CLEF 2017
IR Task Report

(Task 3)

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Why consumer health search?

Studies showing that a large majority of people seek health information online: e.g. 80% in Pew Research survey (2012)

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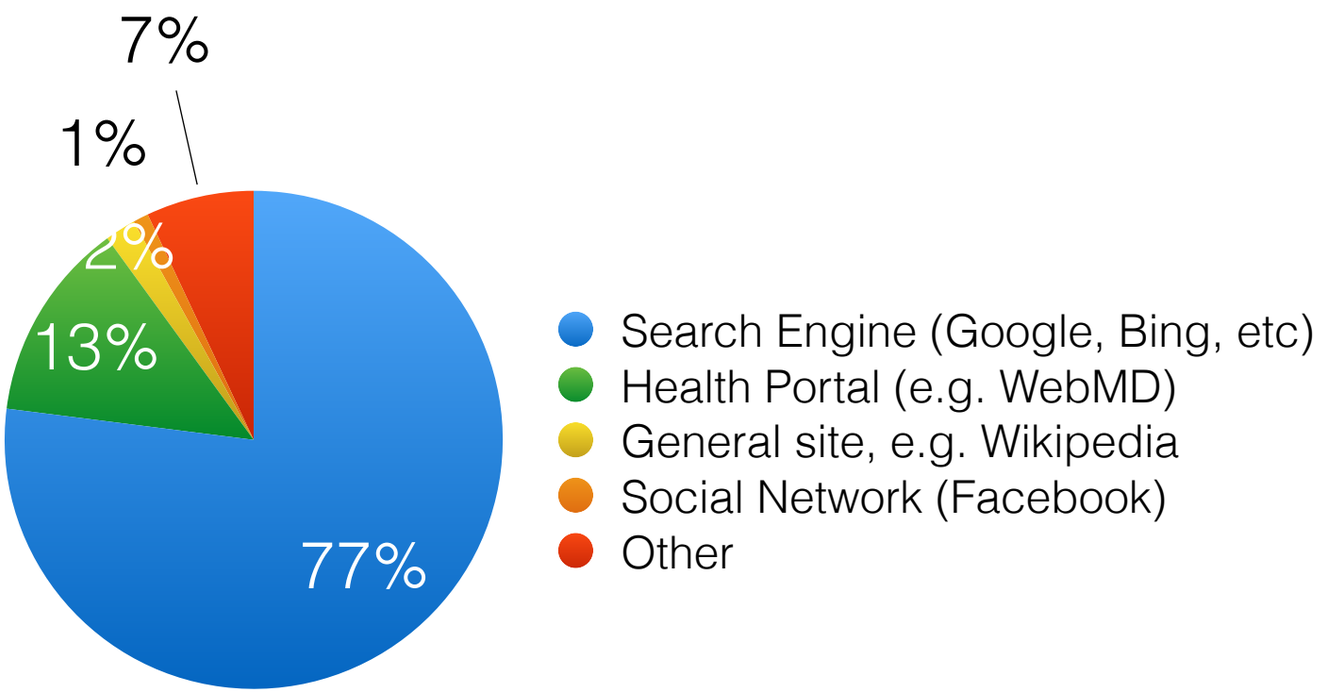

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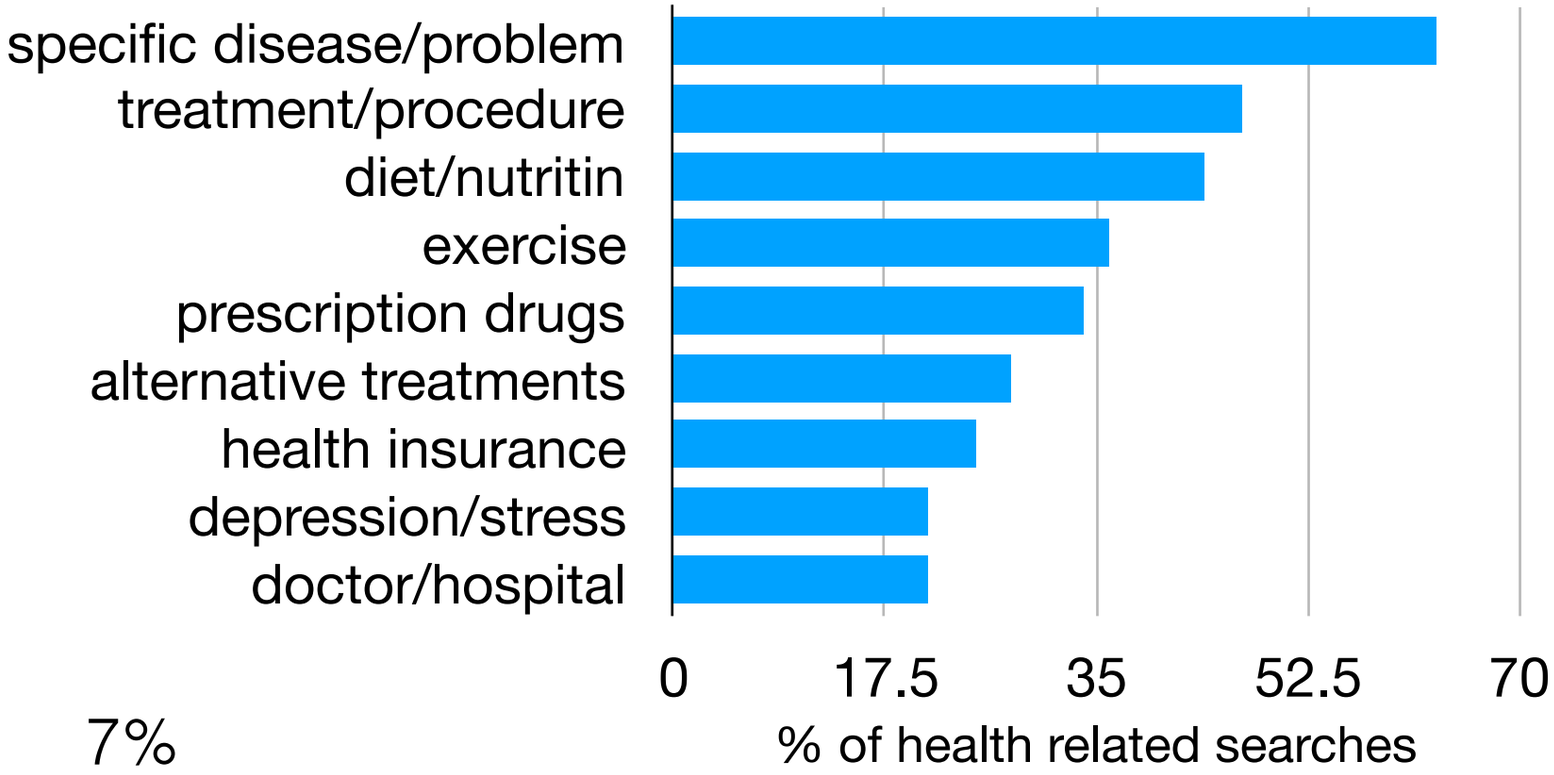

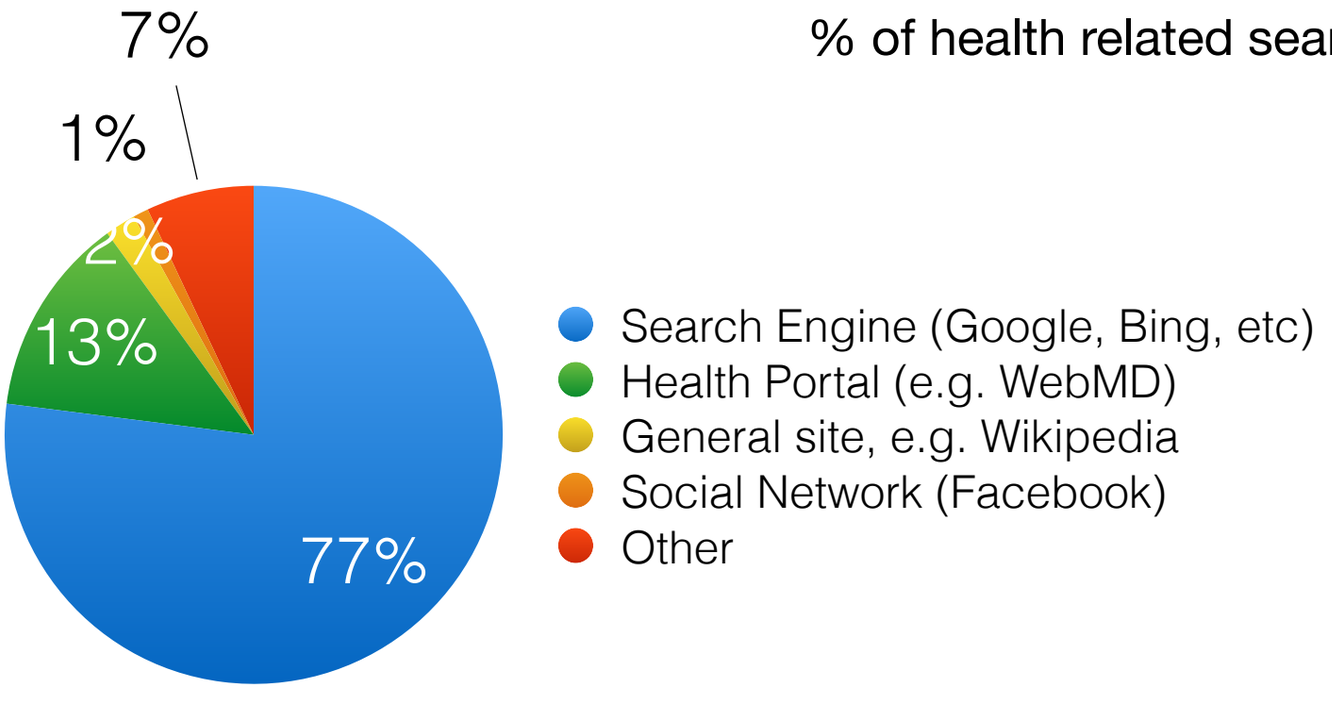

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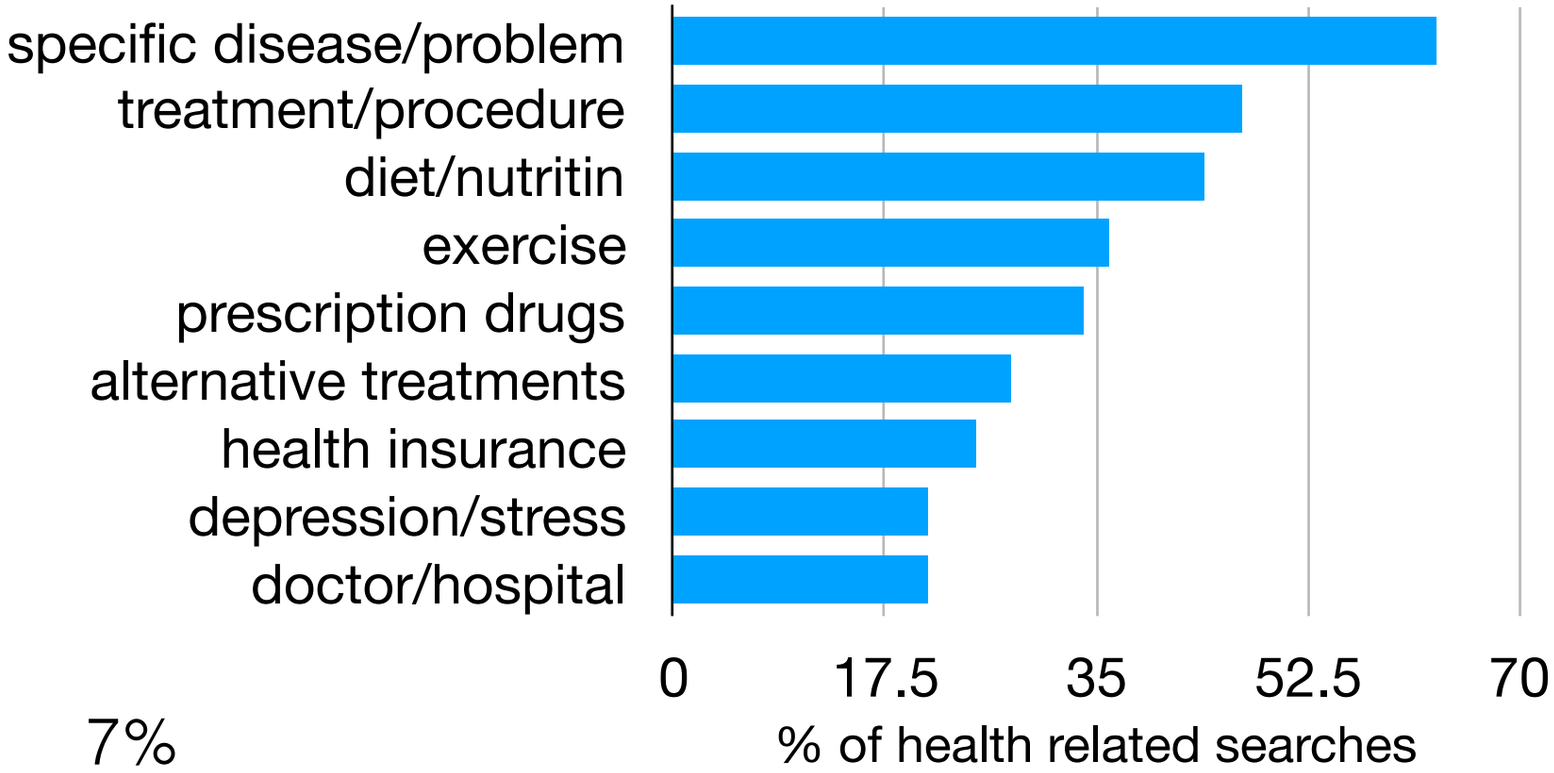

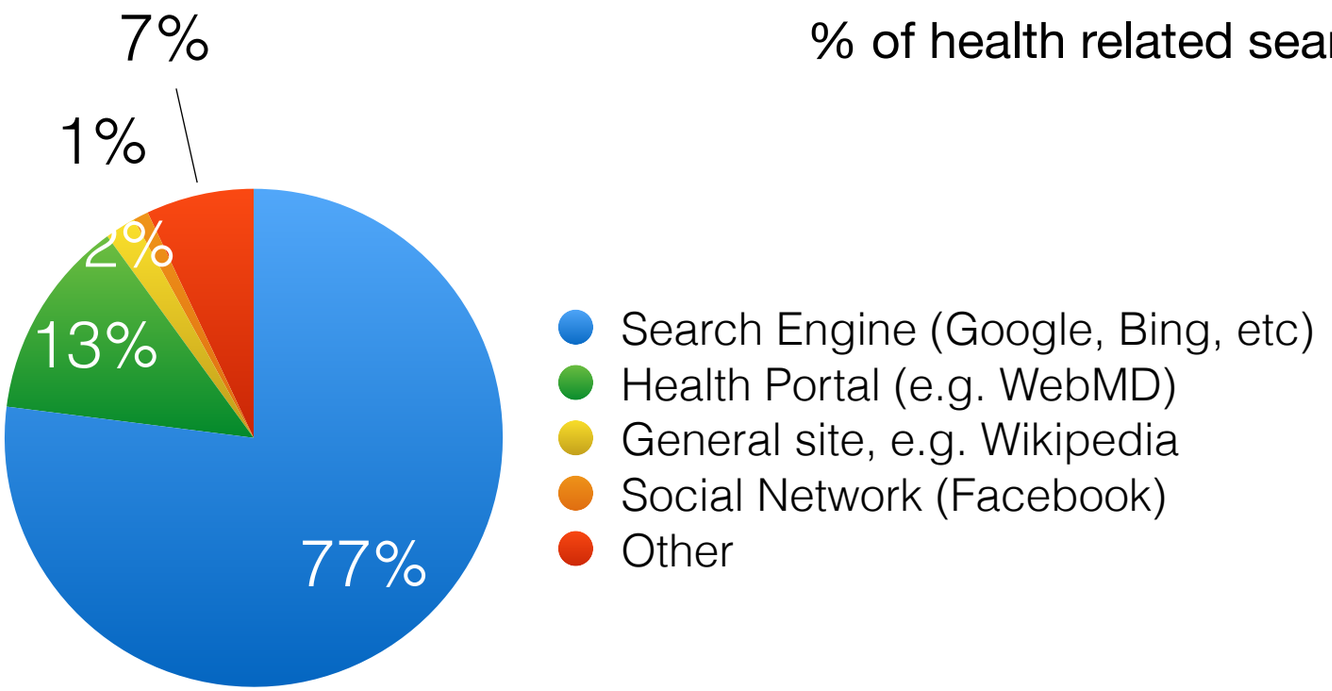

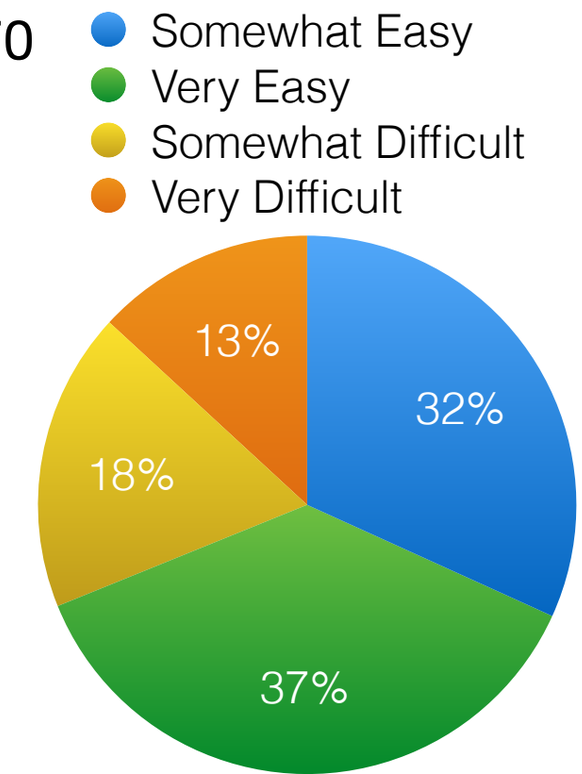

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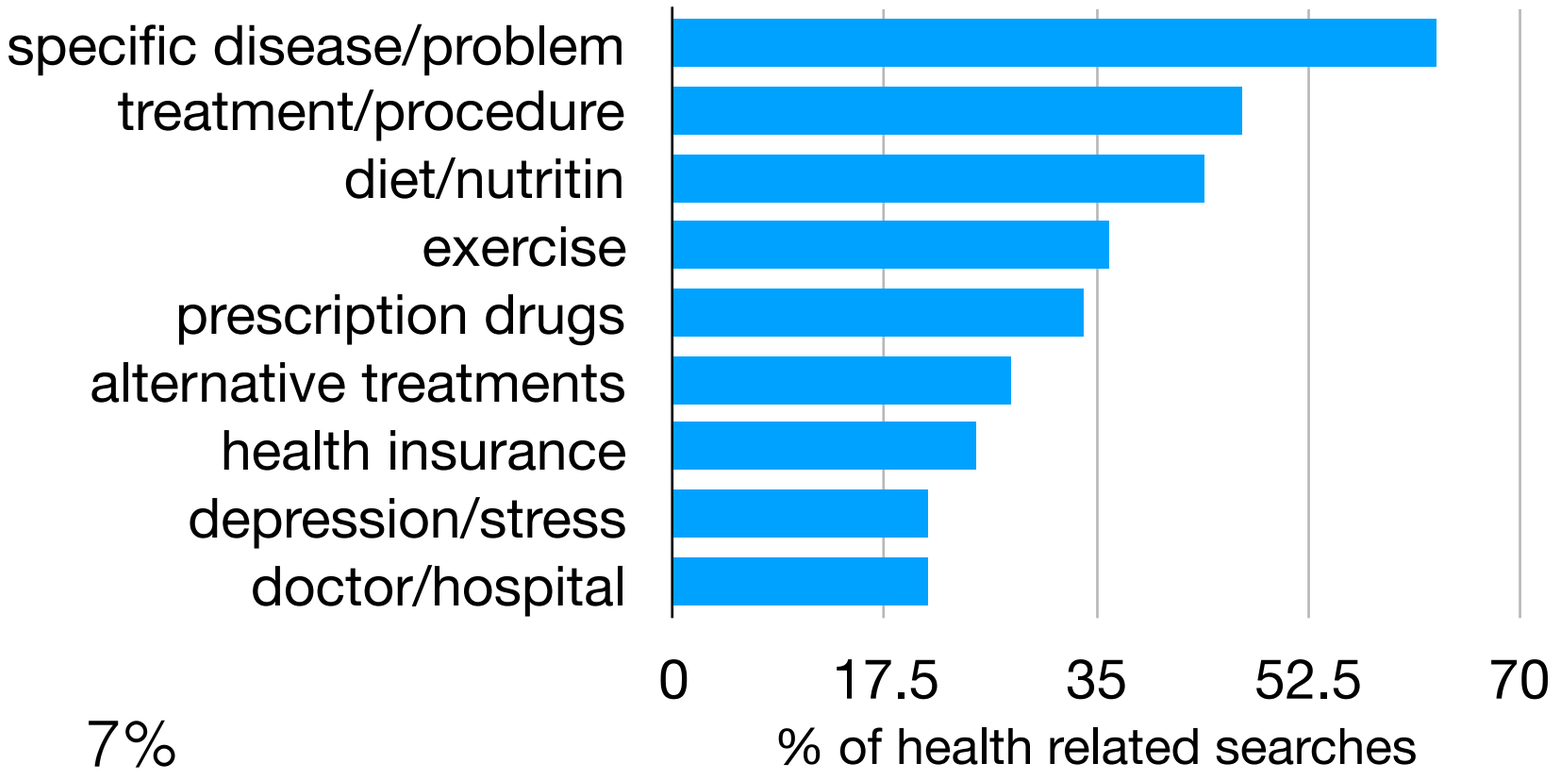

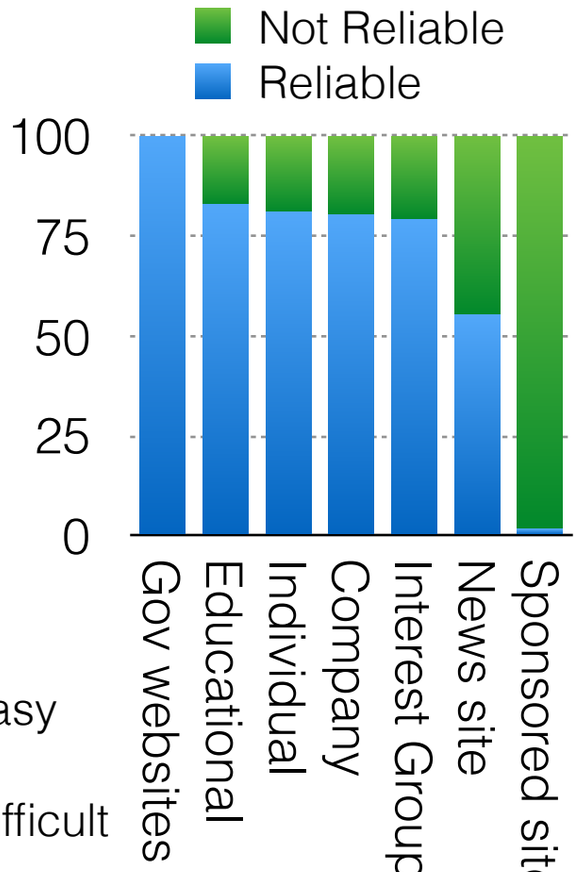

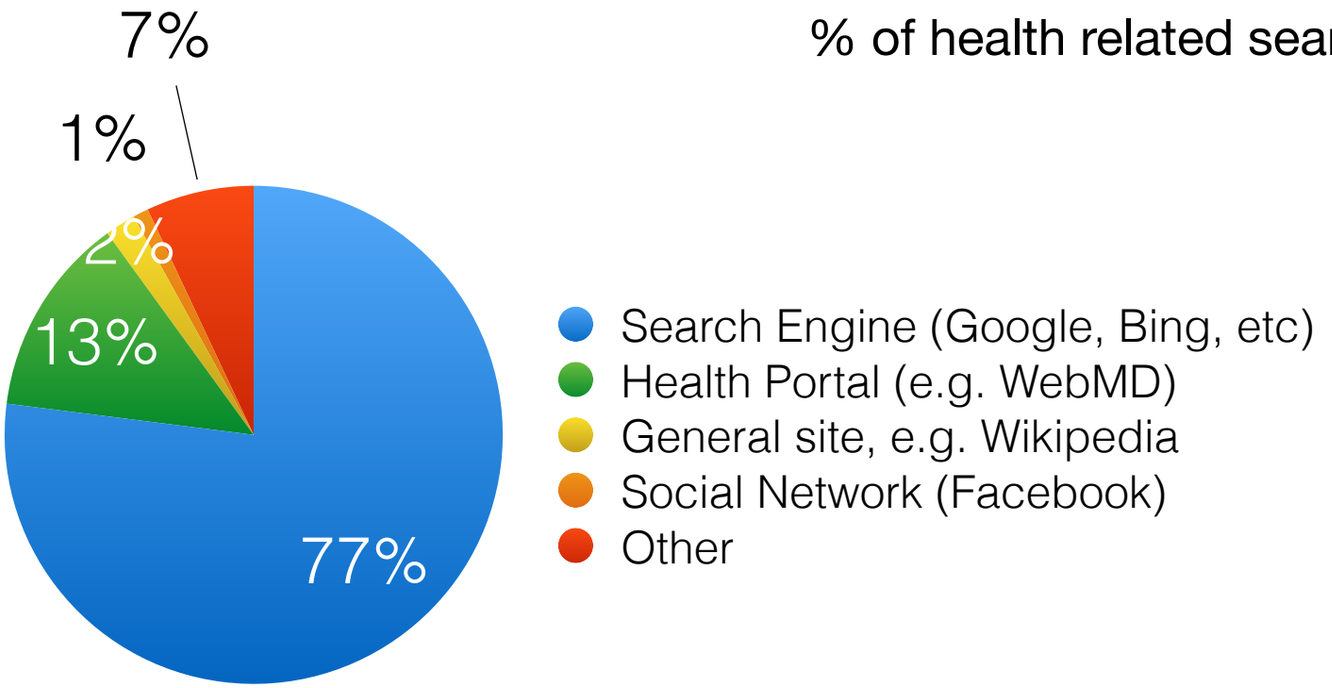

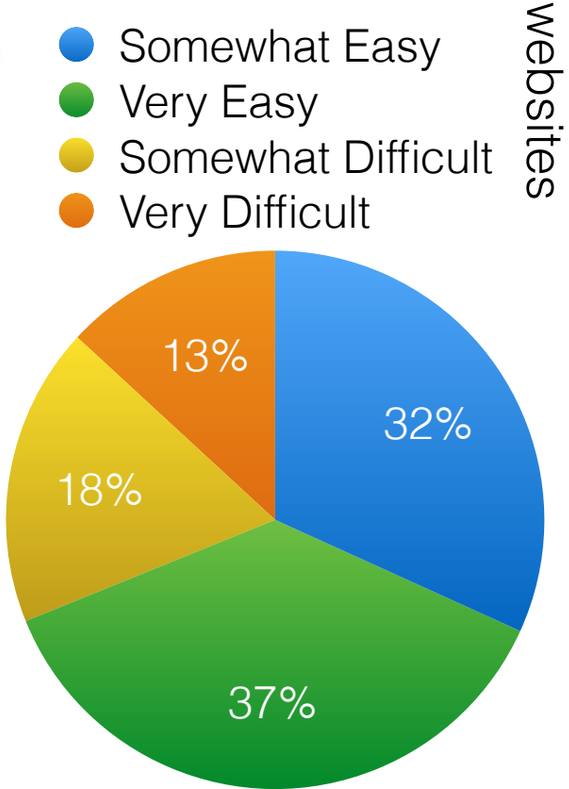

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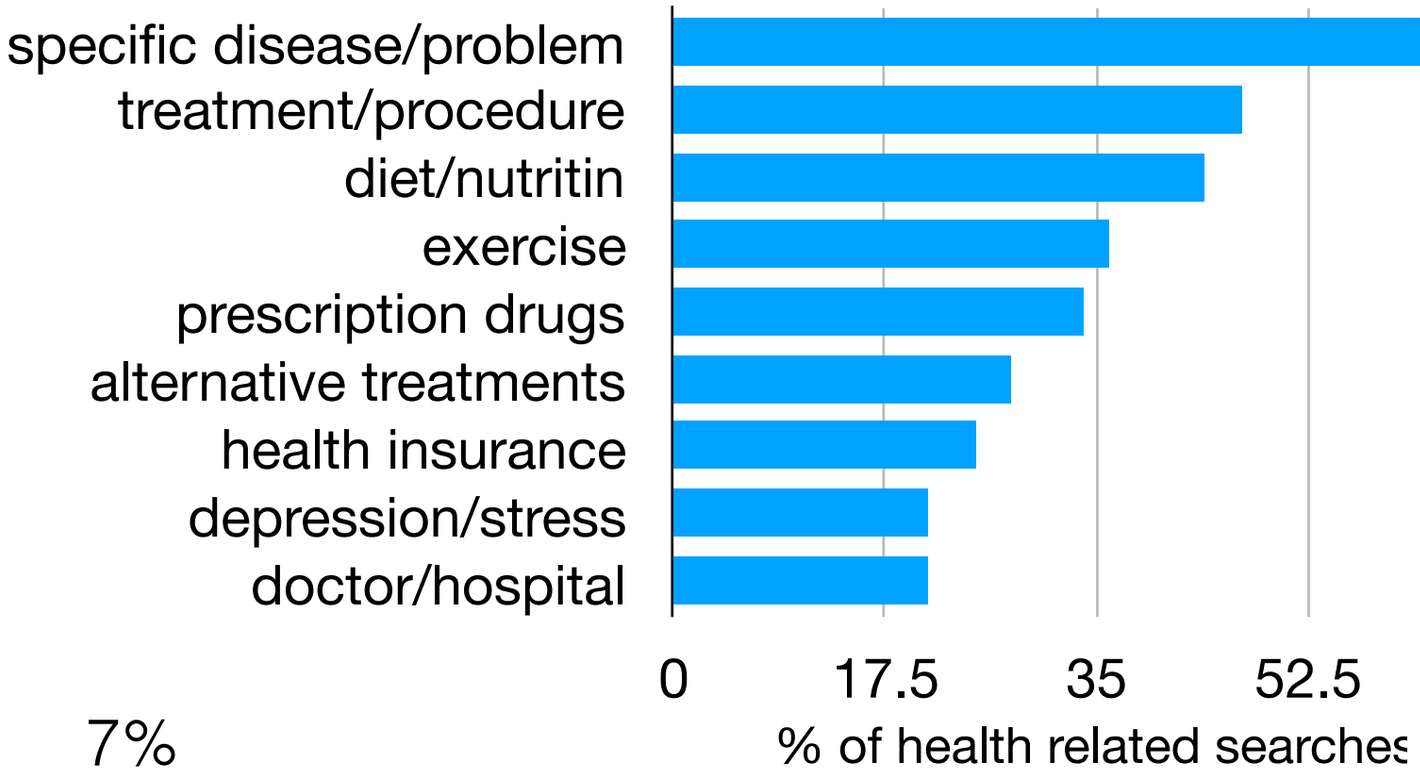
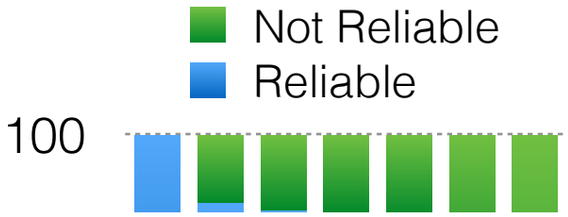
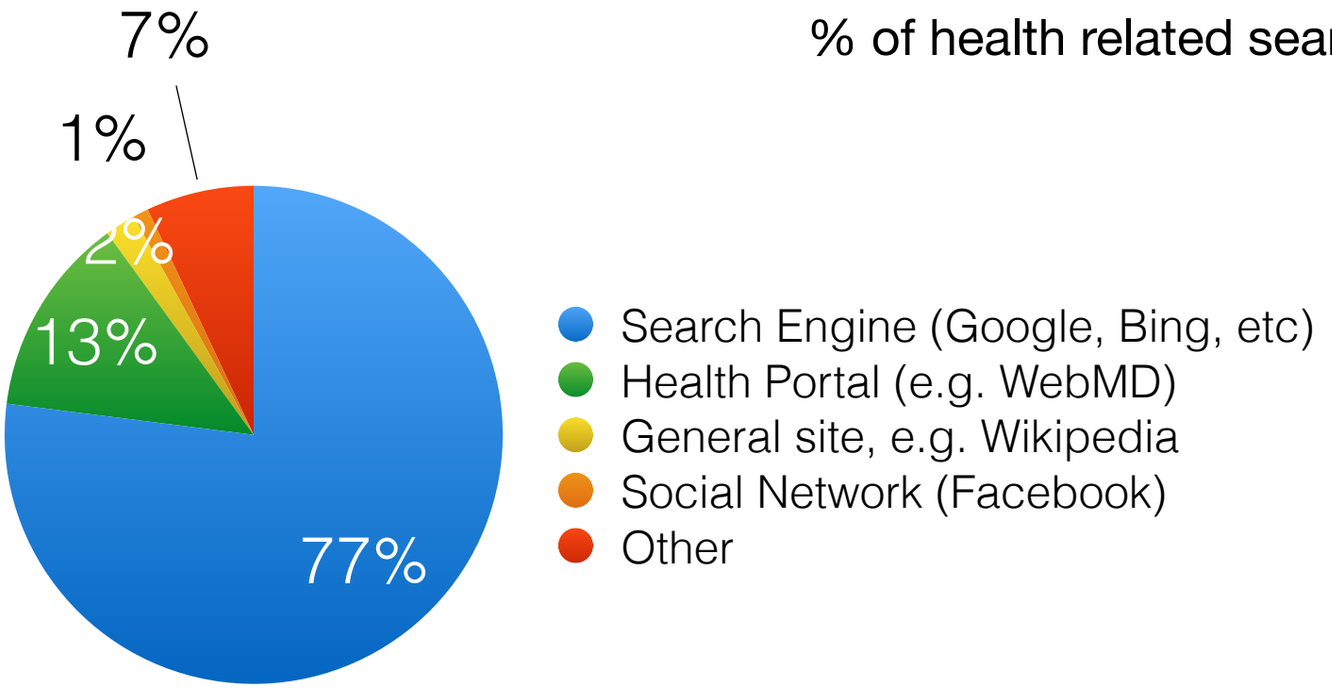




What would be your query to Google if you have this on your skin?



IR Task @ CLEF 2016

Topics	Corpus	Assessments
Generated by genuine user questions made on Reddit www.reddit.com/r/AskDocs/ 6 query variations for each of the 50 information need	50 million web pages from Clueweb 12B Terrier, Indri and Elastic Search Indices available on purpose Azure platform *	Assessments made by experts with respect to: • Topical Relevance • Understandability • Trustworthiness

* Thanks to: Microsoft Azure for equipment grant & Jamie Callan (CMU) for making the collection available to participants

Query Generation

6

Headaches if I don't donate blood? self.AskDocs

submitted 11 months ago by **ndguardian**

Hey doctors! I have had something going on for about 10 years now that has baffled every doctor I have ever seen. Maybe one of you could help. First, let me include my basic stuff.

- I am 22 years old.
- I am a male.
- I am roughly 6 feet tall.
- I am roughly 200 pounts (90.718474 kilograms).
- I am Caucasian.
- Issue has persisted ~10 years.

So anyway, I have had a weird issue of getting really wicked headaches. They are located at the base of the skull in the back, and the pain is on par with migraines. They do not seem to come with the nausea or sensitivity to sound or light, but rather seem to pop up by themselves. Nothing really seems to treat these headaches, with the exception of losing blood (typically by blood donation). A standard blood donation causes these headaches to go away for roughly 5 weeks, after which they will start to return.

I do tend to have high iron contents, but I have tested negative for hemachromatosis. I am not really certain what else to even consider here.

Thanks in advance for your help, and maybe we can figure something out!

And by all means, if you have questions, please ask away.

-ndguardian

19 comments share

Query Generation

high iron headache

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headache that only goes away with blood loss

blood donation headache reduction

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19 comments share

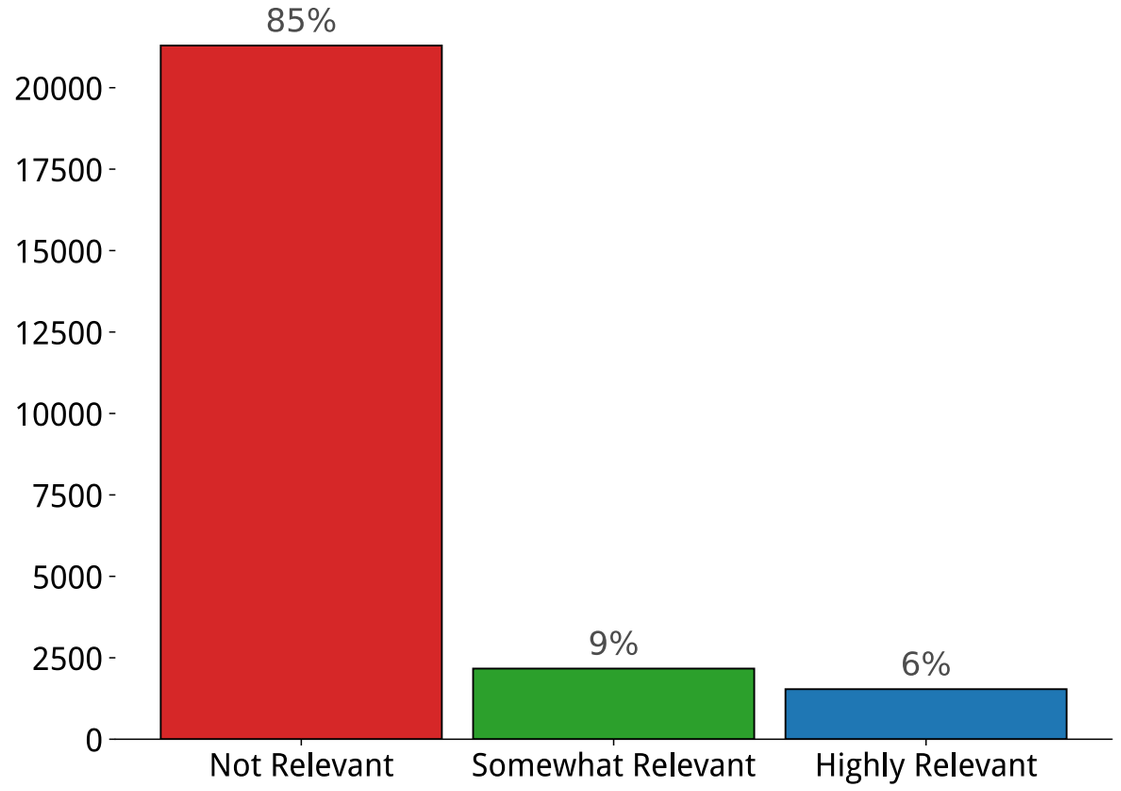
headaches relieved by blood donation

headaches caused by too much blood or "high blood pressure"

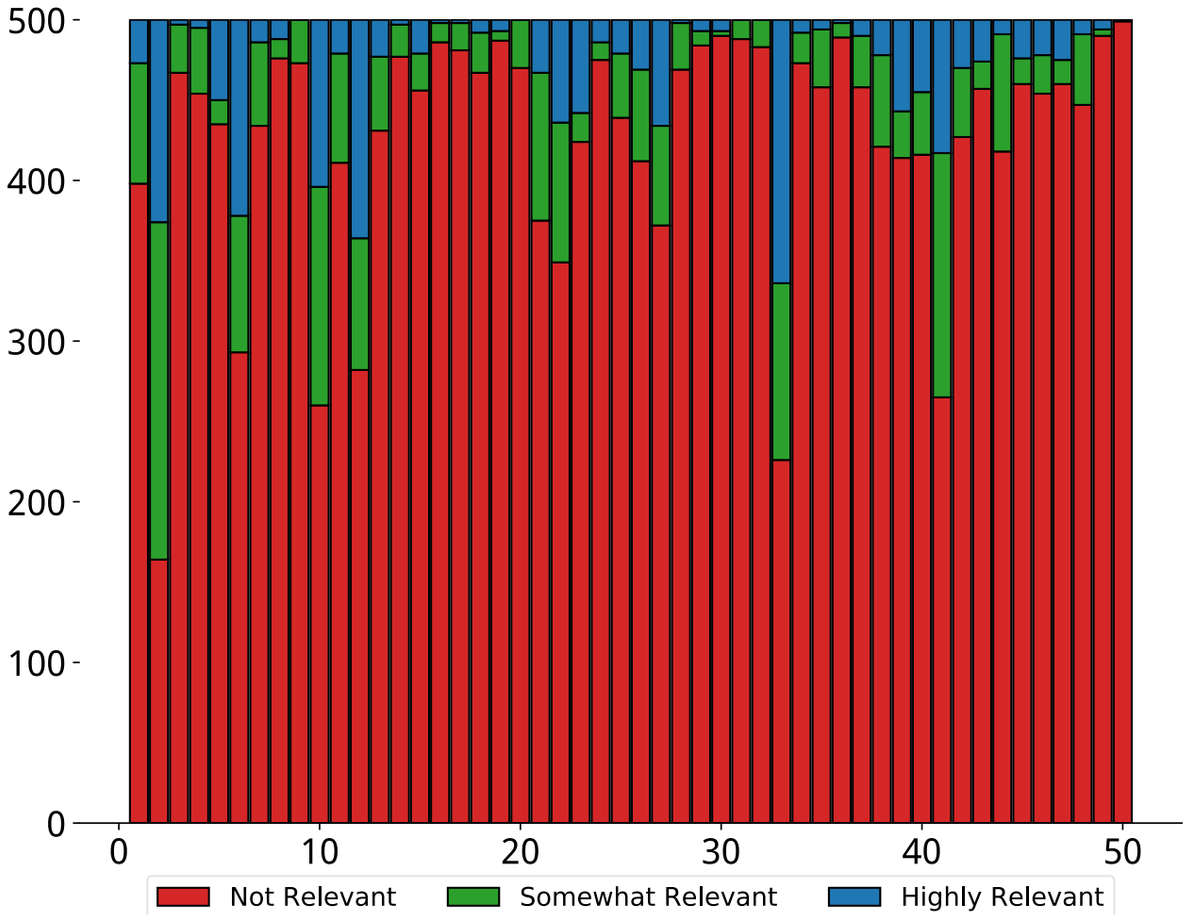
what causes strong headaches at base of skull, stops with blood donation

Problem with IR Task @ CLEF 2016

- Reliability of the collection: only few relevant documents identified



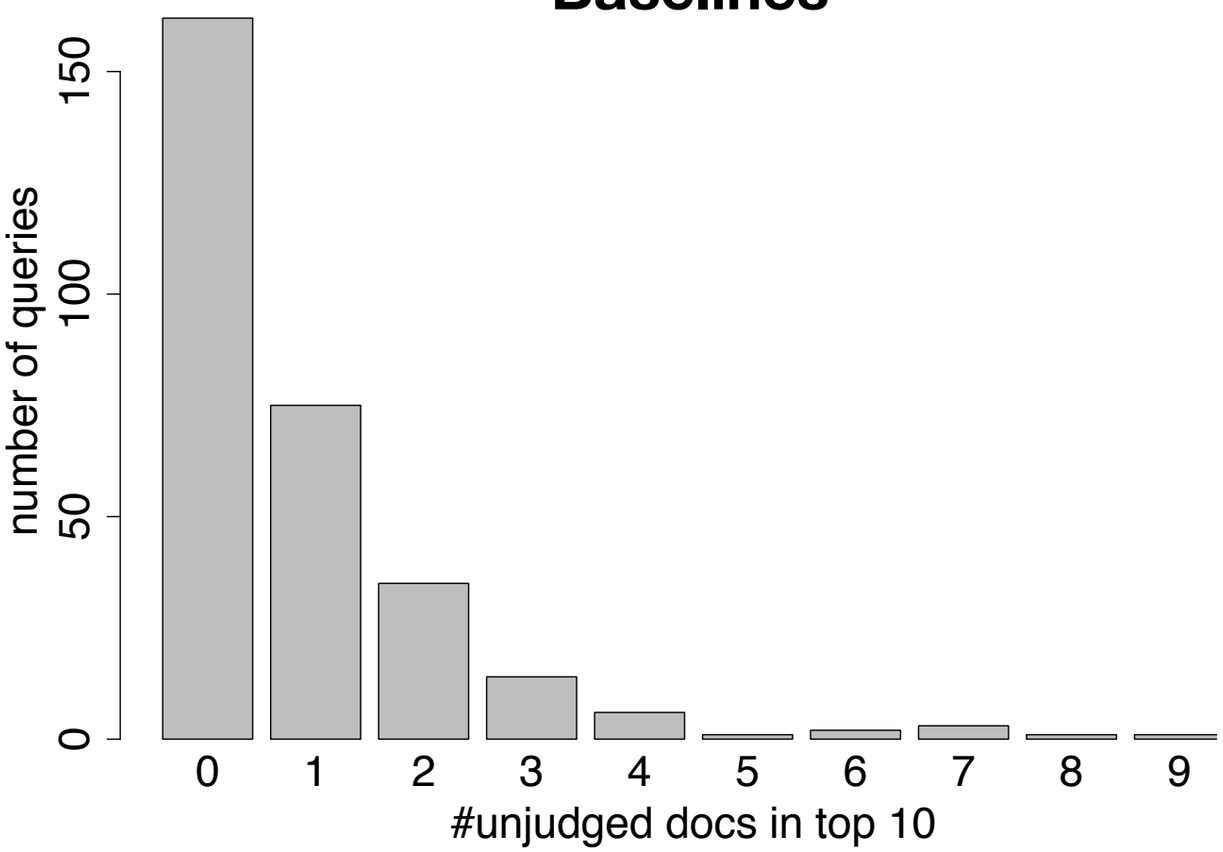
- On Avg: 12 relevant docs/query
  74 relevant docs/topic

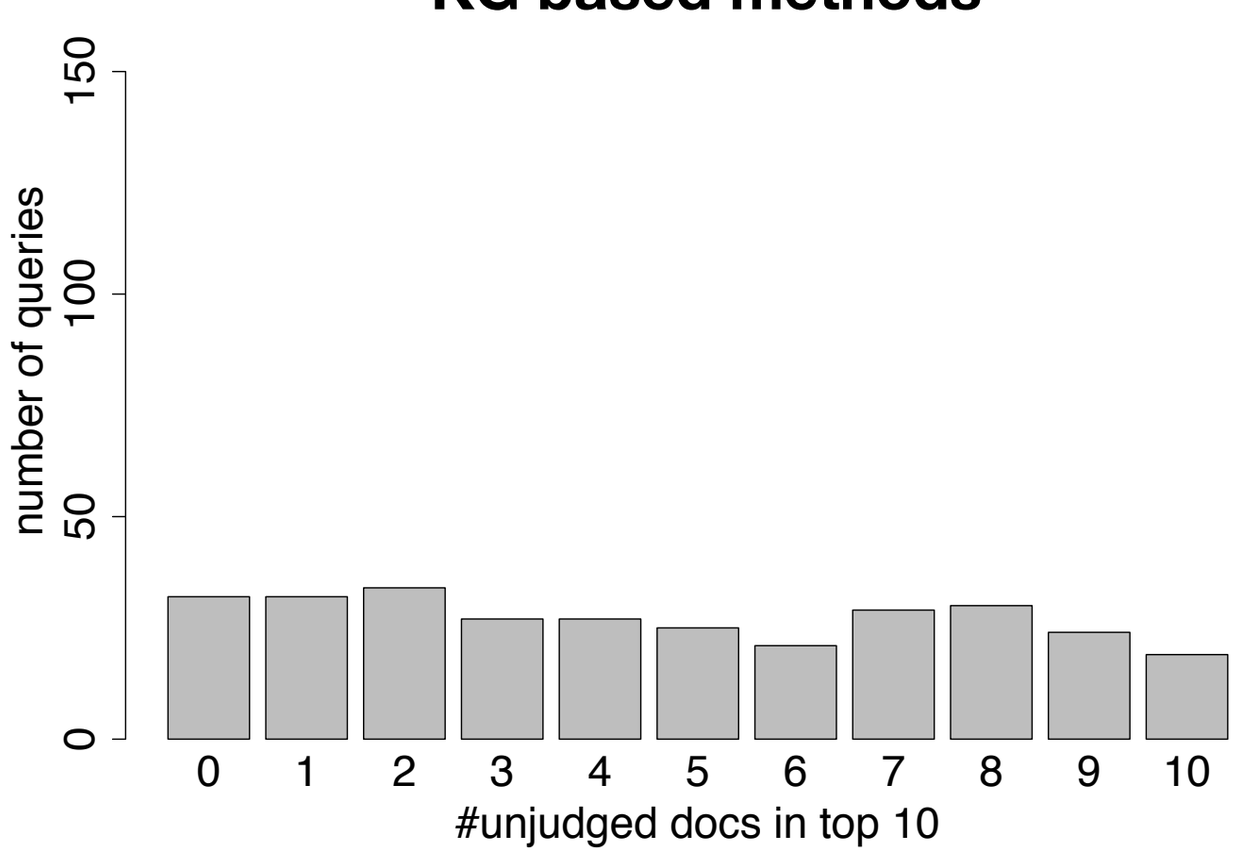


- Few easy topics, many difficult topics

Problem with IR Task @ CLEF 2016

- Reliability of the collection: many unjudged documents
- Example from a Knowledge Graph expansion method
- On Avg: 4.63 unjudged docs in top 10 results for new method





CLEF 2017: consolidate collection

Goals:

- Obtain more relevance assessments - including possibly higher number of relevant documents
- Obtain greater variation in approaches
- Build a more reliable collection (CLEF 2016 + CLEF 2017)

How?

- Re-use CLEF 2016 topics
- Participants told that:
  - They should exclude documents assessed in CLEF 2016 from their submissions
  - They could use CLEF 2016 assessments in their retrieval functions (e.g. RF)

THE SUB-TASKS

IRTask1: Ad-Hoc Retrieval

- For each query, submit a ranking of documents, so as to maximise the relevance of the top results

…

```
<query>
   <id> 103001 </id>
   <title>headaches relieved by blood donation</title>
</query>
<query>
   <id> 103002 </id>
   <title>high iron headache</title>
</query>
<query>
   <id> 103003 </id>
   <title>blood donation headache reduction</title>
</query>
…
```

IRTask1: Evaluation

- User interested in only the first page of results:
  Precision at 10 (P@10)

- User interested in only the first page of results, but cares about ranking:
  Normalized Discounted Cumulative Gain, depth 10 (NDCG@10)

- User prefer relevant result at early ranks, but explore the ranks with medium-patience (i.e. beyond rank 10):
  Rank Biased Precision with μ=0.8 (RBP(0.8))

IRTask2: Personalised Search

- **Users have different abilities in understanding** content of health web pages

- A document that an health expert finds easy to understand, may be difficult for a common person

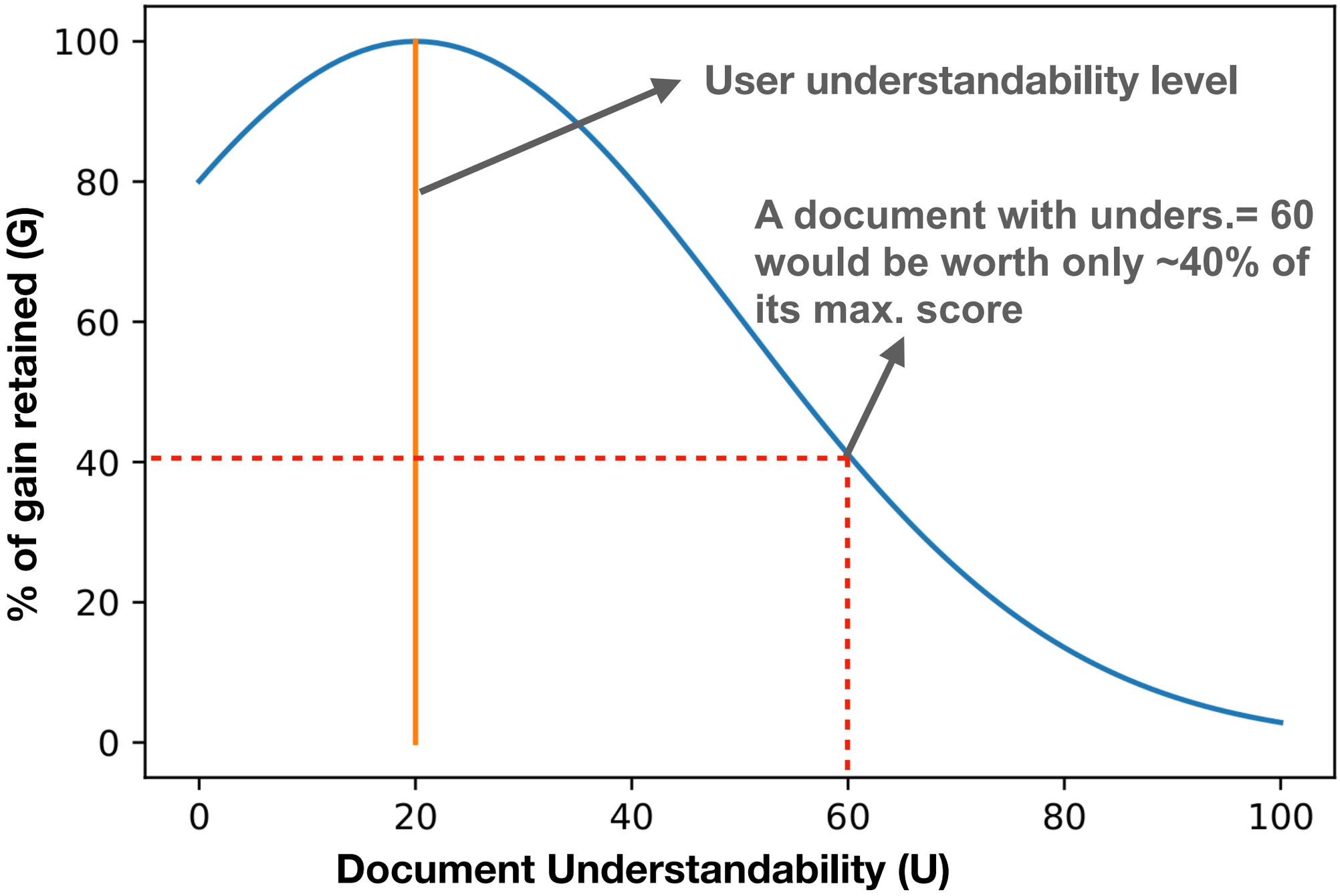
- If a user does **not understand** a document, does **not get gain (utility)**, regardless of the topical relevance of the document

- Task: systems need to retrieve&rank relevant documents that match the user understandability profile

IRTask2: Evaluation

- Each user is characterised by an **understandability level parameter** (alpha)
- Assessors will judge documents according to relevance and understandability
- alpha parameter and understandability assessments expressed on the same scale: 0 - 100 (0-> easiest level; 100 -> hardest level)
- Example:
  - A user struggles to read web pages with medical terms/content: a small alpha, e.g., 20
  - A judge thinks that document D1 is quite easy to understand: score 15
  - document D2 is hard to understand : score 90

Modelling gain as a Gaussian



IRTask2: Personalisation measures

- Same idea as in uRBP (2016 measure), but gain is personalised to user

- Compute the new personalised gain:

$$Gain(T, U, G) = T * (100.0 - |U-G|) / 100$$

- A hard-to-understand document (U = 85), but highly relevant (T = 2), shown to a kid (G = 20), would not be that valuable:

$$Gain(2, 75, 20) = 2 * (100.0 - 65) / 100 = 2 * 0.35 = 0.70$$

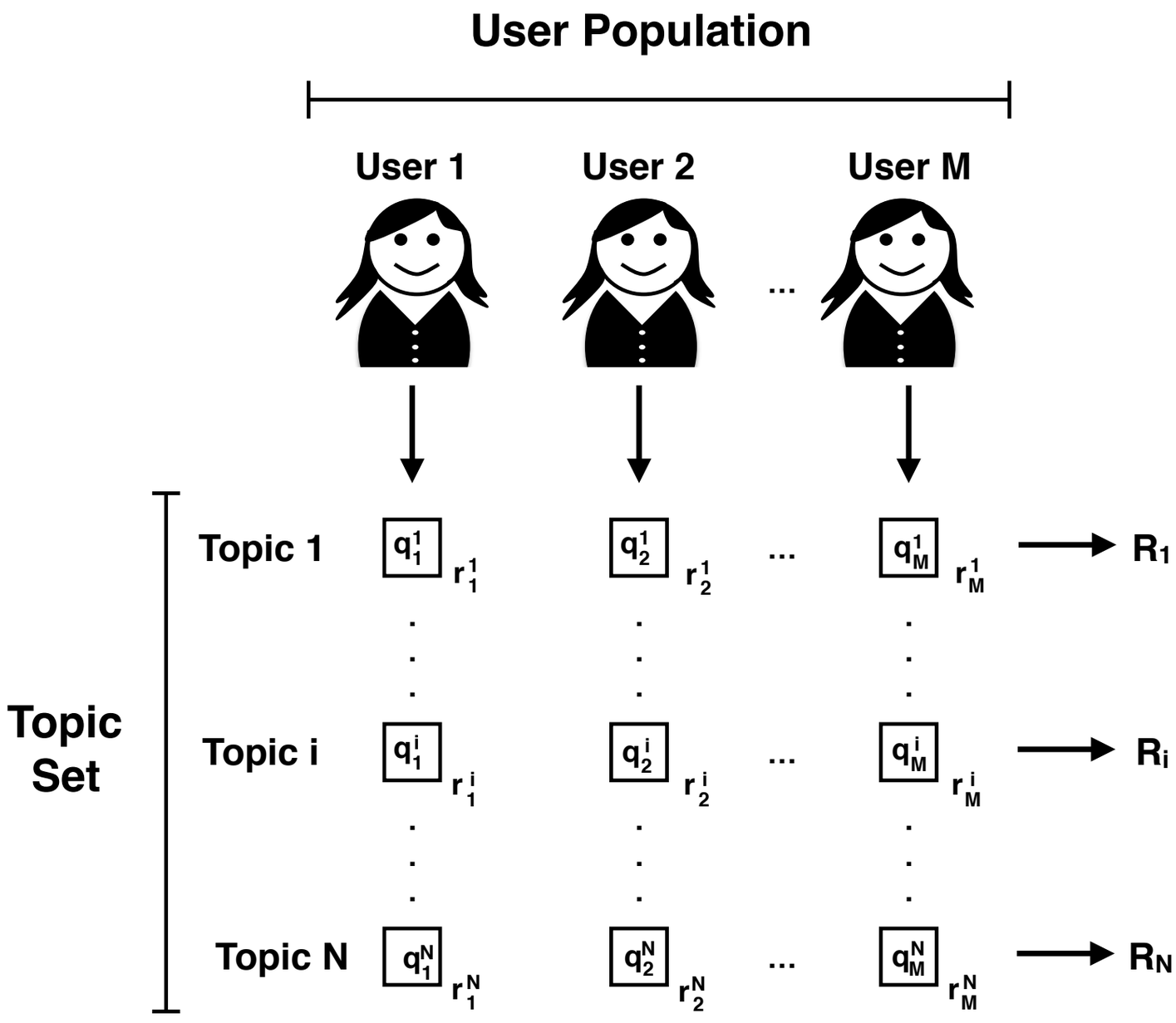
- We modified RBP and P@10 with a linear and gaussian variants.

- Pairs of query variations assigned to different alpha values

IRTask3: Query Variations

- Each topic has 6 query variations
- The query variations capture the variability intrinsic in how people formulate queries when searching to answer the same information need
- Participants asked to exploit dependence between query variations, and submit one result ranking for each topic (i.e. a common one for all 6 variations)

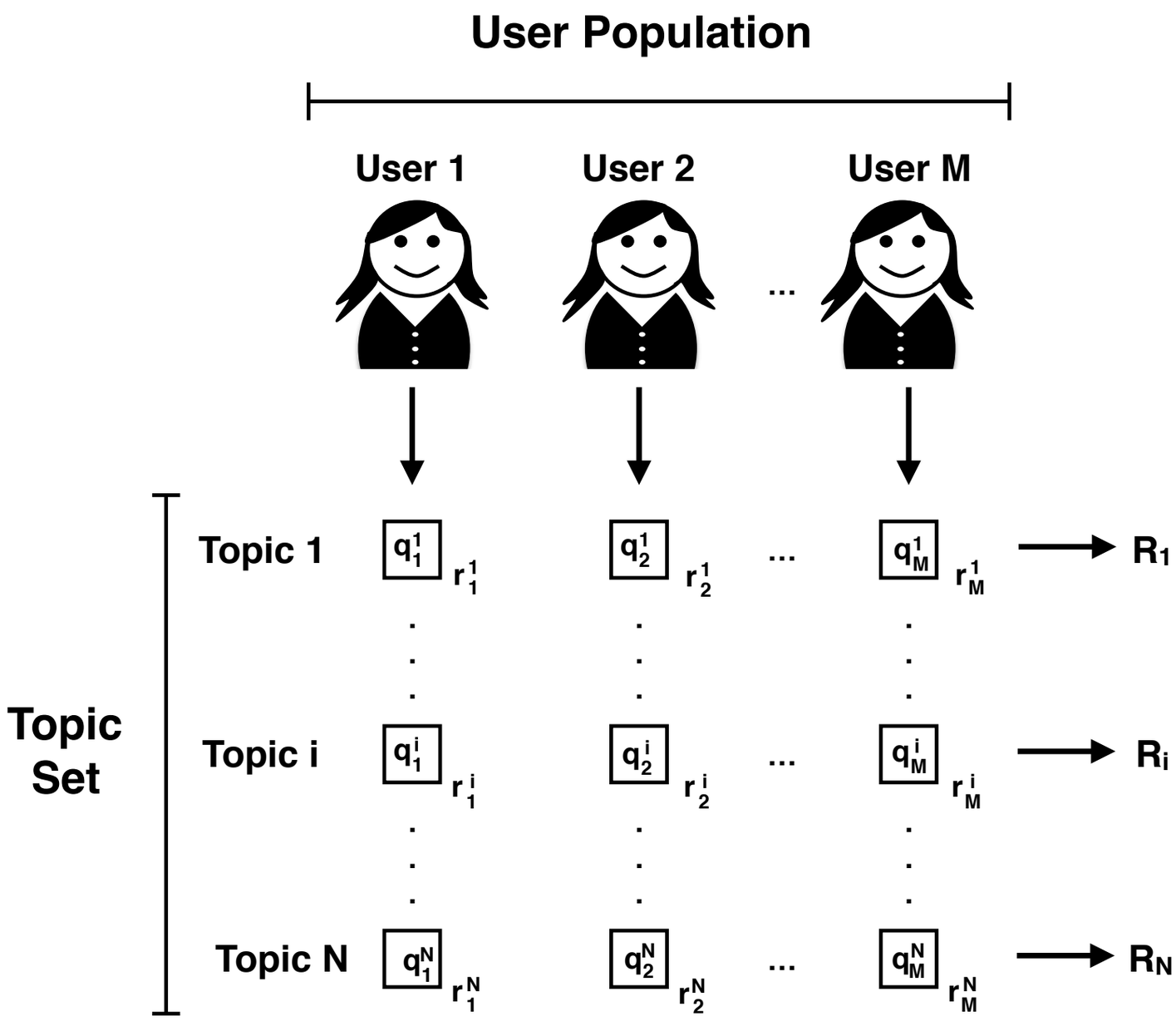
IRTask3: Evaluation



The effectiveness of a system is:

$$\mu - \alpha\sigma^2$$

IRTask3: Evaluation

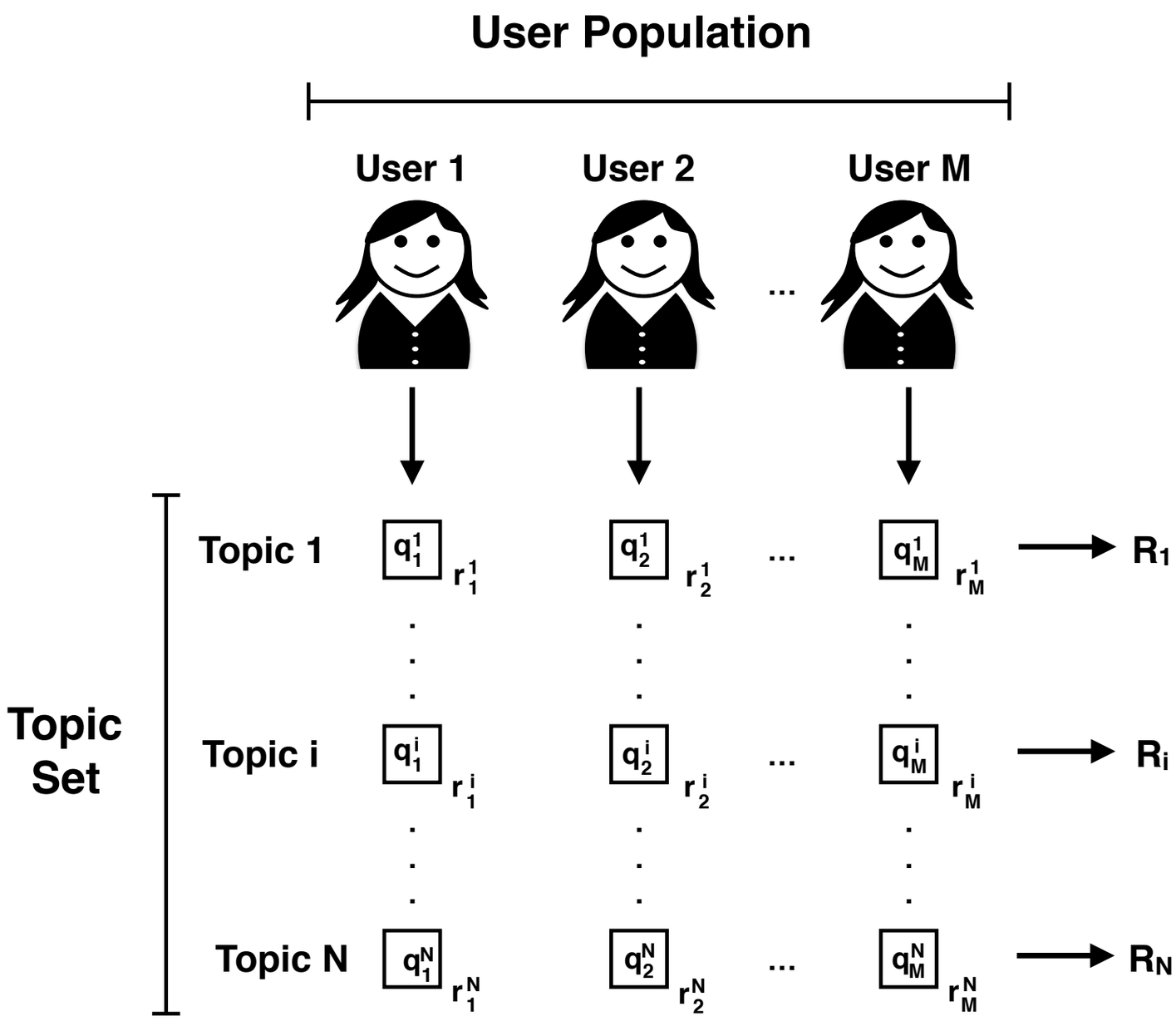


The effectiveness of a system is:

$$\mu - \alpha\sigma^2$$

mean effectiveness over topics

IRTask3: Evaluation



The effectiveness of a system is:

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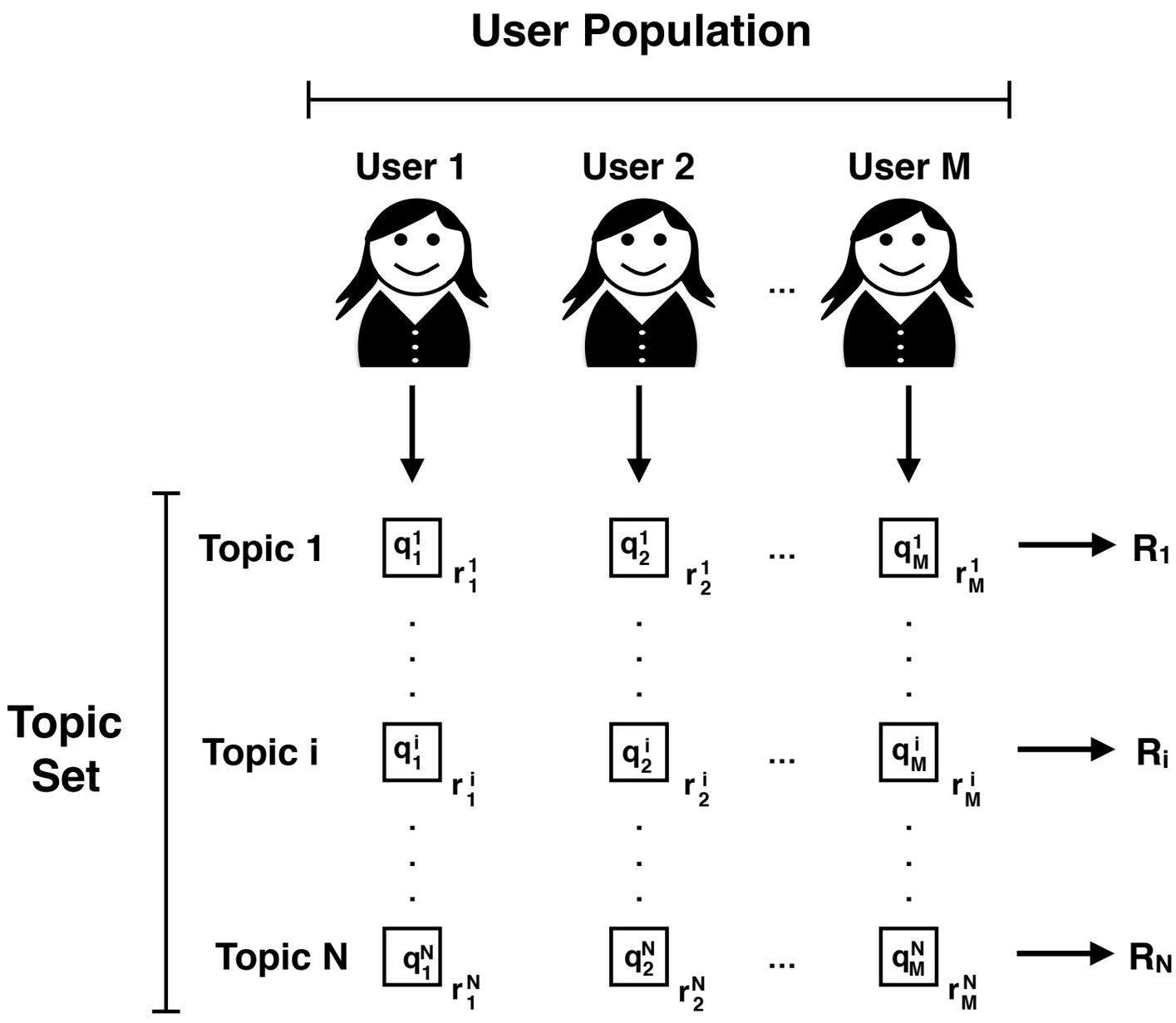
mean effectiveness over topics

effectiveness variance over topics

IRTask3: Evaluation



The effectiveness of a system is:

risk preference parameter

$$\mu - \alpha\sigma^2$$

mean effectiveness over topics

effectiveness variance over topics

IRTask4: Multilingual Ad-hoc

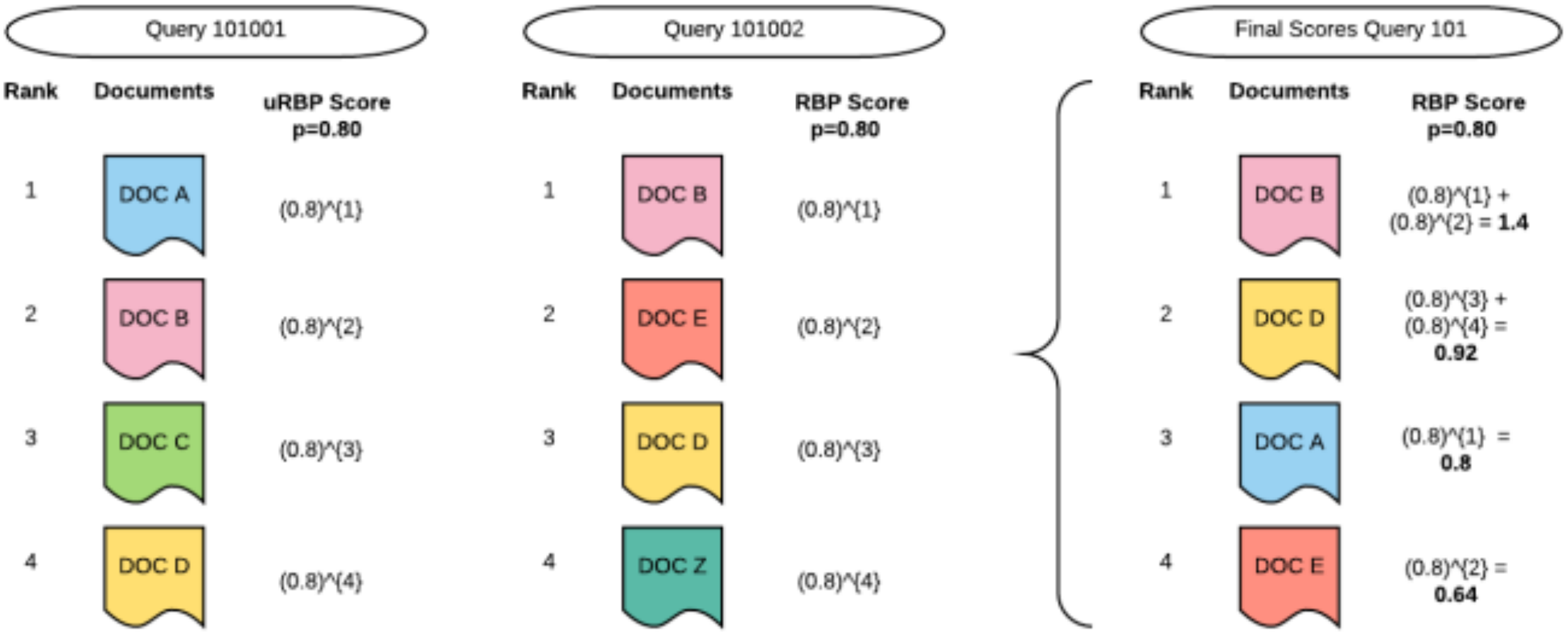
- Multilingual translations for each query

- Languages: Czech, French, Hungarian, German, Polish, Spanish and Swedish

- Evaluation: same as per IRTask1

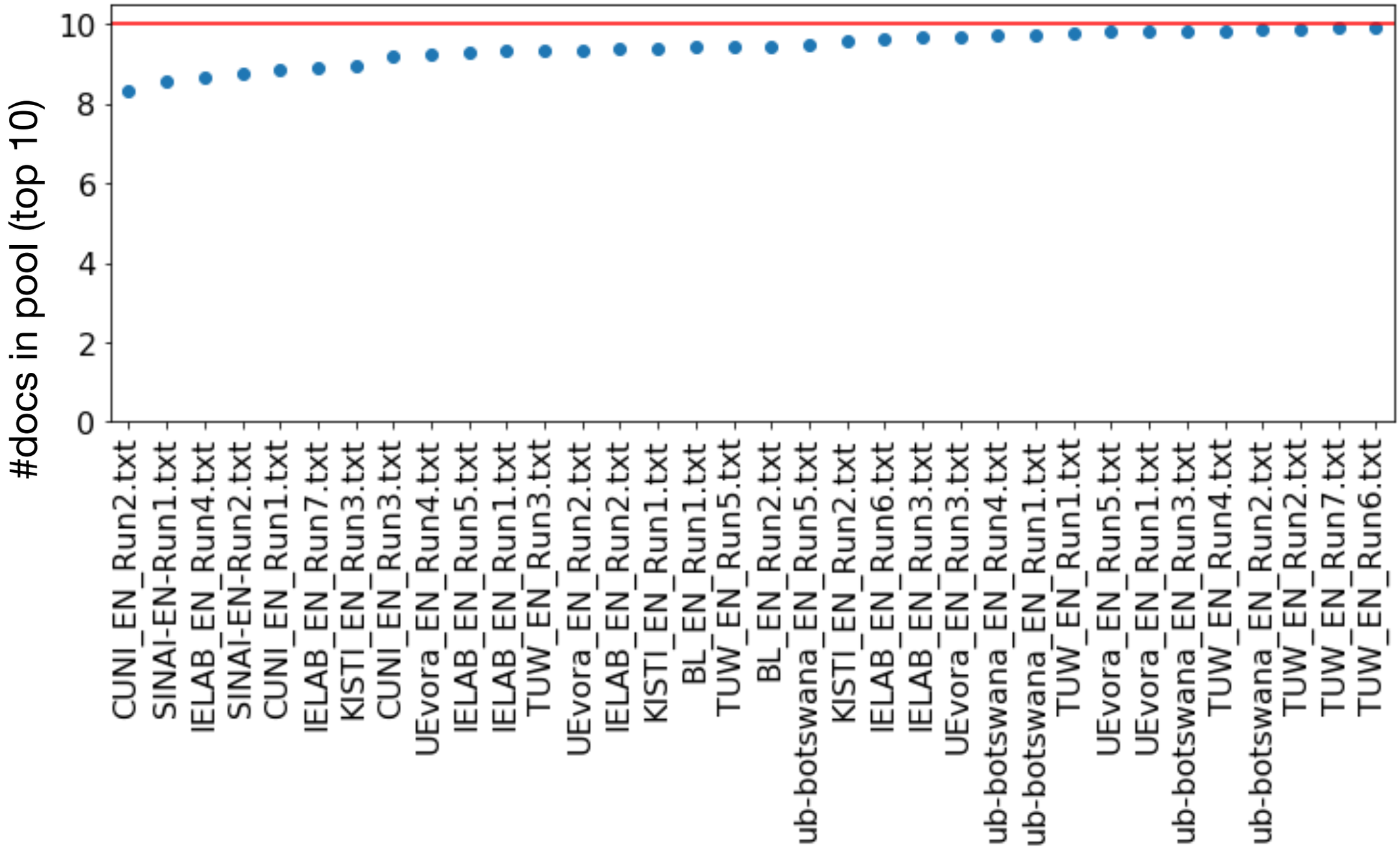
POOLING & ASSESSMENT

Pooling



- Depth@10 Pool: huge size (~41,923)
- Assessment budget limit: 25,000 docs
- Pool according to RBP residual reduction method

Pool coverage



Relevance assessments

- Medical experts judged documents using the online interface Relevation: https://github.com/ielab/relevation

- Experts assessed:
  - Topical relevance (based on criteria given)
  - Understandability
  - Trustworthiness

103 - The results returned should discuss recurrent occipital headaches in adolescents or young adults. The questioner highlights that donating blood relieves these headaches, so documents that highlight experiences with headaches related to iron storage disorders or red blood cell disorders should be included. Results that relate to complicating factors which would not occur in a male, such as use of the oral contraceptive pill or menorrhagia, should be excluded. Results that solely focus on low iron and/or haemochromatosis should be excluded.

Back to Query

Prev Document

Next Document

Document "clueweb12-1901wb-00-03368" (487 / 500)

Relieve Migranes and Headaches Without Drugs

We have successfully eliminated severe, debilitating and recurring chronic headache symptoms for over twenty years. We include a thorough evaluation of the bionechanics of headache symptoms. We look beyond the cranium and evaluate tightness and asymmetry at the neck, shoulders, back and even tailbone – important, often overlooked areas in recurring headaches. Clear Passage Physical Therapy[SM] has over two decades of experience discovering and eliminating the causes of chronic or recurring headache pain, without drugs.

Download a Free eBook
Treating Chronic Pain – Naturally

Headaches can be caused by adhesions

Nearly 45 million people in the United States live with chronic headaches. About seven million report debilitating headaches that last for hours at a time, at least every two days. It is estimated that 157 million workdays are lost due to headaches and two billion dollars are spent on over-the-counter painkillers to treat headache symptoms each year. Yet most headache sufferers are not content to merely treat symptoms; they want to treat the cause of the pain that takes so much quality from their lives. In short, they want a permanent solution to their pain.

At Clear Passage Physical Therapy, we have been very successful

Judgement

- Unjudged
- Highly relevant
- Somewhat relevant
- Not relevant

Understandability

Easy Neutral Hard

Trustworthiness

Low Medium High

Comment

(optional)

RUNS

Baselines

- Terrier’s BM25 and Dirichlet LM
- Parameters as set by default in Terrier

Participants Runs

Team Name	University	Country	Sub-Task 1	2	3	4
CUNI *	Charles University in Prague	Czech Republic	3	-	-	28
IELAB *	Queensland University of Technology	Australia	7	-	-	-
KISTI	Korean Institute of Science and Technology Information	Korea	3	-	-	-
SINAI	Universidad de Jaén	Spain	3	-	-	-
TUW *	Vienna University of Technology	Austria	7	7	-	-
ub-botswana	University of Botswana	Botswana	5	-	-	-
UEvora	Universidade de Évora	Portugal	5	-	-	-
7 Teams	7 Institutions	7 Countries	33	7	0	28

*: Organisers contributed

Although scarce participants to sub-tasks 2-4, relevance assessments can still be used, though may find systems have large number of unassessed for this task (thus unreliable)

NEXT STEPS

Completion of CLEF 2017

- Complete relevance assessment acquisition (employing medical professionals for assessments)

- Analysis of results

- Submission of task results to SIGIR Forum - all participants invited to co-author

IR Task @ CLEF 2018

- Focus on consumer health search
- New queries
- Sub-task 1: ad-hoc retrieval
- Need to increase participation to ensure diversity in approaches/ reliability of collection
- New subtasks?
    - Diversity?
    - Answer Card Generation?
    - Tell us your ideas/feedback!

- Come to see the CLEF 2017 participants submissions on

- We need you to help us building a reliable collection: Join us for the CLEF 2018 tasks!

- GitHub repository for task: https://github.com/CLEFeHealth/CLEFeHealth2017IRtask

    - Evaluation scripts, queries, assessments, runs, etc.

- Slack team: https://join.slack.com/t/clef2017ehealthirtask/shared_invite/MjM0Mzk2NDE3ODc2LTE1MDQxNjk2NjAtY2I3NGQwZjZlZg