Diagnose This If You Can: On the effectiveness of search engines in finding medical self-diagnosis information

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Searching for Health Information

Large proportion of Internet users search for health information online:

- Pew Research Center [2]: ∼80% of U.S. users acquire health information on the Web; ∼70% of search engine users have performed health-related searches
- Type of health information online:
  - information and support for people with diagnosed conditions;
  - suggest diagnoses for particular symptoms;
  - provide self-treatment options and cures.
- Many searches are for **self-diagnosis purposes**, and of these about half lead to users seeking professional medical attention

But searching for health information may be problematic:

- White&Horvitz [4]: access to medical information on the Web can **lead to the escalation of concerns** about common symptoms (cyberchondria)
- Benigeri&Pluye [1]: exposing people with no or scarce medical knowledge to complex medical language may lead to **erroneous self-diagnosis and self-treatment**;

What we Investigated

How effective are commercial search engines in retrieving information that helps users correctly self-diagnose themselves?

To answer this question, we evaluate:

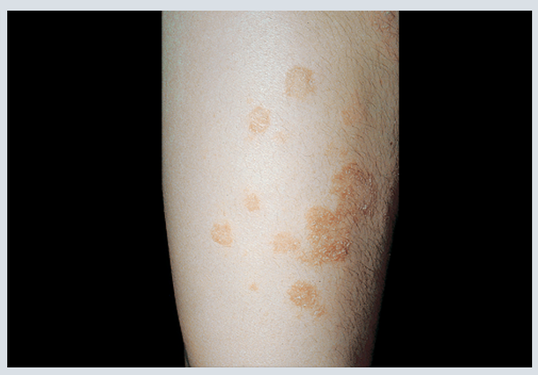
- two commercial search engines (Google and Bing)
- focus on self-diagnosis queries: 8 main symptoms, 3 to 4 queries each (26 queries in total)
- assess the top 10 results for each query

Limitations of this Study

- small amount of queries
- ad hoc scenario (one query only), while it is likely that health-related queries are part of more complex search sessions
- evaluation measures used here do not specifically consider issues of reliability and understandability

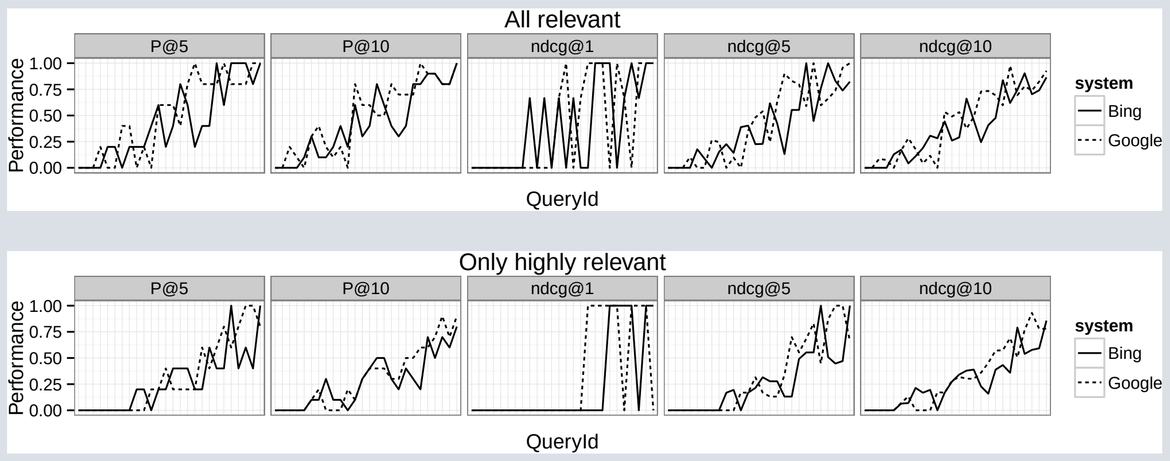
Self-diagnosis Queries

- 26 self-diagnosis queries from Stanton et al. [3]
- queries are descriptive and circumlocutory, resembling what users may issue to search for self-diagnosis information
- queries were obtained by showing images/videos of disease conditions to users ("Imagine you have this condition... how would you search?")
- the actual diagnosis of the shown images/videos was known



Query:	yellow thick eye leakage	Query:	weird brown patches on skin
Diagnosis:	conjunctivitis	Diagnosis:	nummular eczema

Empirical Results



	ndcg@1		ndcg@5		ndcg@10	
System	Rel	Hrel	Rel	Hrel	Rel	Hrel
Bing	.3846	.2308	.3812	.2654	.3802	.2764
Google	.3846	.3077	.4242	.3142	.4252	.3138

	P@5		P@10	
System	Rel	Hrel	Rel	Hrel
Bing	.4385	.2769	.4308	.2769
Google	.5000	.3154	.4923	.3115

Main Findings

- Only half of the top 10 results retrieved provide information that is somewhat relevant to self-diagnose the medical condition
- Only about 3/10 results are highly relevant
- Prototypic "somewhat relevant" pages contained information that was not focused on only the relevant symptom (e.g., list of symptoms with corresponding definition)
- "Highly relevant" pages contained information mostly solely focused on the relevant symptom, including descriptions and causes of the symptoms, often aided by photographic material of visual examples of symptoms
- Considerable number of “on topic but unreliable” pages: contained somewhat relevant information, but it was of suspicious origin and often involved the purchase of a service or a product: e.g., selling anti hair loss shampoos for alopecia.

Queries, webpage URLs and relevance assessments are made available at http://github.com/ielab/ecir2015-DignoseThisIfYouCan.

Implications

- People searching the Web for information for self-diagnosis are likely to encounter misleading advice that could confuse them or, ultimately, cause harm
- Empirical results suggest that current techniques may be poorly suited to understand and answer self-diagnosis, circumlocutory queries
- **CLEF eHealth 2015 (Task 2)** will provide a framework to investigate self-diagnosis queries more in depth

References

[1] M. Benigeri and P. Pluye. Shortcomings of health information on the internet. *Health promotion international*, 18(4):381–386, 2003.

[2] S. Fox. *Health topics: 80% of internet users look for health information online*. Pew Internet & American Life Project, 2011.

[3] I. Stanton, S. Ieong, and N. Mishra. Circumlocution in diagnostic medical queries. In *Proc. of SIGIR ’14*, pages 133–142, 2014.

[4] R. White and E. Horvitz. Cyberchondria: studies of the escalation of medical concerns in web search. *ACM TOIS*, 27(4):23, 2009.