

Think outside the search box

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2Dsearch



Introductions



Tony Russell-Rose, PhD

Senior Lecturer, Goldsmiths Director, UXLabs

- PhD (natural language interfaces), MSc in human-computer interaction, first degree in engineering (human factors)
- Led R&D / technology innovation at Microsoft, Canon, Reuters, BT Labs, HP Labs, Oracle
- Visiting Professor of Cognitive Computing & AI, Essex University.
- 5 patents, 80+ scientific and technical papers on AI/NLP, information retrieval and UX
- Founder, 2Dsearch: next generation advanced search
- Director, UXLabs: UX research & design consultancy
- Founder of Search Solutions conference series.
- Served as Vice-chair of BCS IRSG, Chair of CIEHF HCI Group
- Blog: <http://isquared.wordpress.com>

uxlabs

Industry Expertise

- Media & publishing
- Healthcare
- Business intelligence
- eCommerce

Domain Expertise

- UX research & design
- Information architecture
- Search & information retrieval
- AI + NLP

2Dsearch



Professional search



- We all need search but...
 - Some need it more than others
- Patent, healthcare, recruitment, media...
 - Keyword search is not good enough
- Professional search needs to be:
 - Comprehensive
 - Repeatable
 - Transparent

Query builders



World Health Organization



International Clinical Trials Registry Platform Search Portal

Home **Advanced Search** List By Search Tips UTM ICTRP website REGTRAC Contact us

Fields can be left blank. Click on the field name hyperlink for an explanation of each search field

Look for trials with the exact phrase or contains

Example: liver cancer OR breast cancer in the [Title](#)

AND Example: Diphtheria NOT tetanus in the [Condition](#)

AND Example: transplant AND immunosuppressant in the [Intervention](#)

Search for [clinical trials in children](#)

[Recruitment status](#) is

[Primary sponsor](#) is or contains

[Secondary ID](#) is or contains

[Countries of recruitment](#) are

and

[Phases](#) are

With results only
 Rare diseases / orphan drugs
 Genome editing

[Search Tips](#)

Disclaimer: Trials posted on this search portal are not endorsed by WHO, but are provided as a service to our users. In no event shall the World Health Organization be liable for any damages arising from the use of the information linked to in this section. None of the information obtained through use of the search portal should in any way be used in clinical care without consulting a physician or licensed health professional. WHO is not responsible for the accuracy, completeness and/or use made of the content displayed for any trial record.

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A healthcare search strategy

1. randomized controlled trial.pt.
2. controlled clinical trial.pt.
3. randomized.ab.
4. placebo.ab.
5. clinical trials as topic.sh.
6. randomly.ab.
7. trial.ti.
8. 1 or 2 or 3 or 4 or 5 or 6 or 7
9. (animals not (humans and animals)).sh.
10. 8 not 9
11. exp Child/
12. ADOLESCENT/
13. exp infant/
14. child hospitalized/
15. adolescent hospitalized/
16. (child\$ or infant\$ or toddlers\$ or adolescens\$ or teenage\$).tw.
17. or/11-16
18. Child Nutrition Sciences/
19. exp Dietary Proteins/
20. Dietary Supplements/
21. Dietetics/
22. or/18-21
23. exp Infant, Newborn/
24. exp Overweight/
25. exp Eating Disorders/
26. Athletes/
27. exp Sports/
28. exp Pregnancy/
29. exp Viruses/
30. (newborn\$ or obes\$ or "eating disorder\$" or pregnan\$ or childbirth or virus\$ or influenza).tw.
31. or/23-30
32. 10 and 17 and 22
33. 32 not 31

Francis, D. K., Smith, J., Saljuqi, T., & Watling, R. M. (2015). Oral protein calorie supplementation for children with chronic disease. *Cochrane Database of Systematic Reviews*, (5).

Recruitment search strategies

Java AND (Design OR develop OR code OR Program) AND ("* Engineer" OR MTS OR "* Develop*" OR Scientist OR technologist) AND (J2EE OR Struts OR Spring) AND (Algorithm OR "Data Structure" OR PS OR "Problem Solving")

A screenshot of a Google search for "boolean strings". The search bar contains the text "boolean strings". Below the search bar, there are tabs for "All", "Images", "Videos", "Shopping", "News", "More", "Settings", and "Tools". The search results show "About 16,400,000 results (0.36 seconds)". The first result is "A Recruiter's Guide to Boolean Searching (and the World's Largest ...)" with a URL "https://www.ere.net/a-recruiters-guide-to-boolean-searching-and-the-worlds-largest-fr...". Below the search results, there is a section "People also ask" with four questions: "What is a Boolean search string?", "What is an example of a Boolean?", "What is a Boolean Google search?", and "What are the three Boolean search terms?". Below this section, there are three more search results: "The Beginner's Guide to Boolean Search Operators - SocialTalent", "Boolean Strings | By Irina Shamaeva", and "Boolean Search String Examples | Boolean Black Belt-Sourcing ...".

A screenshot of a LinkedIn search for a Java developer. The search bar contains the text "(site:linkedin.com intitle:profile) (Java AND (Design OR develop O)". The search results show "6,540 Results". The first result is "Latha Balne - Java Support Developer - KCOM | LinkedIn" with a URL "https://uk.linkedin.com/in/latha-balne-83673217?trk=pub-ptmap". The second result is "Eugen Hoble - Senior J2EE Engineer - Crosscap Media ..." with a URL "https://ca.linkedin.com/in/emh2k7". The third result is "Artem Gluhovskiy - Java Software Engineer - Exadel | ..." with a URL "https://by.linkedin.com/in/artem-gluhovskiy". The fourth result is "Shahzeb Khan - Sr. Java Developer - WizTech Pakistan ..." with a URL "https://pk.linkedin.com/in/shahzebhan111". The fifth result is "Aamir Naeem - Java Integration Developer (Software ...)" with a URL "https://pk.linkedin.com/in/aamir-naeem-927873116?trk=prof-same-name".

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Patent search & media monitoring

```
1      A01N0025-004/CPC
2      RODENT OR RAT OR RATS OR
MOUSE OR MICE
3      BAIT OR POISON
4      2 AND 3
5      1 OR 4
6      AVERSIVE OR ADVERSIVE OR
DETER? OR REPEL?
7      NONTARGET OR (NON WITH
TARGET) OR HUMAN OR DOMESTIC OR
PET OR DOG OR CAT
8      6 AND 7
9      8 AND 5
10     BITREX OR DENATONIUM OR
BITREXENE OR BITTERANT OR BITTER
11     10 AND 5
12     9 OR 11
```

```
(
  (
    (~Magnolia OR ~Magnolias) AND
    ('~Paul ~Anderson' OR '~Paul ~Thomas' OR paul* OR thom*
OR anders*)
  ) OR
  'jeremy blackman*' OR jeremy OR Jerem* OR
  (
    (~incredible OR ~coincidences) AND
    (role* OR chance* OR life* OR investigat* OR disturb*)
  ) OR
  (
    (~C NOT
      ('~John C' OR
        (
          (~Mister C' AND ~Shamen) OR
          ('~Tom C' AND ~Scientology)
        )
      )
    )
  ) OR ~XCs OR ~CV OR ~CVs OR
  (
    (
      (~CKR OR ~CKRs) NOT ('CKR 123' OR lawyer)
    )
  )
)
```

And more...

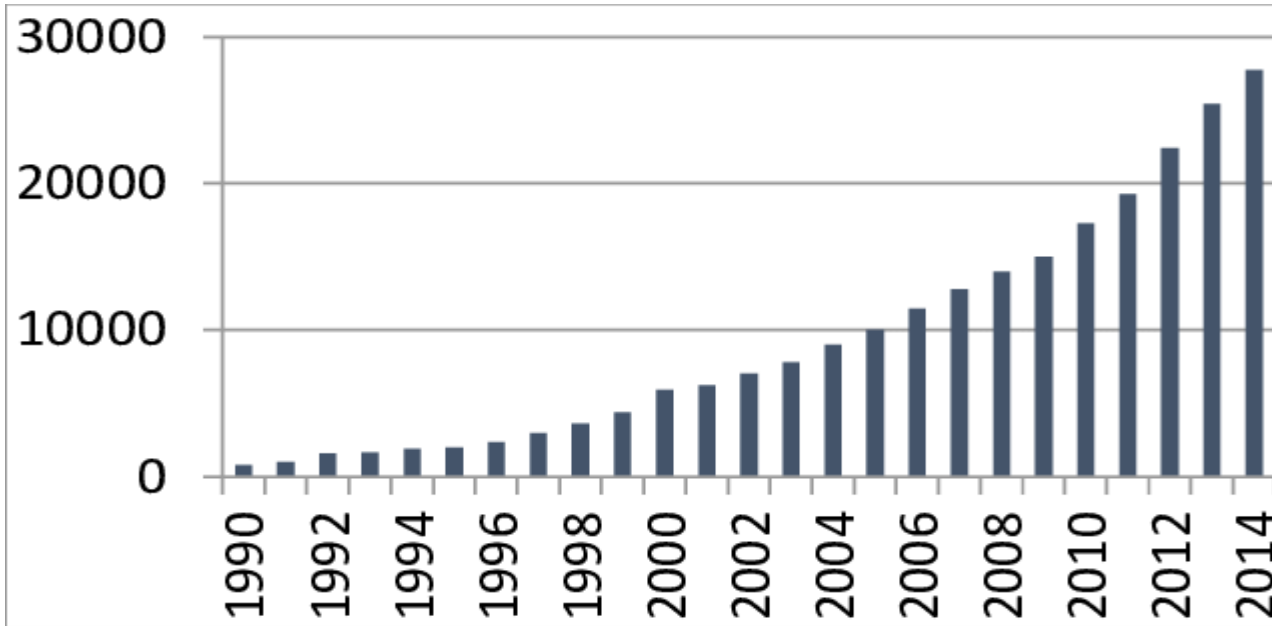
(topic:"d5f485b9\|aabo\|4d95\|a83b\|28b2decd900c" AND (topic:"bag42587\|854e\|407d\|81dc\|812ee29624bd" OR topic:"805a2281\|8fo4\|42b7\|a451\|e2b7daac4db1" OR topic:"1fc2a4f5\|3f23\|4c80\|943c\|42f789d1644" OR topic:"91e4df78\|db55\|4d63\|be65\|2fad1afa7a77" OR organization:"Argos" OR organization:"Sainsbury" OR organization:"Marks and Spencer" OR organization:"Morrisons" OR organization:"Signet" OR organization:"Rapha" OR organization:"Vodafone" OR organization:"Evans Cycle" OR organization:"The Body Shop" OR organization:"Homebase" OR organization:"Toppo Tiles" OR organization:"Carphone Warehouse" OR organization:"B&Q" OR organization:"Tesco" OR organization:"Lidl" OR organization:"Aldi" OR organization:"Waitrose" OR organization:"John Lewis" OR organization:"Dixons" OR organization:"Alliance Boots" OR organization:"AS Watson" OR organization:"Halfords" OR organization:"Vision Express" OR organization:"Pets at Home" OR organization:"Asda" OR organization:"Pret a Manger" OR organization:"Greggs" OR organization:"Majestic Wine" OR organization:"Ocado" OR organization:"Selfridges" OR organization:"Nike" OR organization:"Adidas" OR organization:"Walmart" OR organization:"Woolworths" OR organization:"Debenhams" OR organization:"Halfords" OR organization:"Punch Taverns" OR organization:"Monarch Group" OR organization:"Whitbread" OR organization:"Carnival Cruise" OR organization:"KFC" OR organization:"Yum!" OR organization:"Costa Coffee" OR organization:"Pizza Hut" OR organization:"Greene King" OR organization:"Carluccio's" OR organization:"Gondola" OR organization:"Starbucks" OR organization:"Sodexo" OR organization:"SSP" OR organization:"Nando's" OR organization:"Avis" OR organization:"Paddy Power" OR organization:"Easyjet" OR organization:"Emaar" OR organization:"Nuffield Health" OR organization:"Safestore" OR organization:"TUI" OR organization:"Merlin Entertainment" OR organization:"Virgin Atlantic" OR organization:"IHG" OR organization:"Virgin Active" OR organization:"Thomas Cook" OR organization:"Odeon Hilton" OR organization:"Pizza Express" OR organization:"Zizzi's" OR organization:"Gemfields" OR organization:"Orlebar Brown" OR organization:"Rebecca Trowell" OR organization:"Spring Studios" OR organization:"Loewe" OR organization:"Jimmy Choo" OR organization:"Burberry" OR organization:"Conde Nast" OR organization:"Zadig & Voltaire" OR organization:"Prada" OR organization:"Fendi" OR organization:"French Connection" OR organization:"Lyle & Scott" OR organization:"LK Bennett" OR organization:"Alexander Wang" OR organization:"Sandro" OR organization:"Isabel Marant" OR organization:"Rag & Bone" OR organization:"J Crew" OR organization:"Maje" OR organization:"Ralph Lauren" OR organization:"Tommy Hilfiger" OR organization:"Michael Kors" OR organization:"Kenzo" OR organization:"Pringle of Scotland" OR organization:"Heidi Klein" OR organization:"Louis Vuitton" OR organization:"Lanvin" OR organization:"Loewe" OR organization:"Chanel" OR organization:"Valentino" OR organization:"Celine" OR organization:"Dior" OR organization:"Alexander McQueen" OR organization:"Victoria Beckham" OR organization:"Sonia Rykel" OR organization:"Bally" OR organization:"Notonthehighstreet" OR organization:"Rupert Sanderson" OR organization:"Dunhill" OR organization:"De Beers" OR organization:"Swarovski" OR organization:"Hermes" OR organization:"Cartier" OR organization:"David Yurman" OR organization:"Mulberry" OR organization:"Tiffany & Co" OR organization:"Boucheron" OR organization:"Lancel" OR organization:"Marc Jacobs" OR organization:"Longchamp" OR organization:"Kate Spade" OR organization:"Salvatore Ferragamo" OR organization:"Asos" OR organization:"Net a porter" OR organization:"Astley Clarke" OR organization:"Fenwick" OR organization:"Yoox" OR organization:"Harrods" OR organization:"Selfridges" OR organization:"MyTheresa" OR organization:"Lane Crawford" OR organization:"Liberty of London" OR organization:"Gucci" OR organization:"Armani" OR organization:"Zara" OR organization:"Topshop" OR organization:"Arcadia" OR organization:"Balenciaga" OR organization:"Stella McCartney" OR organization:"Brioni" OR organization:"Bottega Veneta" OR organization:"Christopher Kane" OR organization:"Anya Hindmarch" OR organization:"Business of Fashion" OR organization:"zi" OR organization:"Active Private Equity" OR organization:"Advent International" OR organization:"Advent" OR organization:"Apollo Global Management" OR organization:"Apollo" OR organization:"Apax" OR organization:"Apax" OR organization:"Augmentum Capital" OR organization:"Bain" OR organization:"Endless" OR organization:"BC Partners" OR organization:"Better Capital" OR organization:"HuttonCollins" OR organization:"Hutton Collins" OR organization:"Bridgepoint" OR organization:"Business Growth Fund" OR organization:"CDR" OR organization:"Darwin" OR organization:"Duke Street Capital" OR organization:"Electra Partners" OR organization:"Exponent" OR organization:"European Capital" OR organization:"General Atlantic" OR organization:"Hilco" OR organization:"Inflexion" OR organization:"KKR" OR organization:"LGV" OR organization:"Lion" OR organization:"Magenta Partners" OR organization:"Montagu" OR organization:"Octopus" OR organization:"Octopus Capital" OR organization:"Piper Private Equity" OR organization:"Piper" OR organization:"Sun Capital" OR organization:"TA Associates" OR organization:"Warburg Pincus" OR organization:"Charterhouse" OR organization:"Primary Capital" OR organization:"Bowmark" OR organization:"Beringea" OR organization:"Business Growth Fund" OR organization:"Bridgepoint" OR organization:"Caird Capital" OR organization:"CapVest" OR organization:"Cerberus Capital" OR organization:"CBPE" OR organization:"CCMP" OR organization:"CDR" OR organization:"Change Capital" OR organization:"Cinven" OR organization:"CVC" OR organization:"Duke Street" OR organization:"EC1" OR organization:"Electra" OR organization:"Encore" OR organization:"EQT" OR organization:"Equistone" OR organization:"Graphite Capital" OR organization:"Caledonian" OR organization:"Kings Park Capital" OR organization:"L Capital" OR organization:"LDC"

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Healthcare search

- Evidence based medicine
- *"A systematic review summarises the results of healthcare studies (controlled trials) and provides a high level of evidence on the effectiveness of healthcare interventions. Judgments may be made about the evidence and inform recommendations for healthcare."*
- Cochrane Consumer Network, <https://consumers.cochrane.org/what-systematic-review>

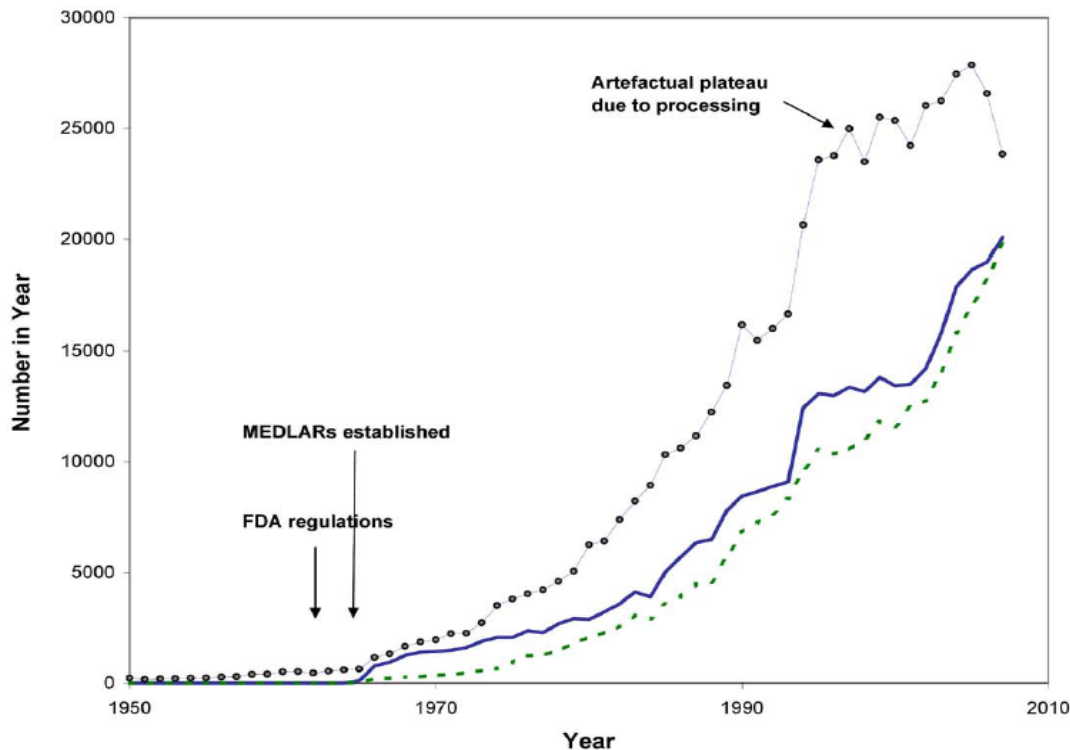
Big data in healthcare



Growth in systematic reviews over 25 years (N=233,785 MEDLINE citations)

Bekhuis T, Tseytlin E, Mitchell KJ. A Prototype for a Hybrid System to Support Systematic Review Teams: A Case Study of Organ Transplantation. *Proceedings IEEE International Conference on Bioinformatics and Biomedicine*. 2015;2015:940-947.

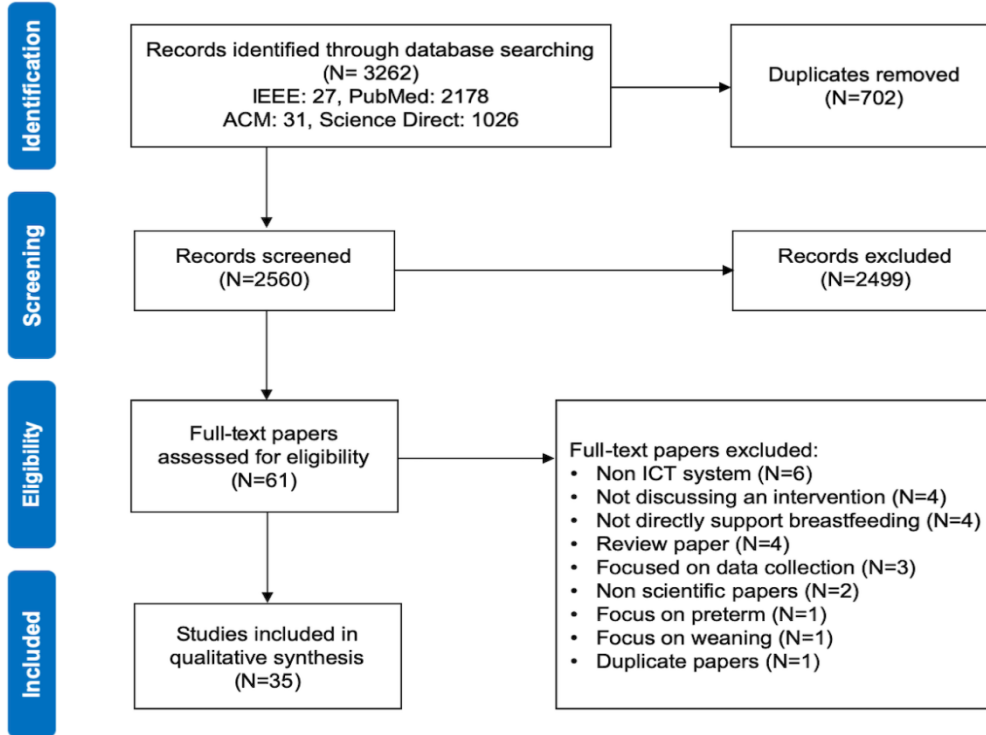
Big data in healthcare



The number of published trials,
1950 to 2007

Bastian H, Glasziou P, Chalmers I.
Seventy-five trials and eleven systematic
reviews a day: how will we ever keep up?
PLoS Med 2010 Sep 21;7(9)

PRISMA flowchart



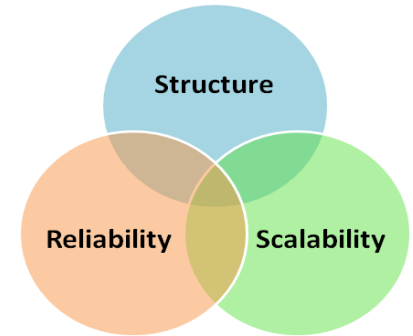
PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is an evidence-based minimum set of items aimed at helping authors to report a wide array of [systematic reviews](https://en.wikipedia.org/wiki/Systematic_Reviews) and [meta-analyses](https://en.wikipedia.org/wiki/Meta-Analyses) that assess the benefits and harms of a health care intervention.

https://en.wikipedia.org/wiki/Preferred_Reporting_Items_for_Systematic_Reviews_and_Meta-Analyses

Tang, K., Gerling, K., Chen, W., & Geurts, L. (2019). Information and Communication Systems to Tackle Barriers to Breastfeeding: Systematic Search and Review. *Journal of Medical Internet Research*, 21(9), e13947.

What's wrong with Boolean strings?

- Ineffective for communicating *structure*
 - Visual cues needed
- Poor scalability
 - No abstraction
- Error-prone
 - Syntactic + semantic errors



- Salvador-Oliván, José Antonio, Gonzalo Marco-Cuenca, and Rosario Arquero-Avilés. "Errors in search strategies used in systematic reviews and their effects on information retrieval." *Journal of the Medical Library Association: JMLA* 107.2 (2019): 210.

An imperfect process

- Auditing published search strategies

- Sampson M, McGowan J. Errors in search strategies were identified by type and frequency. *J Clin Epidemiol* 2006 Oct;59(10):1057-1063
- Salvador-Oliván, J.A., Marco-Cuenca, G. and Arquero-Avilés, R., 2019. Errors in search strategies used in systematic reviews and their effects on information retrieval. *Journal of the Medical Library Association: JMLA*, 107(2), p.210.

- 63 MEDLINE search strategies examined

- 90.5% contained ≥ 1 errors
- 82.5% contained errors that could potentially lower recall of relevant studies
 - missed MeSH terms (44.4%)
 - unwarranted explosion of MeSH terms (38.1%)
 - irrelevant MeSH or free text terms (28.6%)
 - Missed spelling variants, combining MeSH and free text terms in the same line, and failure to tailor the search strategy for other databases (20.6%)
 - Logical operator error occurred in 19.0% of searches

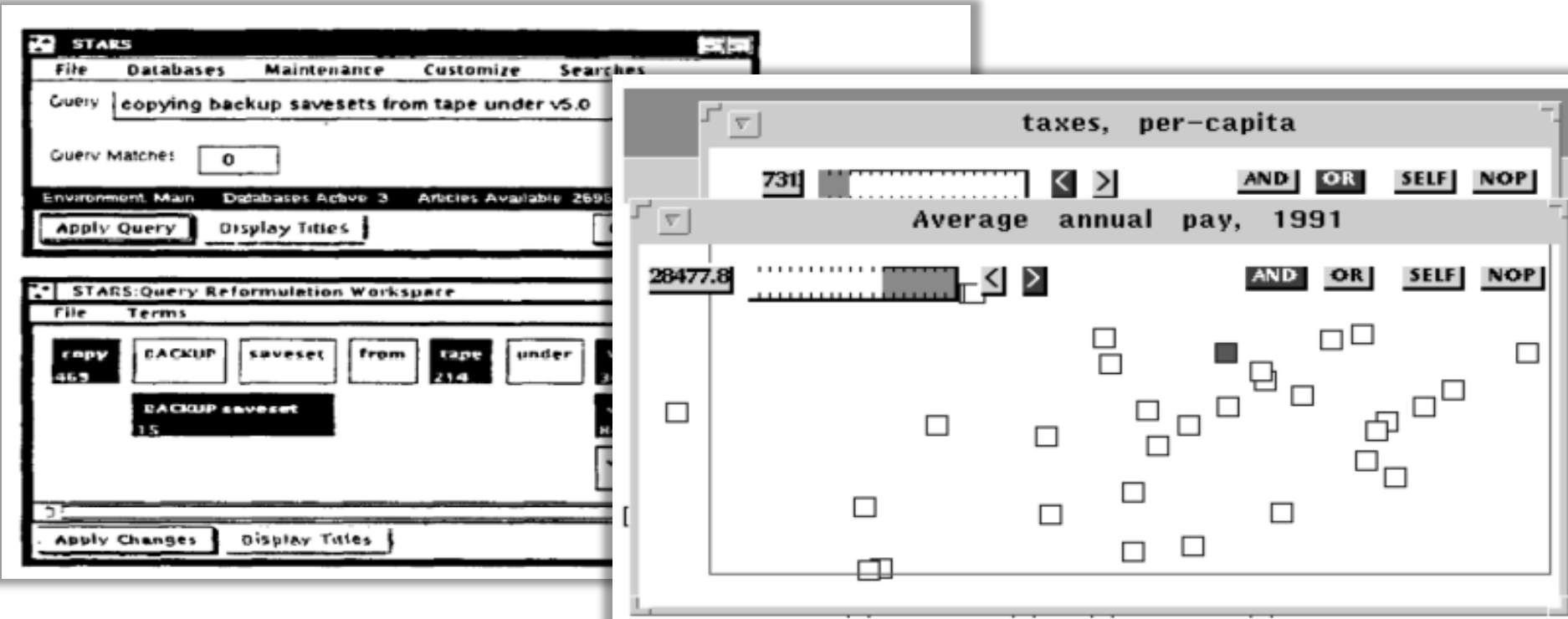
Learning from other disciplines

- Search strategies are:
 - Complex, logical constructs
 - Read many more times that they are written
 - Exhibit abstraction, modularity, encapsulation
 - Maintained, shared, optimised...
- *"For the IBM PC in the early 1980s, the software development process was text edit, compile, write down the errors, and debug with your eyes."*
 - The History of Visual Development Environments, <https://www.mendix.com/blog/the-history-of-visual-development-environments-imagine-theres-no-ides-its-difficult-if-you-try/>

Thinking outside the search box

- What if we could *visualize* search strategies?
 - Use metaphors the user already understands
 - Separate keyword selection from query manipulation
 - Provide a 'scratchpad' & 'debugging aids'
 - Provide instant feedback
 - Support abstraction (levels of composition)
 - Provide query suggestions

Anick et al (1989), Fishkin & Stone (1995)



Jones (1998), Yi et al (2005)

The screenshot displays the VQuery interface, which includes a Venn diagram, a search results preview, and a visualization of search results.

VQuery Interface:

- File Edit Bookmarks About VQuery Help**
- Venn Query:** A Venn diagram showing the intersection of terms: 'Iron 25', 'Sugar 10', 'Tazan 2', 'Jung 10', 'Stephan 12', 'Jane 12', and 'Sherah 1'.
- Enter new terms:** A text input field.
- Submit Query to NZDL:** A button.
- Search for any documents in "Docfed Text Archive" containing either Iron and Sugar, or Jung, but not Tazan:** A search query.

VQuery Results Preview:

- 14 documents match the selected query:**
- Text of the d/Unben...
Conan Doyle: The Yel...
Conan Doyle: The Sto...
Dracula
Moby Dick
Conan Doyle: The Red...
Conan Doyle: His Last...
Aboriginal America (Am...
The Look of the Mollie...
Selected Statist...
The Sea Wall
The Jungle Book
Lord Jim
White Fang

Dust & Magnet:

- File View Magnet Help**
- A visualization showing a cluster of points representing search results. Labeled points include: Protein, Special K, Vitamin, Product 19, Total Whole Grain, Sugar, and Fat.

Control:

- Color Size Filter Magnet**
- Fat (g):** A dropdown menu.
- Magnitude:** A slider ranging from 0 to 20.
- Repetent:** A slider ranging from 0 to 4.
- Apply:** A button.

Detail:

Date	0	1	2
Cereal	Product 19	Total Whol...	Special K
Manufacturer	Kellogg's	General Mil	Kellogg's
Type	Cold	Cold	Cold
Calories	100	100	110
Protein (g)	3	3	6
Fat (g)	0	1	0
Sodium (...	320	200	230
Fiber (g)	1.0	3.0	1.0
Carbohydr...	20.0	16.0	16.0
Sugar (g)	3	3	3
Potassium	.45	110	55
Vitamin (%)	100	100	25

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Nitsche & Nurnberger (2013), Boolify (2014?)

The image displays a search interface with a circular visualization of search results and a search filter panel. The circular visualization shows a central area with two large blue circles labeled 'Cat' and 'Dog'. Surrounding these are various icons representing different search results, including a 'W' icon, a 't' icon, and a 'W' icon. The search filter panel on the right includes a search bar with the text 'Word or phrase', a dropdown menu with 'Exact word or phrase', and a list of filters: 'Not', 'Or', 'Site', 'Intitle', 'Inurl', and 'Biotype'. The search bar contains the text 'NLP -neuro-linguistic programming inurl twitter.com artificial intelligence OR Machine learning'. The search filter panel also includes a 'Save' button, a 'View' button, and a 'Reset' button. The search bar has a 'Search' button next to it.

Keyboard Shortcut:
"NLP" -neuro-linguistic programming inurl twitter.com artificial intelligence OR "Machine learning"

Boolio, Search Whiteboard, Searchrefiner

AND
OR
NOT
RESET

Filetype - Off ⌵ LinkedIn

Software Enrngineer	Platfon
Software Developer	Softwa
	PaaS
	SaaS

("Software Enrngineer" OR "Softwa

Patient	Interve
Hypertension	aspirin
high blood pressure	NSAIDS
"Hypertension"	"aspirin"
"high blood pressure"	"NSAIDS"
Hypertension[TI]	aspirin[TI]
"high blood pressure"[TI]	NSAIDS[TI]
"high blood pressure"[OT]	aspirin[MeSH]
Hypertension[MeSH]	Anti-Inflammat Non-Steroidal[

searchrefiner

Text Editor Structured Editor Tree View Console

```

1. exp ORTHODONTICS/
2. orthodontic$.mp.
3. or/1-2
4. (retention or retain$).mp.
5. (stabilise$ or stabilize$).mp.
6. (fraenectom$ or frenectom$).mp.
7. (fiberotom$ or fibreotom$).mp.
8. interproximal stripping.mp.
9. percision.mp.
10. reproxinat$.mp.
11. ((gingiv$ or periodont$).mp. adj4
    surg$).mp.
12. (retain or retention).mp.
13. 11 and 12
14. or/4-10
15. 13 or 14
16. 3 and 15
    
```

Query Language [help?](#)

Ovid MEDLINE ⌵

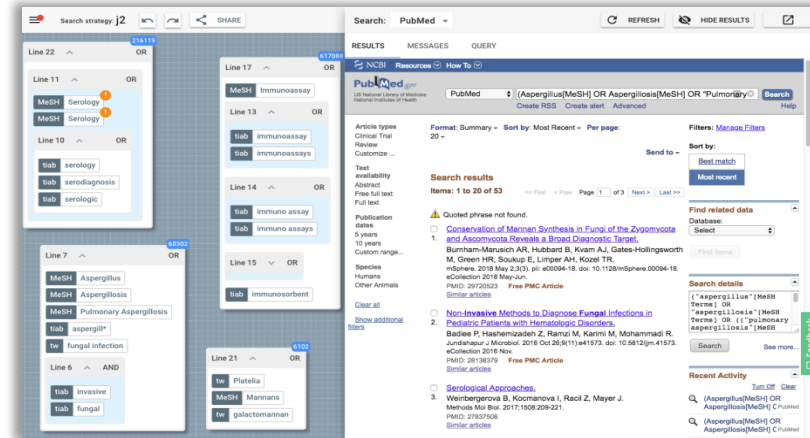
Results > Edit >

Update Tree

4161 citations retrieved
10 citations relevant
7 citations relevant retrieved
[help?](#)

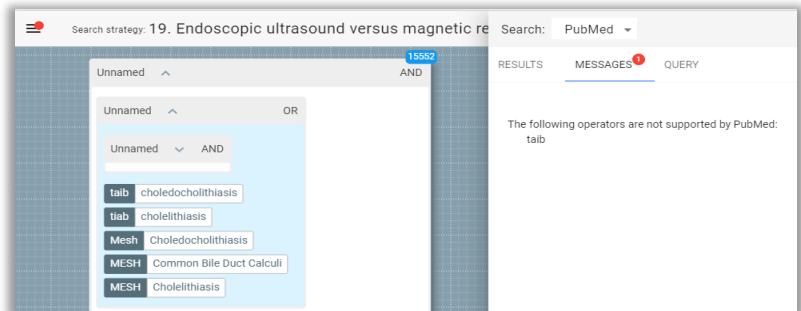
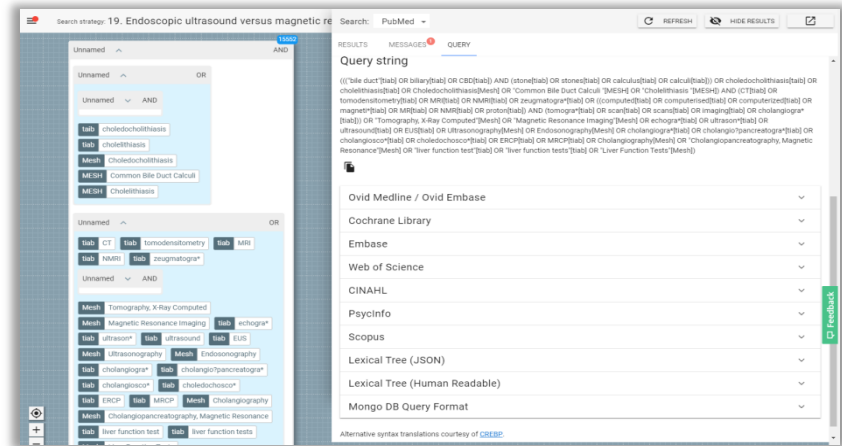
Query formulation

- Concepts are objects on a 2D canvas
- Relationships via direct manipulation
 - Syntactically correct expressions
 - Transparent semantics
 - Arbitrary levels of abstraction
- 'Lego' analogy
 - Optimisation thru exploration
 - Execute, enable/disable
 - Hit counts



Executing queries

- Integrations
 - 9 databases & counting...
- Universal representation
 - Auto-translation
 - Error-checking
- Interoperability with legacy formats
 - Boolean string I/O



That healthcare strategy...

Type of study 1198210 AND

RCT OR

- pt randomized controlled trial
- pt controlled clinical trial
- tiab randomized
- tiab placebo
- Mesh:NoExp clinical trials as topic
- tiab randomly
- ti trial

Humans only AND

- animals
- Unnamed AND
 - humans
 - animals

Target population 3994866 OR

- Mesh Child
- Mesh:NoExp ADOLESCENT
- Mesh infant
- Mesh:NoExp child hospitalized
- Mesh:NoExp adolescent hospitalized
- tiab child* tiab infant*
- tiab toddler*
- tiab adolescent*
- tiab teenage*

Intervention 161355 OR

- Mesh:NoExp Child Nutrition Sciences
- Mesh Dietary Proteins
- Mesh:NoExp Dietary Supplements
- Mesh:NoExp Dietetics

Exclusions 3024636 OR

- Mesh Infant, Newborn
- Mesh Overweight
- Mesh Eating Disorders
- Mesh:NoExp Athletes
- Mesh Sports
- Mesh Pregnancy
- Mesh Viruses tiab newborn*
- tiab obes*
- tiab eating disorder*
- tiab pregnan* tiab childbirth
- tiab virus* tiab influenza

That patent strategy...

The image displays a patent search interface with a complex query tree on the left and search results on the right.

Search Strategy (Left Panel):

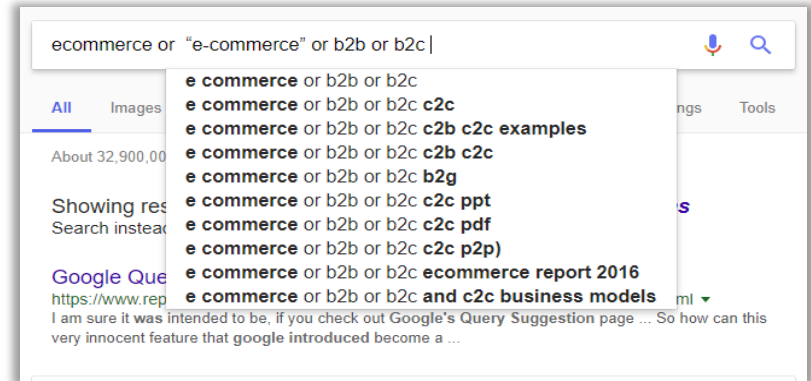
- Level 12: AND (9, 11)
- Level 9: OR (6, 7)
- Level 6: AVERSIVE, ADVERSIVE, DETER?, REPEL?
- Level 7: NONTARGET, NON WITH TARGET, HUMAN, DOMESTIC, PET, DOG, CAT
- Level 11: AND (10, 5)
- Level 10: BITREX, DENATONIUM, BITREXENE, BITTERANT, BITTER
- Level 5: CPC A01N0025-004, Unnamed AND (2, 3)
- Level 2: RODENT, RAT, RATS, MOUSE, MICE
- Level 3: BAIT, POISON

Search Results (Right Panel):

- Search: Lens.org
- RESULTS: 3,936 Scholarly Works, 1,266 Citing Patents (903 Families)
- Section: Citing Patents
- Filters: No filters applied
- Patent 1: Sheet Or Tubular Structure Consisting Of Elastic Biocompatible Material And Its Use
 - Published: Jun 10, 2009 Filed: Dec 4, 2007 Earliest Priority: Dec 4, 2007
 - Family: 2 Cited Works: 22 Cited by: 5 Cites: 14 Additional Info: Cited Works Published
 - Applicants: Charite Universitaetsmedizin
 - Inventors: Duda Georg, Manav Metha, Strube Patrick
 - Patent Application: EP 2067494 A1 004-204-033-924-753
- Patent 2: Methods For Production Of Growth-promoting Proteins And Peptides For Kidney Epithelial Cells
 - Published: Jun 23, 2009 Filed: Nov 6, 2006 Earliest Priority: Nov 22, 2002
 - Family: 4 Cited Works: 20 Cited by: 3 Cites: 2 Sequences: 49
 - Additional Info: Cited Works Full text Published Sequence

But what about content?

- Term selection is common source of inefficiency & error
 - Apply query suggestions?



- (*"business analyst" or "systems analyst" or "system analyst" or "data analyst" or "requirements analyst" or "functional analyst"*) and *crystal and report** and *analy** and *data near analy** and *not inventory and not retail and not (ecommerce or "e-commerce" or b2b or b2c)*

Suggestions in context

Unnamed ^ AND

Unnamed ^ OR

- exclud!
- contract out
- contracted out
- contract-out
- contracted-out
- not cover!

Unnamed ^ OR

- landlord and tenant act 1954
- lta 1954
- lta 1954
- possession

RESULTS MESSAGES QUERY

(exclud! OR "contract out" OR "contracted out" OR contract-out OR contract

All Images Videos Maps News Shopping My sa

session

18 ...

and Ten

ed to 'hok

ed to mov

ected to ev

OR ...

contracte

https://www.burnetts.co.uk/publications/factsheets/lease-or-...

< What Is A Lease? What Is A Licence? The Importance of The Distinction

Suggestions (from DBPEDIA and word vectors)

Based on "landlord and tenant act 1954"

SELECT ALL

- English property law
- Landlord
- Landlord & Tenant Act 1954
- Landlord & Tenant act 1954
- Landlord-tenant law
- United Kingdom Acts of Parliament 1954

CANCEL ADD SELECTED TERMS

Search strategy: 19. Endoscopic ultraso

Search: PubMed ^ REFRESH

RESULTS MESSAGES QUERY

Suggestions (from MeSH and word vectors)

Based on "Common Bile Duct Calculi"

SELECT ALL

- bladder
- Calculi
- Cholecystolithiasis
- Cholelithiasis
- digestive
- ducts
- gallbladder
- gland
- glands
- hepatic
- intestine
- pancreas
- urinary

CANCEL ADD SELECTED TERMS

Unnamed ^ AND

- tiab choledocholithiasis
- tiab cholelithiasis
- Mesh Choledocholithiasis
- MESH Common Bile Duct Calculi
- MESH Cholelithiasis

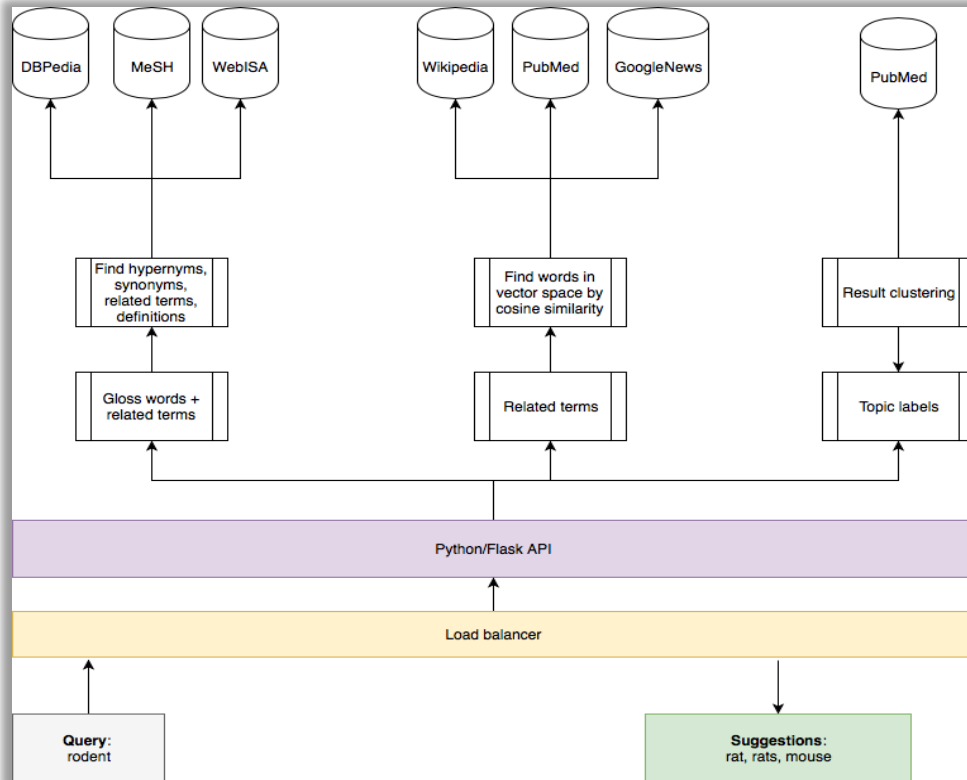
Unnamed ^

- tiab CT tiab tomodensitometry tiab MRI
- tiab NMRI tiab zeugmatogra*

Unnamed ^ AND

- Mesh Tomography, X-Ray Computed
- Mesh Magnetic Resonance Imaging tiab echogr
- tiab ultrason* tiab ultrasound tiab EUS
- Mesh Ultrasonography Mesh Endosonography
- tiab cholangiogra* tiab cholangio?pancreatogra
- tiab cholangiosco* tiab choledochosco*
- tiab ERCP tiab MRCP Mesh Cholangiogr
- sh Cholangiopancreatography, Magnetic Resonan
- + b liver function test tiab liver function tests

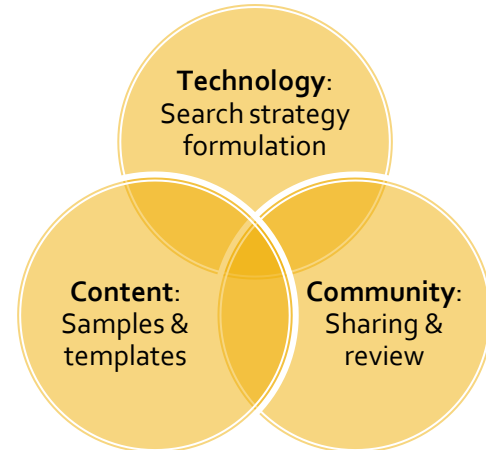
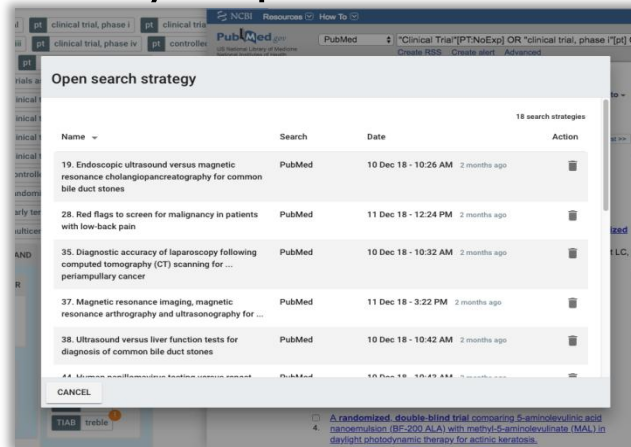
NLP architecture



T.G. Russell-Rose and Phil Gooch, "2dSearch: a visual approach to search strategy formulation", Proceedings of DESIRES: Design of Experimental Search & Information REtrieval Systems, Bertinoro, Italy, 28-31 August 2018

Sharing, reuse, best practice

- Open content repository:
 - Templates and best practices
 - Library of shared strategies (aka 'GitHub')
 - Community of practice (aka 'Stack Overflow')



Think outside the search box – www.2dsearch.com

What's next

- Feature development
 - Integrations: Google Patents, Espacenet(?)
 - File browser (for strategies)
- R&D
 - Front end
 - Visual methods vs. traditional query builders
 - Quality of query suggestions
 - Back end
 - Semi-automated strategy generation
 - Investigation of ConceptNet, Wikidata, etc.
 - Contextual language modelling (BERT, ELMo, etc.)

Summary

- Reimagining 'advanced search'
 - Eliminate syntactic error
 - Make semantics transparent
 - Provide support for reuse, optimisation, best practice
- Try it for yourself: <https://www.2dsearch.com>
 - Tutorial videos: <https://www.2dsearch.com/help>

Thank you

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