

Query Processing

PRI 21/22 · Information Processing and Retrieval
M.EIC · Master in Informatics Engineering and Computation

Sérgio Nunes
Dept. Informatics Engineering
FEUP · U.Porto

Based on Chapters 9 from Introduction to Information Retrieval, Manning et al. (2008)
Based on Chapter 5 from Information Retrieval - Implementing and Evaluating Search Engines, Büttcher et al. (2010)
Based on Chapters 5, 6 and 7 from Search Engines - Information Retrieval in Practice, Croft et al. (2015)

Outline

- Recap
- Query Processing
 - Processing strategies, document and term evaluation
 - Query transformation
 - Query expansion
 - Relevance feedback
- Search User Interface

Inverted Index (with counts)

and	1:1	only	2:1
aquarium	3:1	pigmented	4:1
are	3:1	popular	3:1
around	1:1	refer	2:1
as	2:1	referred	2:1
both	1:1	requiring	2:1
bright	3:1	salt	1:1 4:1
coloration	3:1	saltwater	2:1
derives	4:1	species	1:1
due	3:1	term	2:1
environments	1:1	the	1:1 2:1
fish	1:2 2:3 3:2 4:2	their	3:1
fishkeepers	2:1	this	4:1
found	1:1	those	2:1
fresh	2:1	to	2:2 3:1
freshwater	1:1 4:1	tropical	1:2 2:2 3:1
from	4:1	typically	4:1
generally	4:1	use	2:1
in	1:1 4:1	water	1:1 2:1 4:1
include	1:1	while	4:1
including	1:1	with	2:1
iridescence	4:1	world	1:1
marine	2:1		
often	2:1 3:1		

Fig. 5.4. An inverted index, with word counts, for the documents in Table 5.1

Inverted Index (with positions)

and	1,15	marine	2,22
aquarium	3,5	often	2,2
are	3,3	only	2,10
around	1,9	pigmented	4,16
as	2,21	popular	3,4
both	1,13	refer	2,9
bright	3,11	referred	2,19
coloration	3,12	requiring	2,12
derives	4,7	salt	1,16
due	3,7	saltwater	2,16
environments	1,8	species	1,18
fish	1,2	term	2,5
	1,4	the	1,10
	2,7	their	3,9
	2,18	this	4,4
	2,23	those	2,11
	3,2	to	2,8
	3,6	tropical	1,1
	4,3	typically	4,6
	4,13	use	2,3
fishkeepers	2,1	water	1,17
found	1,5	while	4,10
fresh	2,13	with	2,15
freshwater	1,14	world	1,11
from	4,8		
generally	4,15		
in	1,6		
include	1,3		
including	1,12		
iridescence	4,9		

Fig. 5.5. An inverted index, with word positions, for the documents in Table 5.1

An Example of Ranking

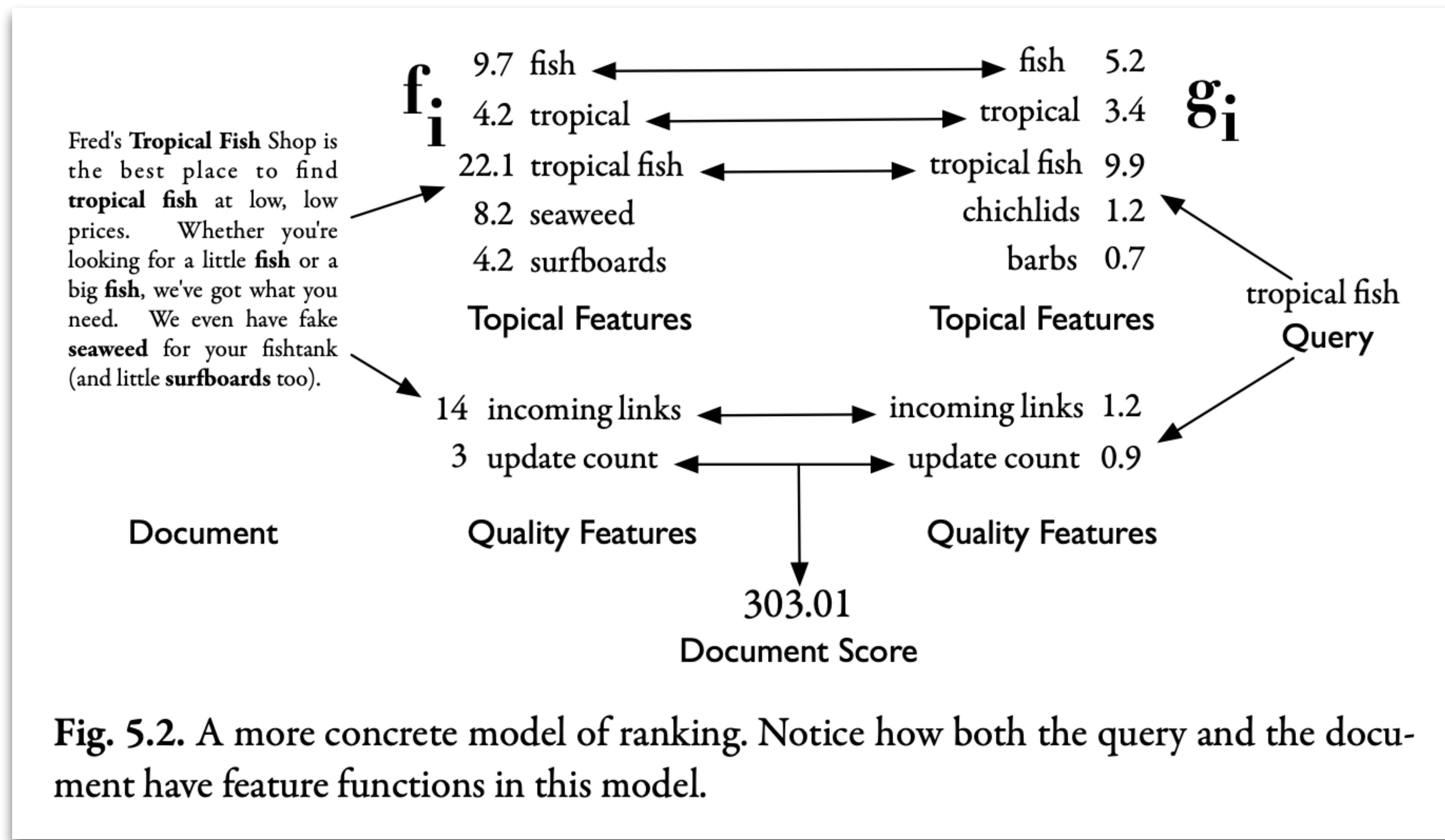


Fig. 5.2. A more concrete model of ranking. Notice how both the query and the document have feature functions in this model.

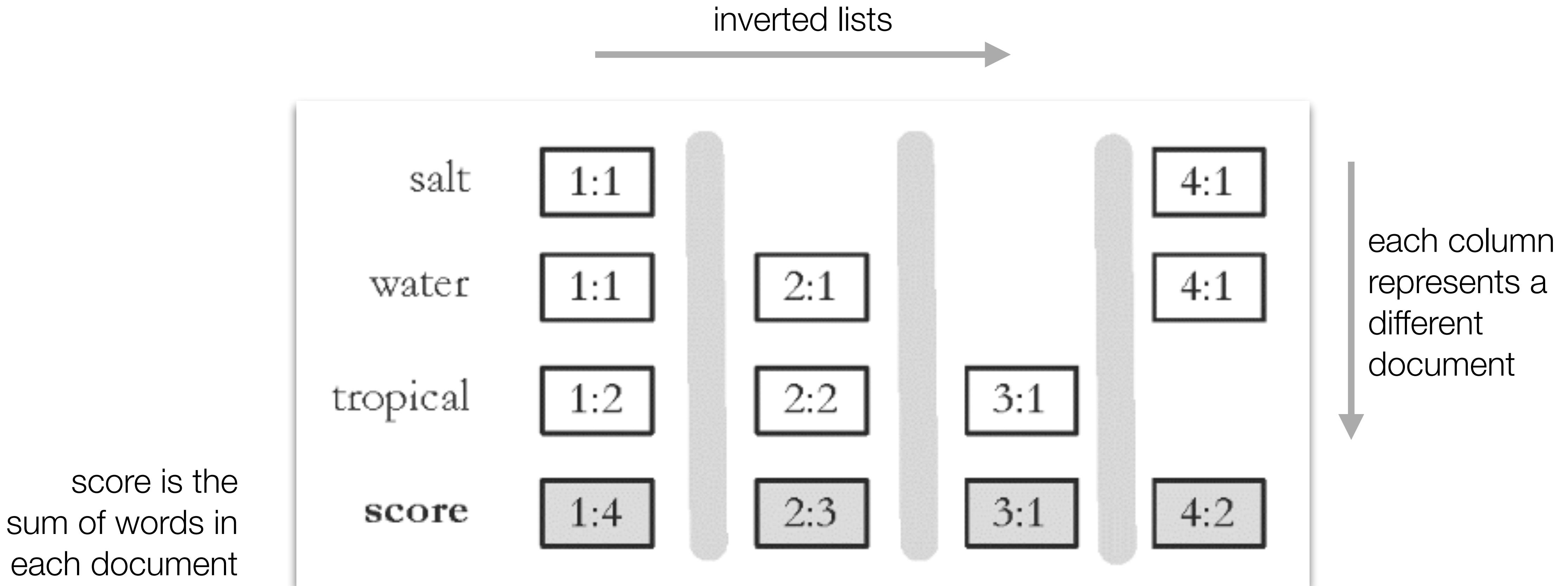
Query Processing

Query Processing

- Once the necessary data structures are in place, we need to efficiently use them to obtain the search results in response to a user query.
- Two main query processing techniques:
 - Document-at-a-time, calculates complete scores for documents by processing all term lists, one document at a time. At the end all documents are sorted according to their score.
 - Term-at-a-time, accumulates scores for documents by processing term lists one at a time. When all terms are processed, the accumulators contain the final scores of all matching documents.
- In both approaches, optimization techniques can significantly reduce the time required.

Document-at-a-Time

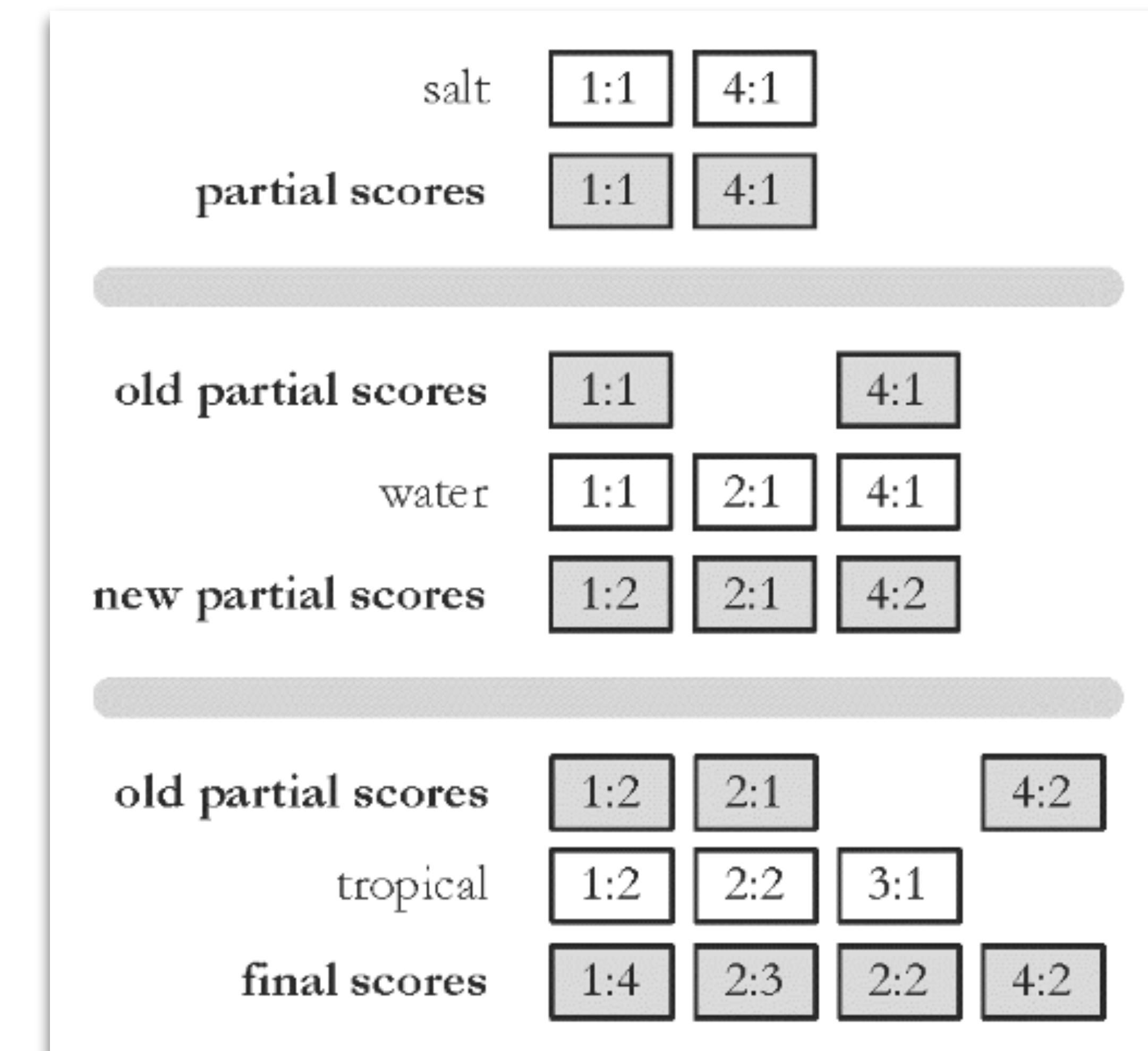
→ query = [salt water tropical]



Term-at-a-Time

→ query = [salt water tropical]

accumulators keep
track of partial scores



1st step: compute
all counts for the
1st term [salt]

one term is
processed in
each step

Optimization Techniques

- Two classes of optimization techniques for query processing:
 - Read less data from the index.
 - Process fewer documents.
- When using complex feature functions, focusing on scoring fewer documents is the main concern.
- With simple feature functions, performance gains come from ignoring as much of the inverted list data as possible.

Skip Pointers

- Skip pointers are used to speed-up inverted index scans.

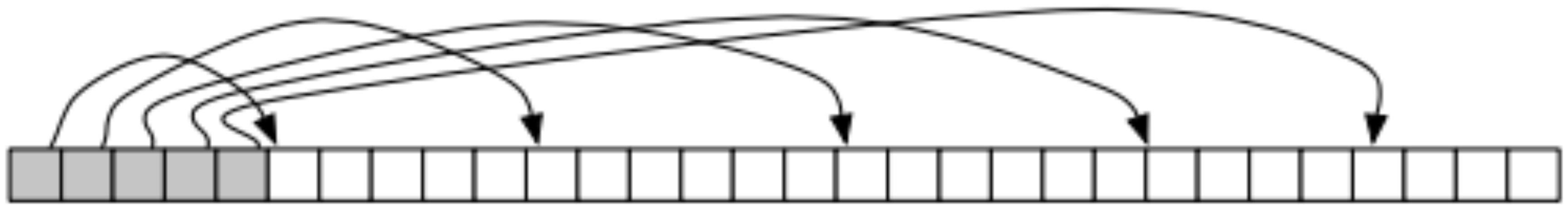


Fig. 5.19. Skip pointers in an inverted list. The gray boxes show skip pointers, which point into the white boxes, which are inverted list postings.

Conjunctive Processing

- Base assumption: only return documents that contain all query terms.
- This is the default in web search engines and the default users' expectations.
- Conjunctive processing works best when one of the terms is rare.
 - [wine baga], since 'baga' is rarer, we can skip most of the inverted list for 'wine'.
- Can be employed for both document-at-a-time or query-at-a-time.
- In short queries, benefits both efficiency and effectiveness.
- Long queries, e.g. phrase searches, are not good candidates for conjunctive processing.

Other Optimization Techniques

- Early termination of query processing:
 - Ignore high-frequency word lists in term-at-a-time (common terms have long postings lists, thus high processing costs).
 - Ignore documents at end of lists in document-at-a-time (when documents are ordered by some quality metric).
- Order postings in inverted indexes
 - Order inverted lists by quality metric (e.g. number of IN links in web IR).
- Caching
 - Cache popular query results

Relevance Feedback and Query Expansion

Relevance Feedback

- Exact matches aren't the only way to obtain relevant results in search systems.
- The vocabulary mismatch between the user and the collection, and the fact that synonyms exist, contribute to this problem.
- For example, a search for [aircraft] should also include results for [airplane].
- This can be addressed by manually refining the query.
- On the system side, this can be tackled with different techniques, broadly grouped in:
 - Global methods, expand or reformulate the query terms independently of the query or the results returned from it, e.g. using thesaurus, and using spelling correction.
 - Local methods, adjust a query relative to the documents that initially appear to match the query, e.g. relevance feedback, and pseudo-relevance feedback.

Local Relevance Feedback Methods

Relevance Feedback

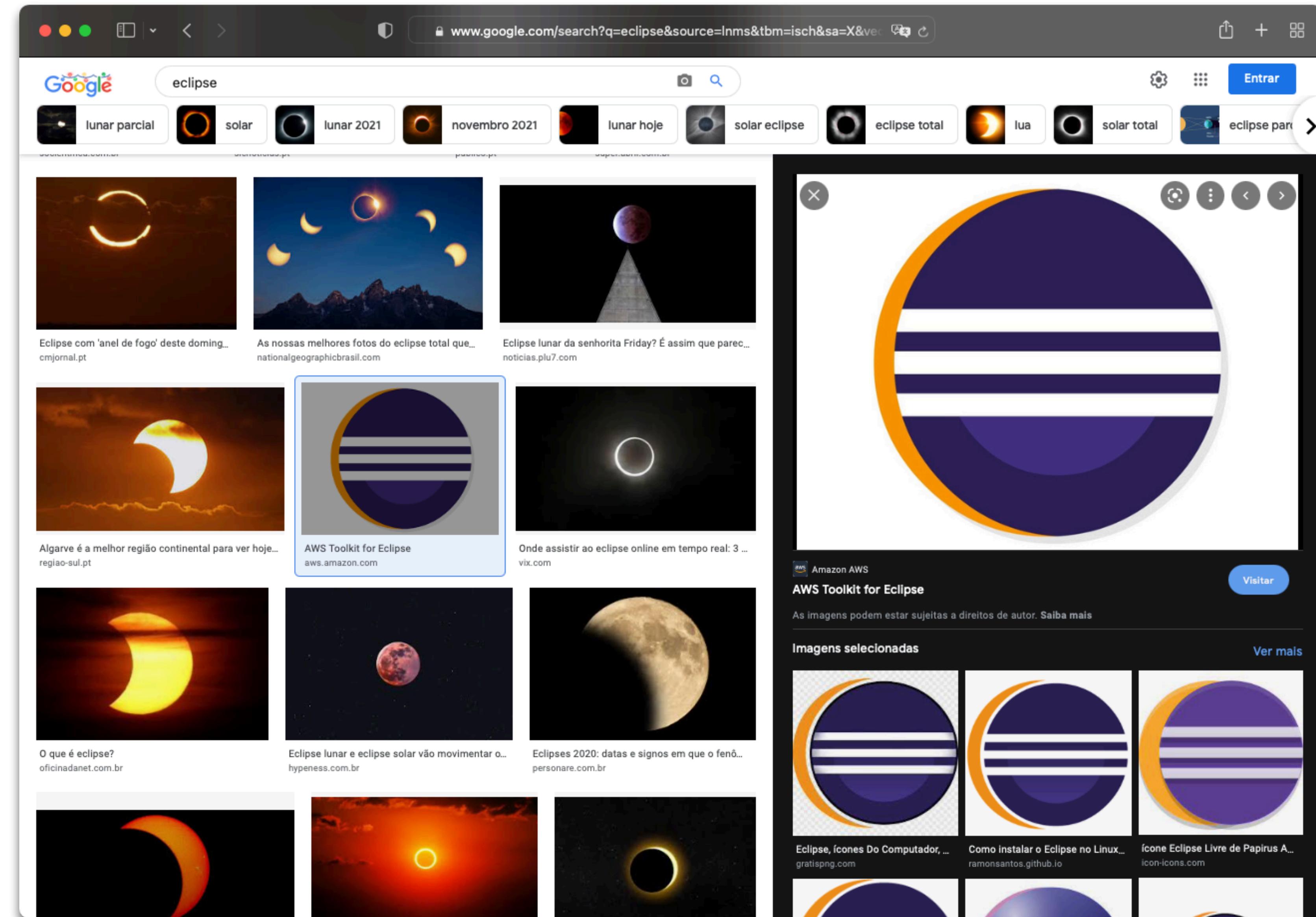
- The idea of relevance feedback is to involve the user in the process to improve the final result set, by considering user feedback on about the initial set of results.
- Basic procedure (one or more iterations are possible):
 - The user issues a (shot, simple) query.
 - The system returns an initial set of retrieval results.
 - The user marks some returned documents as relevant or non relevant.
 - The system computes a better representation of the information need based on the user feedback.
 - The system displays a revised set of retrieved results.

- (a) Query: New space satellite applications
- (b)
- + 1. 0.539, 08/13/91, NASA Hasn't Scrapped Imaging Spectrometer
 - + 2. 0.533, 07/09/91, NASA Scratches Environment Gear From Satellite Plan
 - 3. 0.528, 04/04/90, Science Panel Backs NASA Satellite Plan, But Urges Launches of Smaller Probes
 - 4. 0.526, 09/09/91, A NASA Satellite Project Accomplishes Incredible Feat: Staying Within Budget
 - 5. 0.525, 07/24/90, Scientist Who Exposed Global Warming Proposes Satellites for Climate Research
 - 6. 0.524, 08/22/90, Report Provides Support for the Critics Of Using Big Satellites to Study Climate
 - 7. 0.516, 04/13/87, Arianespace Receives Satellite Launch Pact From Telesat Canada
 - + 8. 0.509, 12/02/87, Telecommunications Tale of Two Companies
- (c)
- 2.074 new 15.106 space
 - 30.816 satellite 5.660 application
 - 5.991 nasa 5.196 eos
 - 4.196 launch 3.972 aster
 - 3.516 instrument 3.446 arianespace
 - 3.004 bundespost 2.806 ss
 - 2.790 rocket 2.053 scientist
 - 2.003 broadcast 1.172 earth
 - 0.836 oil 0.646 measure
- (d)
- *
 - * 1. 0.513, 07/09/91, NASA Scratches Environment Gear From Satellite Plan
 - * 2. 0.500, 08/13/91, NASA Hasn't Scrapped Imaging Spectrometer
 - 3. 0.493, 08/07/89, When the Pentagon Launches a Secret Satellite, Space Sleuths Do Some Spy Work of Their Own
 - 4. 0.493, 07/31/89, NASA Uses 'Warm' Superconductors For Fast Circuit
 - * 5. 0.492, 12/02/87, Telecommunications Tale of Two Companies
 - 6. 0.491, 07/09/91, Soviets May Adapt Parts of SS-20 Missile For Commercial Use
 - 7. 0.490, 07/12/88, Gaping Gap: Pentagon Lags in Race To Match the Soviets In Rocket Launchers
 - 8. 0.490, 06/14/90, Rescue of Satellite By Space Agency To Cost \$90 Million

Figure 9.2 Example of relevance feedback on a text collection. (a) The initial query. (b) The user marks some relevant documents (shown with a plus sign). (c) The query is then expanded by 18 terms with weights as shown. (d) The revised top results are then shown. A * marks the documents which were judged relevant in the relevance feedback phase.

Relevance Feedback

- Relevance feedback explore the idea that it may be difficult to formulate a good query when you don't know the collection, but it is easy to judge particular documents.
- Relevance feedback can be effective in tracking a user's evolving information need, i.e. seeing some documents may lead users to refine their understanding of the original information need.
- Image search is a good example of relevance feedback, a task where it may be difficult to express a query in words, but is easy to determine if an image is



Rocchio Algorithm

- The Rocchio algorithm is the classic algorithm for implementing relevance feedback.
- It models a way of incorporating relevance feedback information into the vector space model.
- It is based on the concept of an optimal query vector, which maximizes the difference between the average vector representing the relevant documents, and the average vector representing the non-relevant documents.
- Considering that only partial relevance information is available about the collection, the Rocchio algorithm defines the "modified query" as a weighted combination of the initial query and the difference vector between the centroid of the documents marked as relevant and the centroid of the documents marked as non relevant.

Rocchio Optimal Query

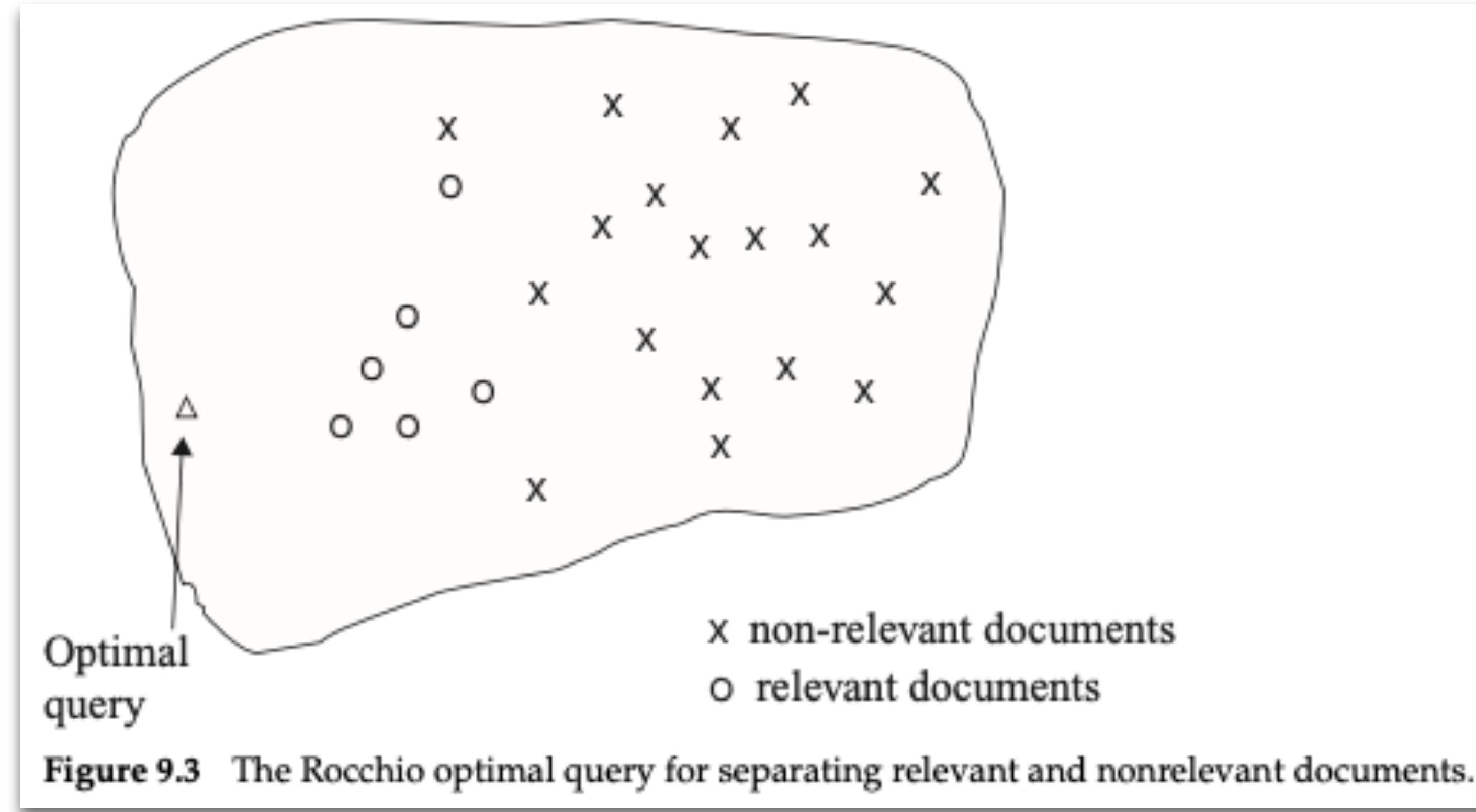


Image from Introduction to Information Retrieval, Manning et al. (2008)

Rocchio Adjusted Query

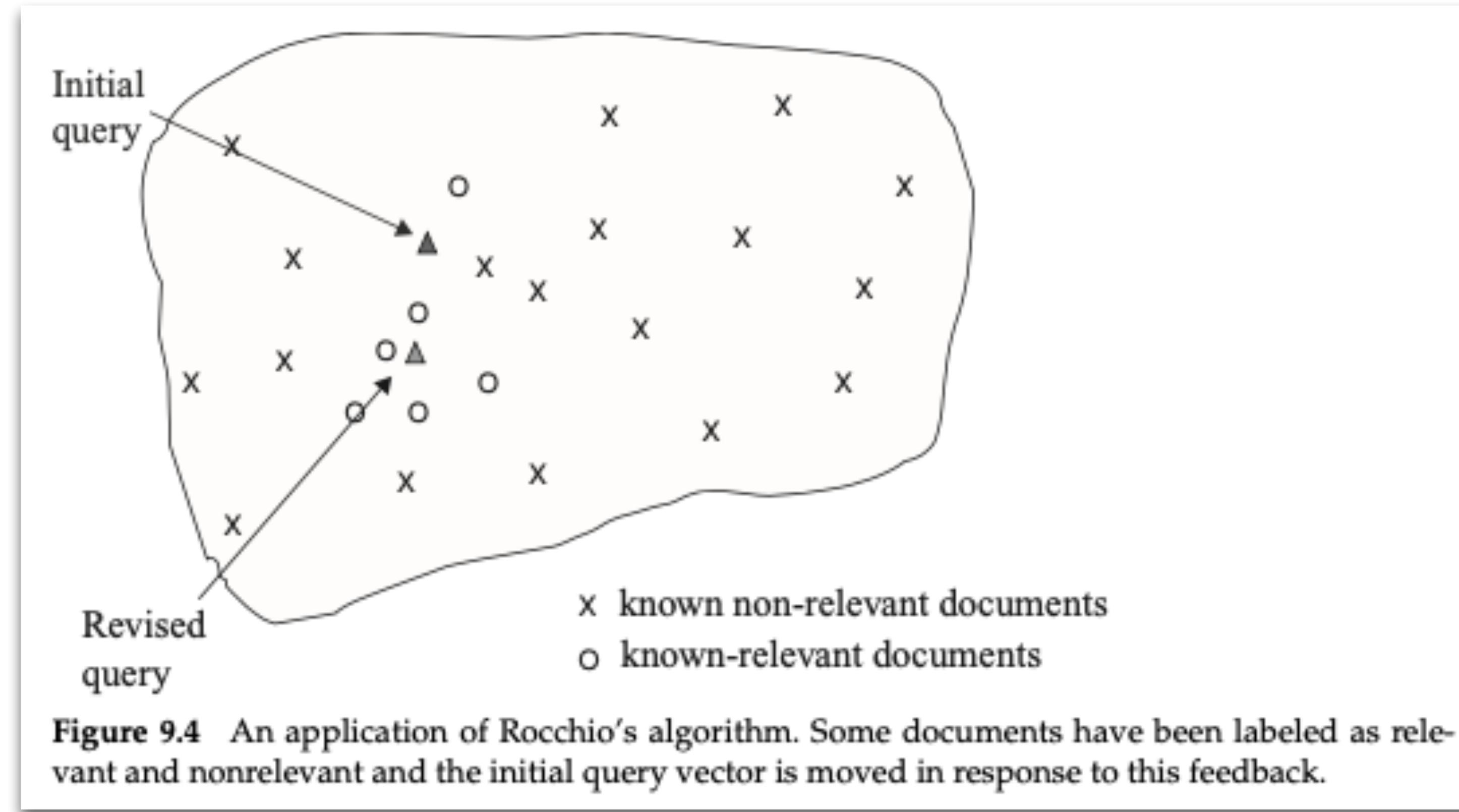


Image from Introduction to Information Retrieval, Manning et al. (2008)

Rocchio Algorithm Performance

- Relevance feedback can improve both recall and precision.
- In practice it has been shown to be most useful for increasing recall – partially an effect of the use case: when a user wants high recall (i.e. see all relevant documents), they are expected to take the time to review results and iterate over the search.
- Positive feedback is more valuable than negative feedback. Many systems only allow for positive feedback.

Relevance Feedback Limitations

- Cases where relevance feedback might be insufficient:
 - Misspellings, if the user spells a term in a different way to the way it is spelled in the document collection, relevance feedback is unlikely to be effective.
 - Cross-language retrieval, documents in another language are not near (in a vector space) of other topic related documents, rather documents in the same language are closer.
 - Vocabulary mismatch, in this cases the initial query mostly likely will fail and thus relevant feedback won't be effective.
- Users are often reluctant to provide explicit feedback. Users expect single interactions in search and the concept of relevance feedback is hard to explain to the average user.
- Additionally, it is often harder to understand why a particular document was retrieved after relevance feedback was applied.

Pseudo Relevance Feedback

- Pseudo relevance feedback provides a method for automatic local analysis.
- It automates the manual part so that a relevance feedback algorithm is applied without extended user interaction.
- The method is to normal retrieval, assume that the top k ranked documents are relevant, and apply a relevance feedback algorithm under this assumption.

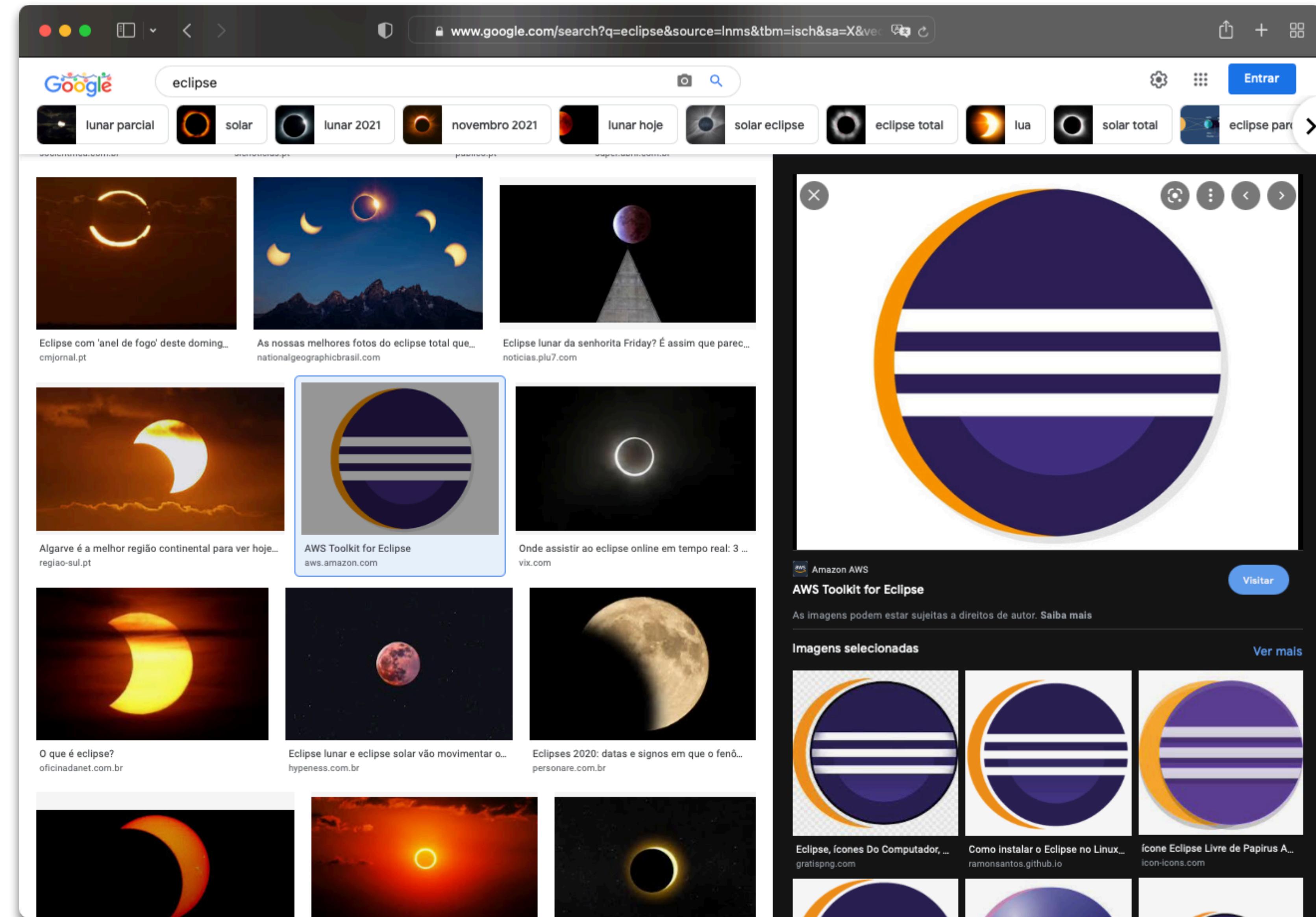
Implicit Relevance Feedback

- We can use indirect sources of evidence rather than explicit feedback on relevance.
- This is called implicit (relevance) feedback.
- Implicit feedback is less reliable than explicit feedback, but is more useful than pseudo relevance feedback, which contains no evidence of user judgements.
- Clickstreams are one of the main examples of indirect relevance information — clicks on links are assumed to indicate that the page was likely relevant for the query.

Global Query Reformulation Methods

Query Expansion

- With query expansion, user give additional input on query words or phrases to suggest additional terms. Users opt to use one of alternative query suggestions.
- How to generate alternative question expansions for the user:
 - Use synonyms and related words from a global thesaurus;
 - Use a controlled vocabulary to build a thesaurus;
 - Use a manual thesaurus built by editors;
 - Automatically derive thesaurus, e.g. use text statistics;
 - Use query log mining to find related expansions (global, contextual, user-based);



www.google.com/search?q=igreja&bih=1017&biw=1538&hl=pt-PT&ei=2

Google

igreja

Tudo Maps Imagens Notícias Vídeos Mais Ferramentas

Cerca de 466 000 000 resultados (0,93 segundos)

<https://pt.wikipedia.org/wiki/Igreja>

Igreja – Wikipédia, a encyclopédia livre

A Igreja é "o povo que Deus convoca e reúne de todos os confins da Terra, para constituir a assembleia daqueles que, pela fé e pelo Batismo, se tornam filhos de ...

[Igreja \(edifício\)](#) · [Igreja Apostólica](#) · [Igreja Militante](#) · [Igreja orgânica](#)

https://pt.wikipedia.org/wiki/Igreja_Católica

Igreja Católica – Wikipédia, a encyclopédia livre

A Igreja Católica ensina que é a Igreja única, santa, católica e apostólica fundada por Jesus Cristo em sua Grande Comissão, que seus bispos são os sucessores ...

Número de Igrejas: + 221 mil paróquias Fundador: [Jesus](#), segundo a tradição cat...
Origem: [Século I](#), [Terra Santa](#), [Império Rom...](#) Sede: [Vaticano](#)

Queria dizer:

- Igreja** Igreja, no sentido genérico religioso, tem várias acepções ...
- Igreja de Santo Ildefonso** Igreja católica no Porto
- Igreja Católica** Igreja Católica, às vezes chamada de Igreja Católica ...
- Igreja Cristã** Função do edifício

Piscinas da Constituição R. do Covoel
R. de Zambujeira Rua das Alianças R. de Ribeiro dos Sousas
Quinta do Covelos Combatentes M Fitness UP Antas
Constituição Park / Antigo Estádio da... Hotel Cristal Porto
Associação Juvenil Escola de Futebol... H Hospital de Santa Maria - Porto
Lapa M Faria Guimarães M Lidl Porto - Av Fernão de Magalhães
R. do Covoel R. Agostinho de Campos R. Jerônimo Mendonça R. João Ramalho
R. de Latino Coelho R. das Dores R. das Dores R. de Santa Catarina R. de Santos Pousada R. da Póvoa
Dados do mapa ©2021

Igreja do Marquês
4000-391 Porto

<https://www.tripadvisor.pt/Attractions-g189180-Activi...>

Confira 10 Igrejas e catedrais em Porto - Tripadvisor

 X Keyboard Search icon

-
-
-
-
-
-  Rua do Medo - Parte 3: 1666
Filme de 2021
-
-
-

Denunciar previsões impróprias

Search User Experience

Search User Experience

- Ranking is only a part of the information retrieval process, user interaction is central to the overall user experience and success of the user task.
- Designing the search user experience involves designing how the user interacts with the system during query formulation and reformulation, and while browsing the results.
- Example of search user experience techniques:
 - Support natural language queries.
 - Query auto-complete and suggestions;
 - Results snippets, e.g. query-dependent result snippets.
 - Clustering results.
 - Support site search.

Contextual Snippets

A screenshot of a search results page from a search engine. The search query is "conquista de ceuta porto". The results are filtered under the "Tudo" tab. The snippet for the first result, from Wikipedia, includes a summary of the Conquest of Ceuta and links to "Os motivos", "Causas", "A conquista", and "O fracasso de Ceuta". Another snippet for a website about the history of Africa also appears.

conquista de ceuta porto

Tudo Imagens Notícias Maps Vídeos Mais Ferramentas

Cerca de 256 000 resultados (0,50 segundos)

[https://pt.wikipedia.org › wiki › Conquista_de_Ceuta](https://pt.wikipedia.org/wiki/Conquista_de_Ceuta) ▾

Conquista de Ceuta – Wikipédia, a encyclopédia livre

A **Conquista de Ceuta**, cidade islâmica no Norte de África, por tropas portuguesas sob o comando de João I de Portugal, deu-se a 21 de Agosto de 1415.

[Os motivos](#) · [Causas](#) · [A conquista](#) · [O fracasso de Ceuta](#)

https://www.todamateria.com.br › ... › História da África ▾

Conquista de Ceuta: o começo das grandes navegações

Na estação de São Bento, na cidade do **Porto**, em Portugal, existe um enorme painel de azulejo sobre a **conquista de Ceuta**. Isto se deve porque a maioria das ...

<https://www.dw.com> › cronologia-1415-1961-da-conq... ▾

Cronologia 1415-1961: Da conquista de Ceuta ao início ... - DW

10/12/2013 — O painel de azulejos de Jorge Colaço na Estação de São Bento, no **Porto**, retrata a **conquista de Ceuta**, no norte de África.

A screenshot of a search results page from Google. The search query is "web sistemas informação". The results are filtered under the "Tudo" tab. The snippet for the first result, from a course at EduPortugal, includes a summary of the course and its objectives. Other snippets include links to a license in Information Technologies and Systems, a guide from DGES, and a Facebook page for the same course.

Google

web sistemas informação

Tudo Imagens Notícias Vídeos Compras Mais Ferramentas

Cerca de 211 000 000 resultados (0,44 segundos)

<https://eduportugal.eu> › Course ▾

Tecnologias e Sistemas de Informação Para a Web

A Licenciatura em **Tecnologias e Sistemas de Informação para a Web** tem por objetivo formar profissionais capazes de liderarem projetos nos domínios da ...

<https://www.esmad.ipp.pt> › cursos › licenciatura ▾

Licenciatura em Tecnologias e Sistemas de Informação Para ...

A licenciatura assenta numa visão contemporânea e multidisciplinar da **Web**, agregando competências focadas na conceção, design e desenvolvimento de produtos ...

<https://www.dges.gov.pt> › guias › detcurso ▾

Tecnologias e Sistemas de Informação para a Web - Guia da ...

Tecnologias e **Sistemas de Informação para a Web**. Instituto Politécnico do Porto - Escola Superior de Media Artes e Design ...

<https://pt-pt.facebook.com> › ... › Outra › Comunidade ▾

Licenciatura em Tecnologias e Sistemas de ... - Facebook

Licenciatura em **Tecnologias e Sistemas de Informação para a Web**. 670 gostos · 8 falam sobre isto. Uma Licenciatura da Escola Superior de Media Artes e ...

Clustering Results

Google search results for "feup":

Cerca de 1 800 000 resultados (0,55 segundos)

<https://sigarra.up.pt> > feup > web_page.inicial
Faculdade de Engenharia da Universidade do Porto - Sigarra
Faculdade de Engenharia da Universidade do Porto ... Ligação à página, FEUP e Sustentabilidade. Ligação à página, Como chegar à...

Cursos/CE
Ciclos de Estudo. Com as alterações ao Ensino Superior ...

Estudantes
Inscrições nas Turmas - Ementa da Cantina - Propinas 2021/2022

Pesquisa
Poderá efectuar uma pesquisa nos documentos que se encontram ...

[Mais resultados de up.pt »](#)

Encontre resultados em:

[Facebook FEUP - Página inicial](#) [Sapo FEUP vai aumentar...](#)

Feup

Mapa da Faculdade de Engenharia da Universidade do Porto (FEUP) mostrando locais como Instituto Superior de Engenharia do Porto, Serviços Académicos Da FEUP, Hipercentro Areosa, AREOSA, Paranhos, Polo Universitário M, AEFEUP - Associação de Estudantes da FEUP, FEUP Bridge, Yuko Tavern, PCDIGA, etc.

FEUP - Faculdade de Engenharia da Universidade do Porto
4,6 ★★★★ (530) · Universidade
s/n, R. Dr. Roberto Frias · 22 508 1400
Aberto · Fecha às 22:00

AEFEUP - Associação de Estudantes da FEUP
4,4 ★★★★ (57) · Organização de Juventude
R. Dr. Júlio de Matos 882 · 22 508 1556
Fechado · Abre às 09:30 de segunda

Google search results for "\"solr\" \"nested documents\"":

Cerca de 5 560 resultados (0,42 segundos)

<https://solr.apache.org> > guide > in... ▾ Traduzir esta página
Indexing Nested Child Documents - Apache Solr

Nested documents (children and all) can simply be replaced by adding a new document with more or fewer documents as an application desires. This aspect isn't ...

[Schema Configuration](#) · [Rudimentary Root-only Schemas](#) · [XML Examples](#)

<https://stackoverflow.com> > questions ▾ Traduzir esta página
How to nest documents in Solr? - Stack Overflow

19/02/2018 · 1 resposta

You have to list child documents under the special key "_childDocuments_". In Apache Solr Reference Guide you will find this example and the ...

[How can you retrieve a full nested document in Solr ...](#) 2 respostas 22/06/2016
[Apache Solr mapping custom JSON can't index nested ...](#) 1 resposta 31/07/2020
[Solr Nested Documents not properly setup - Stack ...](#) 3 respostas 2/01/2020
[Query for child documents filtered by a parent field ...](#) 1 resposta 3/12/2018

[Mais resultados de stackoverflow.com](#)

Infoboxes

Google search results for "porto":

Search term: upporto

Results:

- U.Porto**
Universidade do Porto SIGARRA U.Porto · Universidade · Estudar · Investigar · Inovar · Internacional · Cultura · Viv...
<https://www.up.pt>
- Cursos**
Abrangendo todos os graus de ensino (licenciatura, mestrado ...)
- Mestrados**
A pensar nisso, a Universidade do Porto vem apostando nos ...
- Sigarra**
O nível organizacional do Sistema de Informação SIGARRA ...
- Licenciaturas e Mestrados ...**
Bolsas e Financiamento - Direito - Ciências do Desporto - ...
- Estudantes Internacionais**
Candidaturas - Alojamento - Bolsas e Financiamento - Alumni
- Get inspired!**
Studying - International Students - University - Masters Degrees
- <https://twitter.com/upporto> Universidade Porto (@UPorto) / Twitter
The official Twitter account of the University of Porto. Use #UPORTO to join us.
- <https://pt-pt.facebook.com> Faculdade pública Universidade do Porto - Página inicial | Facebook
Fundada em 1911, a Universidade do Porto é uma instituição de ensino e investigação científica de referência em Portugal, figurando hoje entre a...

Google search results for "recuperação de informação":

Search term: recuperacao de informacao

Results:

- Recuperação de informação – Wikipédia, a encyclopédia livre**
É uma ciência de pesquisa sobre busca por informações em documentos, busca pelos documentos propriamente ditos, busca por metadados que descrevam documentos e ... Histórico acadêmico · Palavras-chave · Principais passos · Esquema global
- https://sigarra.up.pt/feup/ucurr_geral.ficha_uc_view Recuperação da Informação - FEUP - Sigarra
Usar os métodos estabelecidos na recuperação de informação para avaliar ferramentas de pesquisa. Resultados de aprendizagem e competências. No final desta ...
- <https://www.marilia.unesp.br/EduardoFernandes.pdf> Recuperação de Informação - Unesp
14/08/2018 — de recuperação de informação dos sistemas gerenciadores de bancos de dados, estudados e implementados no âmbito da Ciência da Computação.
26 páginas
- <https://pt.slideshare.net/CliaDias/sistemas-de-recuperacao-de-informacao> Sistemas de recuperação de informação - SlideShare
O que é recuperação de informação consiste em encontrar a informação desejada, seja em Sistemas de recuperação da informação Indexação Recuperação ...
- <https://apdsi.pt/glossario/recuperacao-da-informacao> recuperacao da informação - APDSI
recuperação da informação ... [Ing.] ... [def.] Processo utilizado para pesquisar seletivamente e obter a informação relevante num conjunto de recursos de ...
- <https://www.teses.usp.br/teses/publico/Tese.pdf>

Diagrama de fluxo de processos de recuperação de informação:

O diagrama ilustra o processo de recuperação de informação. Ele mostra a interface com o usuário, a interface com o sistema de informação, a interface com o banco de dados, e a interface com o usuário. O processo envolve a indexação, a organização, a recuperação e a apresentação de resultados. Exemplos de sistemas de informação mencionados no diagrama incluem o SISTEMA DE RECUPERAÇÃO DA INFORMAÇÃO (SRI) e o SISTEMA DE INFORMAÇÃO (SI).

Results Browsing

Google O Silêncio dos Inocentes

Tudo Imagens Vídeos Notícias Compras Mais Ferramentas

Anthony Hopkins/Filmes

O Silêncio dos Inocentes (1991) | O Pai (2020) | Hannibal (2001) | Conhece Joe Black? (1998) | Um Crime de Mestre (2007) | Dragão Vermelho (2002)

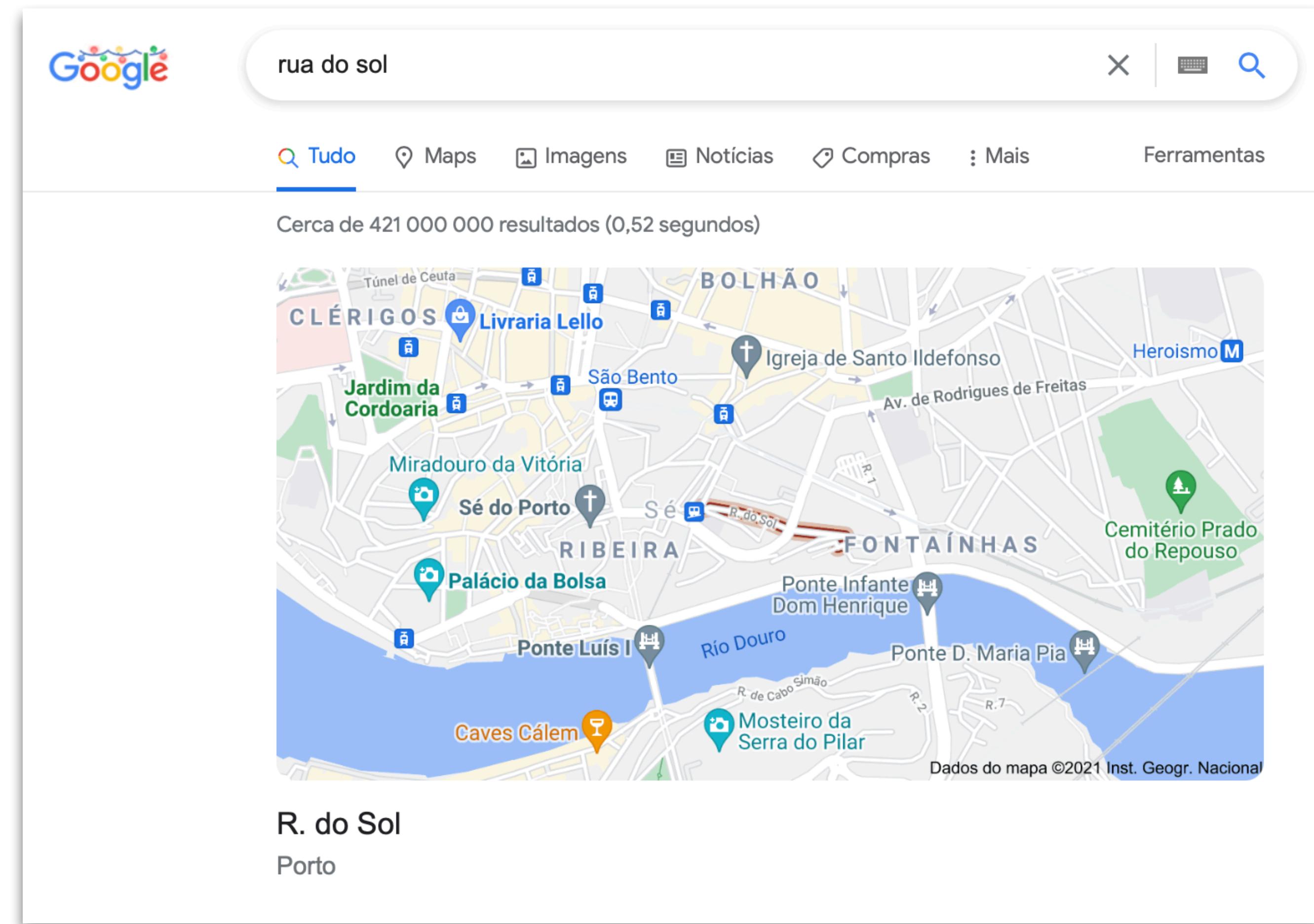
https://pt.wikipedia.org/wiki/O_Silêncio_dos_Inocentes

O Silêncio dos Inocentes – Wikipédia, a encyclopédia livre

O Silêncio dos Inocentes é baseado no romance homônimo de Thomas Harris de 1988 e é o segundo filme a apresentar o personagem Hannibal Lecter após o filme ...

Baseado em: The Silence of the Lambs; de... Companhia(s) produtora(s): Strong Heart...
Elenco: Jodie Foster; Anthony Hopkins; Sc... Produção: Kenneth Utt; Edward Saxon; ...
Hannibal Lecter · Hannibal (filme) · Manhunter · Jodie Foster

Geographical Results



Immediate Answers

capital de frança

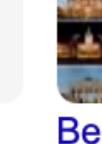
Tudo Imagens Maps Notícias Vídeos Mais Ferramentas

Cerca de 38 200 000 resultados (0,63 segundos)

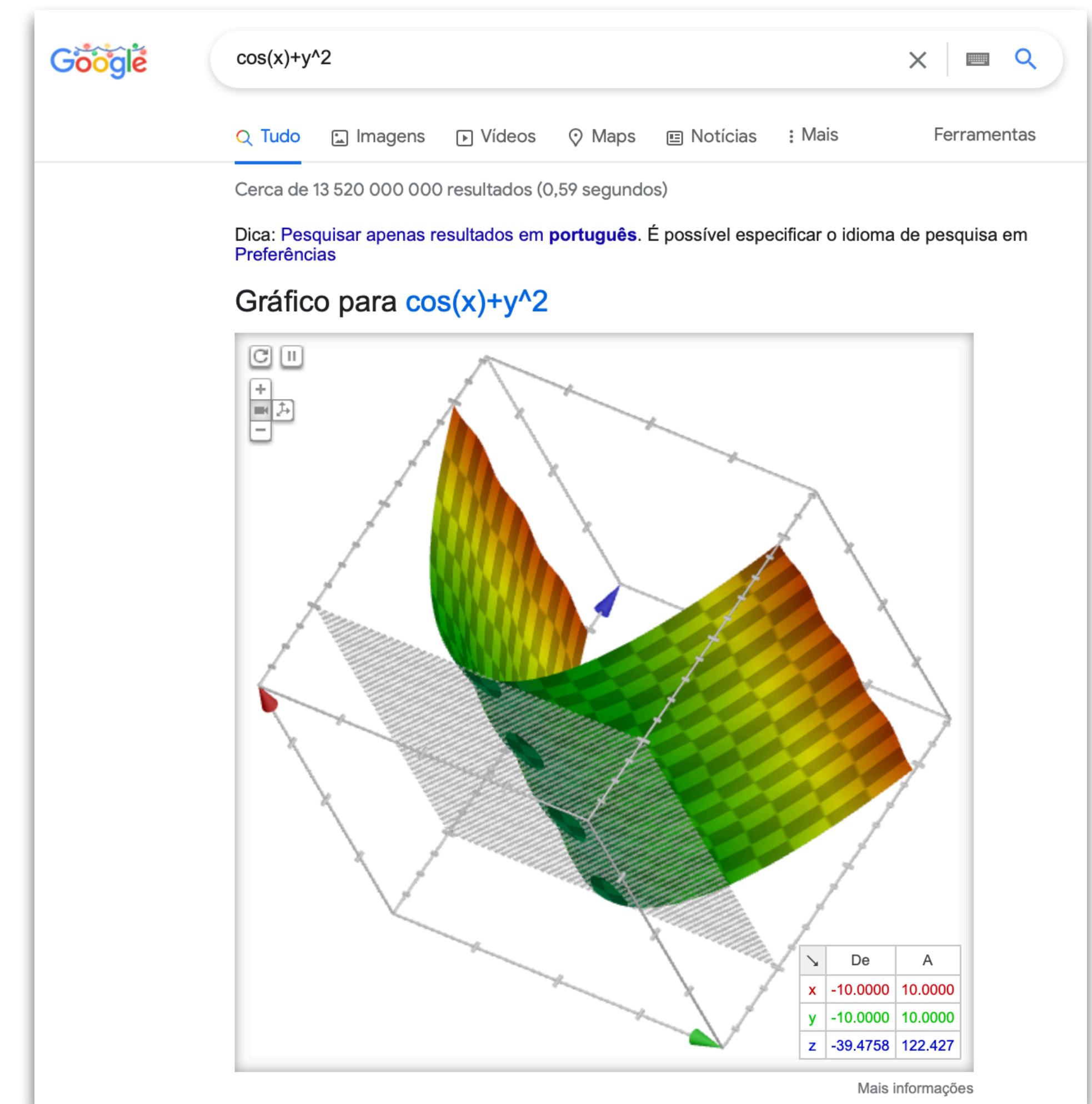
França / Capital

Paris

Itens também pesquisados

 França  Lond...  Torre Eiffel  Berlim  Roma  Madrid  Île-d...

Feedback



Domain Specific Search

A screenshot of a Google search results page. The search query "cursos universidade do porto" is entered in the search bar. The results are filtered under the "Tudo" tab. The first result is from the website <https://www.up.pt>, which is identified as "U.Porto". Below the link, there is a snippet of text: "Contactos · Universidade · A U.Porto em Síntese · Estudar · Faculdades · Faculdade de Arquitetura (FAUP) · Investigar · Políticas e Estrutura · Políticas de I&D ...". The second result is from the website <https://www.dges.gov.pt>, titled "Índices de Cursos (por distrito e instituição) - DGES". Below the title, there is a snippet of text: "Porto. Ensino Superior Público Universitário. 1102. Universidade do Porto - Faculdade de Arquitetura. 5402. Universidade do Porto - Faculdade de Belas-Artes. Universidade do Porto · Universidade Portucalense... · Universidade Católica...".

References

- Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Introduction to Information Retrieval
 - Chapter 9: Relevance feedback and query expansion
- W. Bruce Croft, Donald Metzler, Trevor Strohman, Search Engines - Information Retrieval in Practice
 - Chapter 5: Ranking with Indexes + Slides
 - Chapter 6: Queries and Interfaces + Slides
 - Chapter 7: Retrieval Models + Slides
- Ricardo Baeza-Yates, Berthier Ribeiro-Neto, Modern Information Retrieval: The Concepts and Technology behind Search
 - Chapter 2: User Interfaces for Search + Slides