query candidates

- Expanding candidates, using “related queries” with Google Trends with a threshold



Related queries	Rising
1 super resolved fluorescence microscopy	Breakout
2 super-resolved fluorescence microscopy	+2,000%
3 super resolution fluorescence microscopy	+650%
4 google scholar	+400%
5 light sheet fluorescence microscopy	+300%

Generate query candidates

Table 2: Query candidates for each topic.

Category	Theme queries
Chemistry	"super-resolved fluorescence microscopy", "fluorescence microscopy", "super-resolution microscopy", "confocal microscopy", "Eric Betzig", "Stefan W. Hell" and "William E. Moerner", "fluorescence microscopy principle", "dark field microscopy"
Physics	"blue light-emitting diodes", "light-emitting diodes", "Isamu Akasaki", "Hiroshi Amano" and "Shuji Nakamura"
Physiology/medicine	"brain positioning system", "brain positioning", "John O'Keefe", "May-Britt Moser", "Edvard I. Moser"

Query trend of academic searchers

- What are the trends after a Nobel prize announcements
- Starts from one week prior to the prize announcements, and ends at the last week of the 5 month period
- Compared against global query trend

Query trend of academic searchers

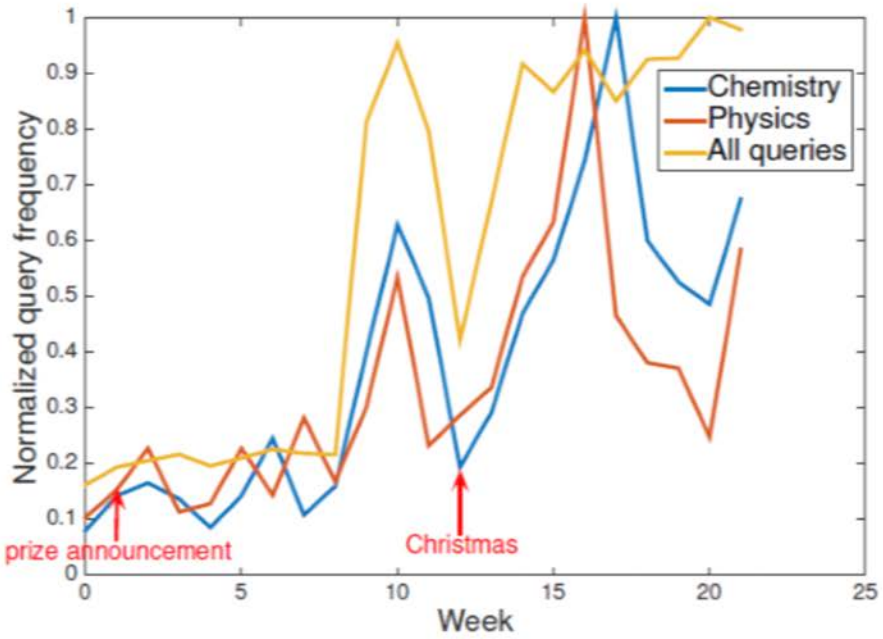
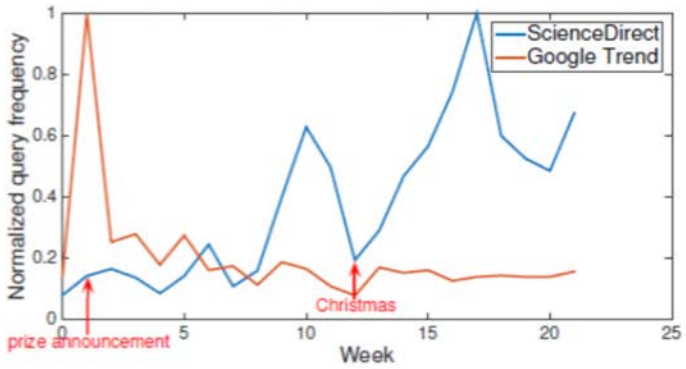
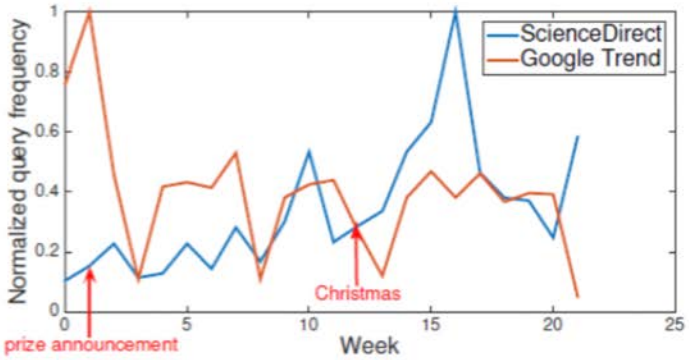


Fig. 2: Query frequency of academic search starting from 1 week before the prize announcement. Frequency is normalized to fall between $[0, 1]$ for each topic and all queries respectively.

Academic search vs web search



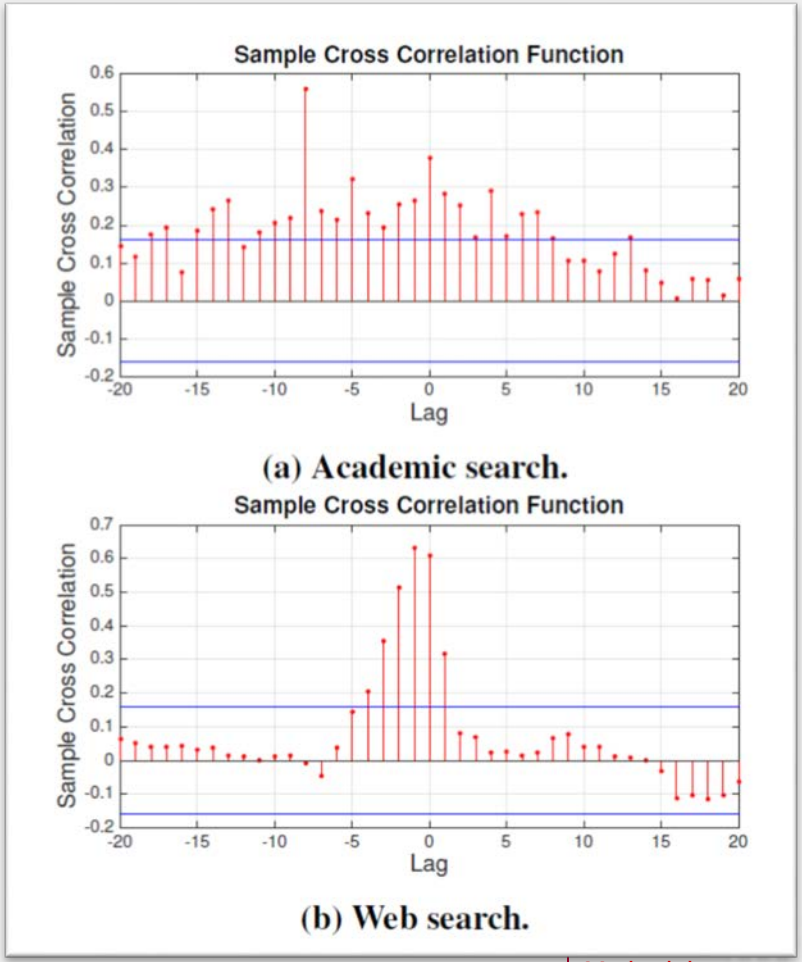
(a) Chemistry Prize.



(b) Physics Prize.

Fig. 3: Query frequency of academic searcher and web search. Frequency is normalized to fall between $[0, 1]$.

Academic searchers and web searchers in different topics



(a) Academic search.

(b) Web search.

Take-home messages

- Distinct information needs of academic searchers VS users of a web search engine
- Different optimization measures should be taken for academic search engine (recommendation systems)

THANKS!

Questions?