

Taxonomy and Search Patterns for Enhanced Search and Discovery

Patrick Lambe

Taxonomy alone is limited in what it can do. Search alone is also limited. Together, they become much smarter. If taxonomy and search are integrated, they can be very powerful and vastly improve the user experience. This paper borrows from previous work on search experience and search patterns, and adds a layer of commentary and examples connecting these patterns to the interaction between taxonomy and search.

Table of Contents

PATTERN 1. SEARCH ZONES	4
1.1 About This Pattern	4
1.2 Benefits	4
1.3 Illustrations	4
1.4 Dependencies	7
1.5 Potential Application	7
 PATTERN 2. AUTOCOMPLETE/AUTOSUGGEST	 8
2.1 About the Pattern	8
2.2 Benefits	8
2.3 Illustrations	9
2.4 Dependencies	11
2.5 Potential Application	12
 PATTERN 3. BEST BETS	 13
3.1 About This Pattern	13
3.2 Benefits	13
3.3 Illustrations	13
3.4 Dependencies	14
3.5 Potential Application	15
 PATTERN 4. FACETED NAVIGATION	 16
4.1 About This Pattern	16
4.2 Benefits	16
4.3 Illustrations	16
4.4 Dependencies	19
4.5 Potential Application	20
 PATTERN 5. RICH SNIPPETS	 21
5.1 About This Pattern	21
5.2 Benefits	21
5.3 Illustrations	21
5.4 Dependencies	23
5.5 Potential Application	24
 PATTERN 6. FROM SEARCH TO ACTION	 25
6.1 About This Pattern	25

6.2 Benefits	25
6.3 Illustrations	25
6.4 Dependencies	27
6.5 Potential Application	28
PATTERN 7. SUGGESTIONS / SEARCH EXPANSION	29
7.1 About This Pattern	29
7.2 Benefits	29
7.3 Illustrations	29
7.4 Dependencies	31
7.5 Potential Application	32
PATTERN 8. CONTEXT BUILDING	33
8.1 About This Pattern	33
8.2 Benefits	33
8.3 Illustrations	33
8.4 Dependencies	35
8.5 Potential Application	35
PATTERN 9. HIGHLIGHTING	37
9.1 About This Pattern	37
9.2 Benefits	37
9.3 Illustrations	37
9.4 Dependencies	38
9.5 Potential Application	38
PATTERN 10. VISUALIZING RELATIONSHIPS AND INTENSITY	39
10.1 About This Pattern	39
10.2 Benefits	39
10.3 Illustrations	39
10.4 Dependencies	42
10.5 Potential Application	42
REFERENCES	43

PATTERN 1. SEARCH ZONES

1.1 About This Pattern

Zoning of search allows the search administrators to scope the content areas that will be searched, and define the search rules, depending on the page where the search is initiated. For example, on Google, a search initiated from Singapore will return results that are most relevant to Singaporean audiences, first. Within an enterprise, a search initiated from within a compliance function will search and return results most relevant to that function.

1.2 Benefits

Search zoning allows the search experience to be customized depending on the known information about the user, using their starting point to make inferences about their context and needs. Zoning helps users target their search on specific content collections that are likely to be most relevant to them. This will improve search recall and precision. Recall is improved because irrelevant items from other sections are not included, and precision is improved because the chance of irrelevant items from other sections surfacing to the top of the result set is reduced.

Search zones can also be used to customize other search patterns (described in the rest of this report) to particular audiences in a targeted way. For example, a technical audience may be prompted with auto-suggested technical terms appropriate to their function. Ranking of results can be changed depending on where the search is initiated.

1.3 Illustrations

A Google search for “twin towers” initiated from Malaysia will show the Petronas Twin Towers in Kuala Lumpur at the top of the search results. From the USA, the same search starts with entries for the World Trade Center in New York and the September 11 attacks. From Taiwan, the search results have cues in traditional Mandarin, and an option to switch to results in English.

Google

twin towers

Sign in

AllImagesVideosMapsNewsMoreSettingsTools

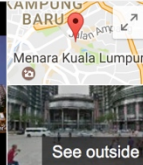
About 13,000,000 results (0.69 seconds)

PETRONAS Twin Towers
<https://www.petronastwintowers.com.my/> ▾
Identical Towers, Identical Wonders. Enjoy and capture the spires of PETRONAS Twin Towers and the skylines of Kuala Lumpur. Tickets are limited, so get yours ...
[Tickets](#) · [Facts](#) · [Gift Shop](#) · [Travelogue](#)

Petronas Towers - Wikipedia
https://en.wikipedia.org/wiki/Petronas_Towers ▾
The Petronas Towers, also known as the Petronas Twin Towers are twin skyscrapers in Kuala Lumpur, Malaysia. According to the Council on Tall Buildings and ...
[Taipei 101](#) · [Kuala Lumpur Tower](#) · [César Pelli](#) · [Hazama Ando](#)

Petronas Twin Towers in Kuala Lumpur - KLCC Attractions
www.kuala-lumpur.ws/attractions/petronas-twin-tower.htm ▾
Petronas Twin Towers were once the tallest buildings in the world. Now the world's tallest twin structures, the 88-storey buildings were designed by Cesar Pelli ...

PETRONAS Twin Towers | Facebook
<https://www.facebook.com> > [Places](#) > [Kuala Lumpur, Malaysia](#) > [Workplace & Office](#) ▾
★★★★★ Rating: 4.6 - 772 votes
To be in the tallest twin tower in the world is a history. Thanks to the tourguide on the connecting bridge of the towers for sharing the story of how it was ...



[See photos](#) [See outside](#)

Petronas Towers
[Website](#) [Directions](#)
4.5 ★★★★★ 2,511 Google reviews
Building complex in Kuala Lumpur, Malaysia · Kuala Lumpur City Centre

The Petronas Towers, also known as the Petronas Twin Towers, are twin skyscrapers in Kuala Lumpur, Malaysia.
[Wikipedia](#)
Address: Kuala Lumpur City Centre, 50088 Kuala Lumpur, Federal Territory of

Google

twin towers

AllImagesMapsVideosNewsMoreSettingsTools

About 12,700,000 results (0.53 seconds)

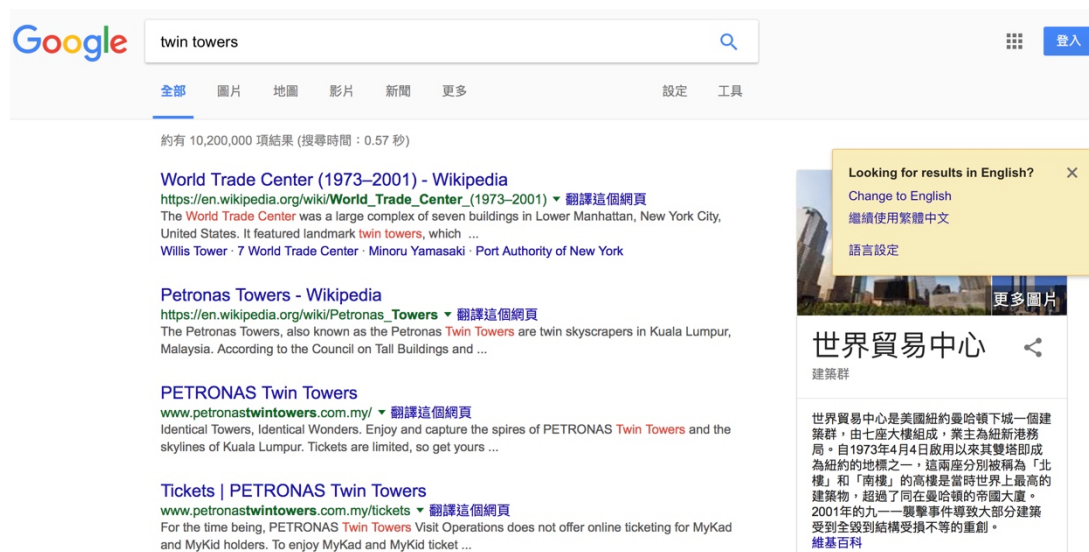
World Trade Center (1973–2001) - Wikipedia
[https://en.wikipedia.org/wiki/World_Trade_Center_\(1973–2001\)](https://en.wikipedia.org/wiki/World_Trade_Center_(1973–2001)) ▾
The **World Trade Center** was a large complex of seven buildings in Lower Manhattan, New York City, United States. It featured landmark twin towers, which ...
[Willis Tower](#) · [7 World Trade Center](#) · [Minoru Yamasaki](#) · [Port Authority of New York](#)

September 11 attacks - Wikipedia
https://en.wikipedia.org/wiki/September_11_attacks ▾
The September 11 attacks were a series of four coordinated terrorist attacks by the Islamic ... The destruction of the **World Trade Center** and nearby infrastructure caused serious damage to the economy of Lower Manhattan and had a ...

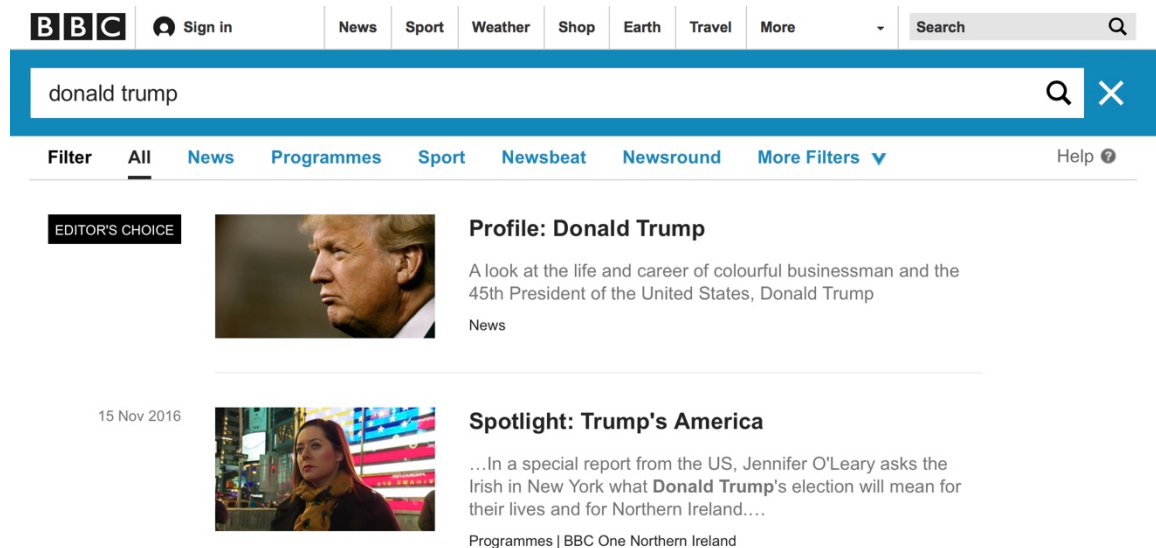
Petronas Towers - Wikipedia
https://en.wikipedia.org/wiki/Petronas_Towers ▾
The Petronas Towers, also known as the Petronas **Twin Towers** are twin skyscrapers in Kuala Lumpur, Malaysia. According to the Council on Tall Buildings and ...

Floor area: 395,000 m² (4,252,000 sq ft) **Floor count:** 88 (+5 below ground)
Top floor: 375 m (1,230 ft) **Owner:** KLCC Holdings Sdn Bhd

PETRONAS Twin Towers
www.petronastwintowers.com.my/ ▾
Identical Towers, Identical Wonders. Enjoy and capture the spires of PETRONAS Twin Towers and the skylines of Kuala Lumpur. Tickets are limited, so get yours ...



The BBC News website helps its users to navigate an extremely rich and dynamic site by inviting them to focus their searches by explicitly selecting the search zones they want.



In a property development company, search results from within the Staff Directory section of the intranet are shown the Expertise taxonomy facet and the Department metadata filter as the first options shown to staff to help them refine their search results further. In the General Resources section of the intranet, the first filtering facets displayed are Business Activities and Document Types.

The screenshot shows a corporate directory web application. At the top is a blue navigation bar with links: Happenings, Resources, Apps, Team sites, **Directory**, and Videos and photos. On the right of the bar are icons for a user profile, RSS, and notifications. Below the navigation bar is a search bar with the text 'Directory' and a dropdown arrow, followed by the placeholder text 'Search for expertise or name' and a magnifying glass icon. The main content area is titled 'Directory'. On the left side, there are two filter sections: 'Departments' and 'Expertise'. The 'Departments' section has a search box 'Filter departments' and a list of departments: Biomedical & Chemicals Cluster, Corporate Finance Division, Food & Lifestyle Cluster, Information Technology Division, Infrastructure Development, and a '+ see more' link. The 'Expertise' section has a search box 'Filter expertise' and a list of expertise areas: Land planning and development (with sub-items: Infrastructure preparation, Land policy review, Land sourcing), Lease and tenancy management (with sub-items: Marketing, Rental renewal), and a '+ see more' link. The main content area displays a list of employee profiles. The first profile is for Calvin Lee, Assistant Director, FAD, with contact numbers +65 6856 7456 and +65 9216 6656, and a 'Follow' button. The second profile is for Joseph Wee, Senior Manager, ITD, with contact numbers +65 6856 7456 and +65 9216 6656, and a 'Follow' button. The third profile is for Ang Soo Chin, Manager, FLC, with contact numbers +65 6856 7456 and +65 9216 6656, and a 'Follow' button. Each profile also includes an 'Organisation expertise' section listing 'Building technologies, Concept design, Smart buildings'. The interface also shows 'Showing 1 - 10 of 256 results', 'Sort by: Relevance', and 'Show graph: None'.

Departments

Filter departments

Biomedical & Chemicals Cluster
Corporate Finance Division
Food & Lifestyle Cluster
Information Technology Division
Infrastructure Development
[+ see more](#)

Expertise

Filter expertise

Concept design

Land planning and development
Infrastructure preparation
Land policy review
Land sourcing

Lease and tenancy management
Marketing
Rental renewal

Showing 1 - 10 of 256 results

Sort by: **Relevance** Show graph: **None**

Calvin Lee
Assistant Director, FAD
+65 6856 7456
+65 9216 6656
[Follow](#)

Joseph Wee
Senior Manager, ITD
+65 6856 7456
+65 9216 6656
[Follow](#)

Ang Soo Chin
Manager, FLC
+65 6856 7456
+65 9216 6656
[Follow](#)

Organisation expertise
Building technologies, Concept design, Smart buildings

1.4 Dependencies

Effective search zoning involves a good understanding of how different user contexts and different content types drive different search strategies. As with many of the other search patterns described in this report, it requires a detailed knowledge of different user needs, and accurate modeling of the most important content types.

1.5 Potential Application

Search zoning can be used to give semi-personalized search experiences to users, based on what is known about their role, function or interests. For example, tax auditors might have taxonomy categories and resources pages related to that function zoned for them. This also involves (a) being able to predict useful content according to different contexts with some confidence, and (b) being able to design a starting point for the task that allows specific search zones to be associated with the search function supporting that task. E.g. search interfaces could be pushed out into task oriented working environments, and configured to make calls on the central resource from within staff's own workspace.

PATTERN 2. AUTOCOMPLETE/AUTOSUGGEST

2.1 About the Pattern

In autocomplete, a small dropdown box appears as a user types a search query, and a short list of items appears under the search input box, these items are modified in real time as the user continues typing.

The user can stop typing and scroll down to select any of the items at any time. The items can be:

- thesaurus or taxonomy terms that are a close match to what the user has typed so far – when clicked, the system initiates a search results page for the associated taxonomy term
- direct links to content (documents or data profiles) whose metadata (e.g. title, description) contains the term or phrase typed so far – when clicked, the system brings the user to the document summary page
- a list of popular searches by other users, or by that user, associated with the term or phrase typed so far – when clicked, the system brings the user to that search results page.

This functionality can be combined with the contextual information in a given **Search Zone** (Pattern 1).

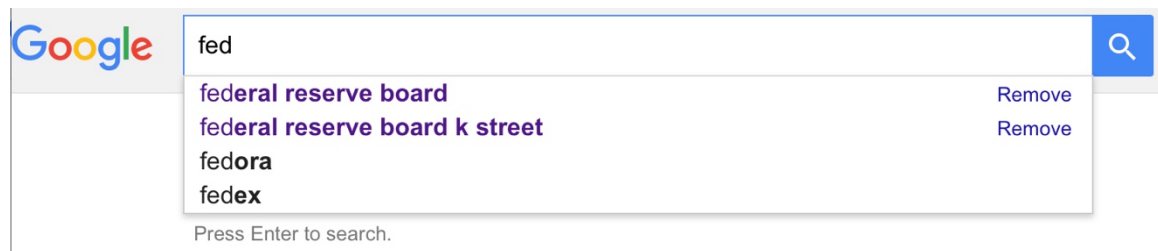
2.2 Benefits

The purpose of autocomplete is to get the user to their intended outcome faster by predicting what might be useful to them.

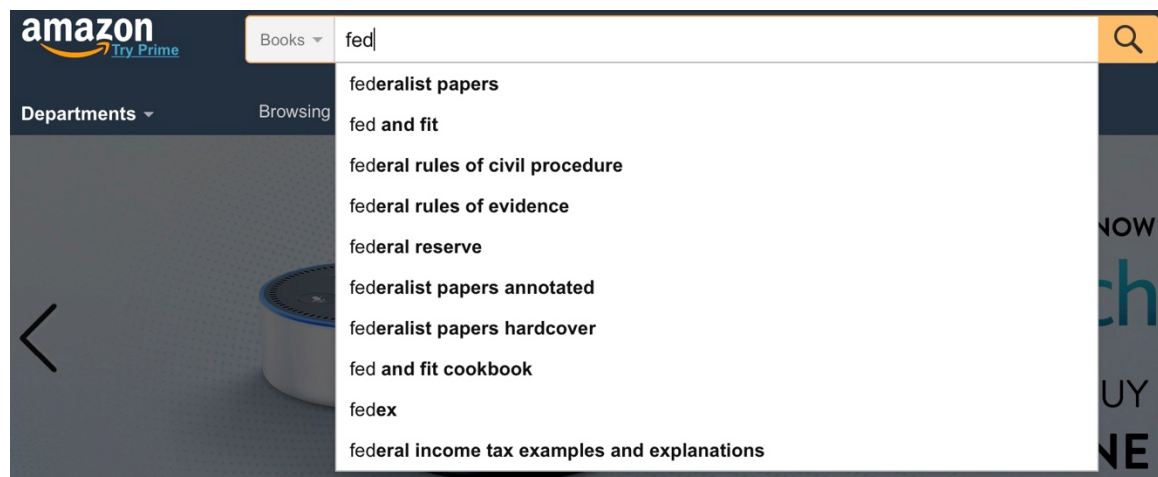
Autocomplete gives the user a preview of potential search results even before they have completed their query. It allows the user to short-circuit the search cycle by allowing them to go to specific search results or even to the content itself, without having to review more generic search results pages.

When associated with taxonomy or thesaurus terms, autocomplete also performs a subtle “convergence” effect, educating the user on the usage of subject terms for which there are good results, and mitigating errors from poor search queries (ambiguous, too complex or with misspellings).

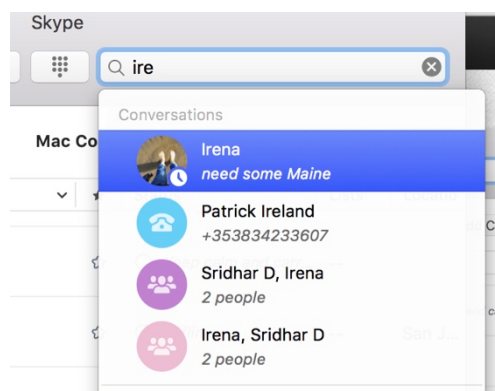
2.3 Illustrations



In the Google example, I have typed the three letters “fed” and Google is suggesting two previous searches I have conducted beginning with “fed” and two additional popular searches. Clicking on any of these will launch the search results page for the terms with me needing to complete the query and click submit.



In the Amazon example, autosuggest in the books department will lead me to search results pages for terms that appear in book titles.



In Skype, autocomplete shows usernames that contain the typed phrase, but because the intended outcome in Skype is actually a calling or messaging function, it also displays previous call groups containing names with the typed text string.

fed

EN



Fed
Wikipedia disambiguation page



Federal Bureau of Investigation
governmental agency belonging to the United States Department of Justice



Federal Reserve System
central banking system of the United States



Federal Communications Commission
independent agency of the United States government



Fedor Emelianenko
Russian mixed martial artist



Federally Administered Tribal Areas
semi-autonomous tribal region in northwestern Pakistan

Autosuggest can also be used to disambiguate close, but distinct concepts for which there is different information. The BBC weather forecast uses autosuggest in this way.

WEATHER

New York

04:00



-1°C

12 →

Thu



Min. night
-1°C

Fri



4°C
-2°C

Find a Forecast

Paris

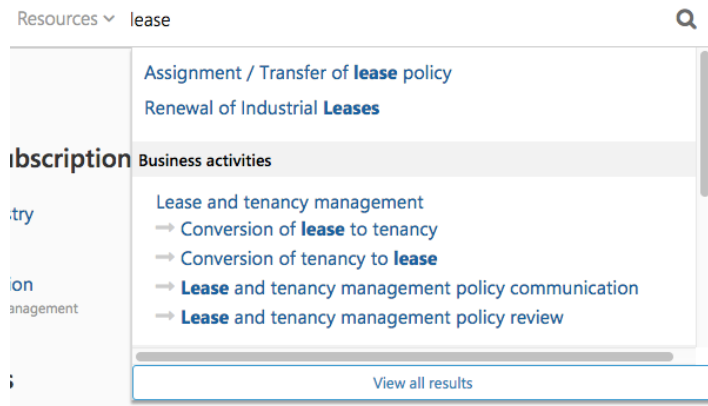
Paris, France

Paris Charles de Gaulle Airport, France

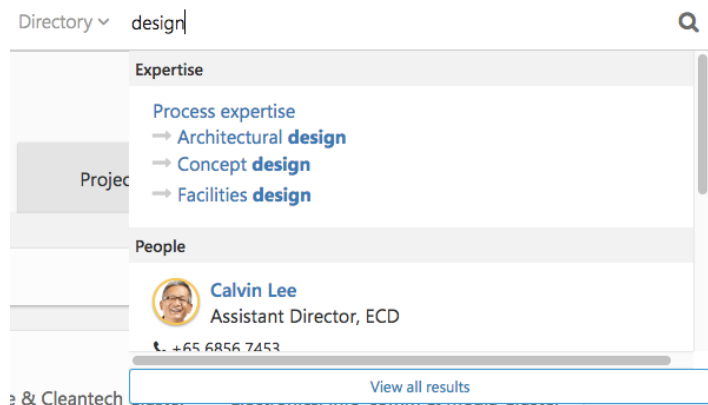
Paris Orly Airport, France

Paris-Le Bourget Airport, France

In Wikipedia, autosuggest begins with a link to a disambiguation page, and then suggests pages ranked according to popularity in searches.



In this example from a property management company, autocomplete in the Resources zone of the intranet first suggests direct links to two documents that have the term in their titles, and then provides links to taxonomy terms from a “business activities” facet containing the term. Clicking on the document links will bring the user to the document profile, and clicking on the taxonomy topics will bring the user to a search results page for that topic.



In the same company, autocomplete from a query starting with “design” in the Staff Directory zone of the intranet works differently. It suggests expertise areas from the “Expertise” facet of the taxonomy, and also suggests people who have been tagged with expertise associated with “design”. The context of search changes the way autocomplete works.

2.4 Dependencies

The effectiveness of autocomplete depends on a good understanding of users’ typical desired outcomes when entering queries. This can be determined from the context from which the search is being initiated (the interface I am using knows I am searching for books, or people, or answers), or predictively from popular searches, or using the user’s own past search query profile.

Taxonomy can be used productively in autocomplete where there is a variety of known synonyms or acronyms in use for common concepts in the taxonomy. These can be captured in a thesaurus, suggested in the drop down box, and if clicked, can bring the user to the search results page for the associated taxonomy concept.

2.5 Potential Application

In general autocomplete/autosuggest is designed to help users see what controlled language is available to them, and to nudge users towards greater consistency of language in conducting search, or in applying taxonomy tags to documents, while allowing them the flexibility to search on their own terms. When combined with synonyms this could help to mitigate the diversity of language used in your organisation.

Combined with search zones, autosuggest can target term suggestions based on the known functions and contexts of specific users. More technical staff could have access to more technical vocabularies in the autosuggest rules configured for their search zones.

PATTERN 3. BEST BETS

3.1 About This Pattern

For some searches, if you know the query term, then you will be able to determine the best possible resources to meet the need expressed by that query. In Best Bets you manually write rules in the search engine to tell it to force-rank certain content items at the top of a results page for a given query.

3.2 Benefits

This pattern ensures that users will see the most authoritative and helpful resources first, at the top of a search results page. Best bets can sharpen the quality of search results and direct users to the most authoritative content to support their work. Concentrating on, and facilitating frequent queries through best bets can show high value in terms of user appreciation of search very quickly.

3.3 Illustrations

The screenshot shows the BBC website's search results for the query 'putin'. The top navigation bar includes the BBC logo, a 'Sign in' button, and links to News, Sport, Weather, Shop, Earth, Travel, and More. A search bar at the top right contains the text 'putin'. Below the search bar, a filter bar shows 'Filter' and 'All' selected, with other options like News, Programmes, Sport, World Service, About the BBC, and More Filters. The search results are displayed in a list format. The first result is titled 'Profile: Vladimir Putin' and is marked as 'EDITOR'S CHOICE'. It includes a photo of Vladimir Putin and a brief description: 'A look at the life and political career of Russian president Vladimir Putin, who won his third term in office in 2012'. The second result is titled 'Panorama: Putin's Secret Riches' and is dated '25 Jan 2016'. It includes a photo of Vladimir Putin and a brief description: '...Vladimir Putin has been accused of corruption on a breathtaking scale. His critics say he's used his power to amass a secret fortune, so is the Russian president really one of the richest people in...'. The third result is titled 'HARDtalk: Dmitry Peskov, Spokesman for Vladimir Putin' and is dated '29 Sep 2016'. It includes a photo of Dmitry Peskov and a brief description: 'HARDtalk: Dmitry Peskov, Spokesman for Vladimir Putin'.

The BBC website uses “best bets” to prioritize general overview articles for a given topic at the top of the results page for its general search across all zones of the website, even if those results are quite dated. Within the news section of the website, articles are ordered by recency.

putin

Filter

All

News

Programmes

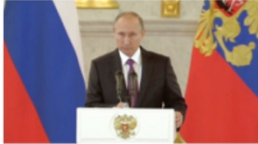
Sport

World Service

About the BBC

More Filters ▾

9 Nov 2016



Vladimir Putin congratulates Donald Trump on election win
...Russian President Vladimir **Putin** has congratulated Donald Trump on his US election win, citing his wish to improve US-Russia relations. Speaking in the Kremlin, he said there was a hard road ahead...
News | Europe

5 Nov 2016



Russia's Putin unveils provocative statue
...President **Putin** has unveiled a vast new statue in central Moscow, honouring the 10th century prince who founded the forerunner to the Russian state. The monument to Vladimir the Great is part of a...
News | Europe

4 Nov 2016



Putin unveils 'provocative' statue of namesake Vladimir

Best bets are often configured on a document level. However, they can also be configured towards a taxonomy concept – for a given keyword search, the system can return the “best” results for the nearest taxonomy topic for that search, even if the taxonomy topic itself was not used – e.g. if a synonym was used.

In a government agency, “procurement” was a complex area with several different kinds of procurement project, and each project had its own project stages, templates, and document types. In a search on the intranet for “procurement” (by keyword or taxonomy search) the search results page showed a link to a “Procurement Hub” page at the top of the search results. Navigating to this page allowed the user to conduct a specialized search or browse operation using procurement facets and categories that would have been too complex to show general users in the general search interface. However the user is not forced to go to the Hub. Their search results page shows other procurement-related resources that treat procurement at a more general level (such as procurement policies).

3.4 Dependencies

Best bets depend on regular review of search logs to determine top queries. Sometimes the intended target of those queries can be seen in the search analytics (for example, which items are most frequently clicked through from the search results page), sometimes understanding the query and what is being sought requires

some investigative work to determine the best possible resources to be associated with it.

Taxonomy can support “best bets” by associating a preferred ranked set of search results to given taxonomy concepts or their synonyms. This is useful if you can predict from a given taxonomy concept which set of resources would be most useful to display first. Associating best bets with taxonomy concepts (and their synonyms) is more scalable than with individual queries since best bets depend on manual rule-writing to associate specific queries with specific resources.

3.5 Potential Application

As the content base grows within your information sharing platforms, best bets will become more important to direct users quickly towards what is likely to be the most relevant and useful result for a given query – especially if you are building integrating resource pages or topic pages to help staff navigate complex knowledge domains. However it does depend heavily on detailed user knowledge, and on a search engine with an active search analytics function in place.

PATTERN 4. FACETED NAVIGATION

4.1 About This Pattern

Faceted navigation allows a user to begin a search with a keyword, and then refine their search using taxonomy facets as filters. It's also known as progressive search.

4.2 Benefits

The primary benefit of faceted navigation is that it allows users to reduce their search results down to a manageable number, based on factors that are of most interest to them, represented in taxonomy facets. Different users have different factors of interest, and each taxonomy facet should represent a way of approaching the content that is of interest to some users and not others. Other metadata elements such as time period, price or location can also be used as filters.

For example, a factor of interest for some users in buying a car might be whether it is automatic or manual, for others whether it is diesel, gasoline, hybrid or electric, or for others whether it is a certain brand. Facets allow users to refine their searches quickly based on what is important to them and they allow the same interface to support the needs of multiple types of users.

4.3 Illustrations

Forrester research uses facets and additional metadata to help users navigate its research products. Results can be refined using metadata elements for date range, vendor or analyst. Taxonomy facets used as filters include Content Type, Primary Role, Methodology, Industry, Topics, Market Imperatives, and Region.

Forrester include two usability features in their filters:

1. They only show topics that have content items assigned to them and the tag itself shows the number of content items present. Topics that exist in a facet but don't have content items assigned to them, are not displayed in the interface. This avoids the problem of "false drops" where a user clicks on a topic only to find there are no items there.
2. Where a topic list is longer than five items, they only show the top five items, and add a "Show all" link to indicate to the user that they can expand the list if they wish. This ensures that all the filters can be readily displayed in the same window.

The screenshot shows the Forrester website's search interface. The top navigation bar includes links for research, data, connect, consulting, events, and analysts, along with a 'log in' button. The search bar contains the term 'taxonomy'. Below the search bar, the results are categorized by content type: Reports (527), Playbooks (1), Blogs (25), Events (12), Charts & Figures (236), and Everything (801). The 'Everything' category is selected. The results are sorted by Relevance. The first result is 'CHARTS & FIGURES: A Normalized Taxonomy Of B2B Marketing Automation Services' by Lori Wizdo, dated October 28, 2016. The second result is 'CHARTS & FIGURES: Today's Smart Glasses Taxonomy' by J. P. Gownder, dated April 21, 2016. The third result is 'CHARTS & FIGURES: Forrester's Data Taxonomy: Data Interaction Channels' by Michele Goetz and Boris Evelson, dated April 19, 2016. The fourth result is 'CHARTS & FIGURES: Forrester's Data Taxonomy Places Data Usage Within The Context of Business Decisions'.

In a good faceted navigation, it should be possible to review the sequence of choices you have made, and re-expand your search if you find that you have overly narrowed your preferences and need to expand them again. In the Forrester example below, I can see the tags I have selected so far (red arrow), and I can remove them by clicking on the “X” to re-expand my search again.

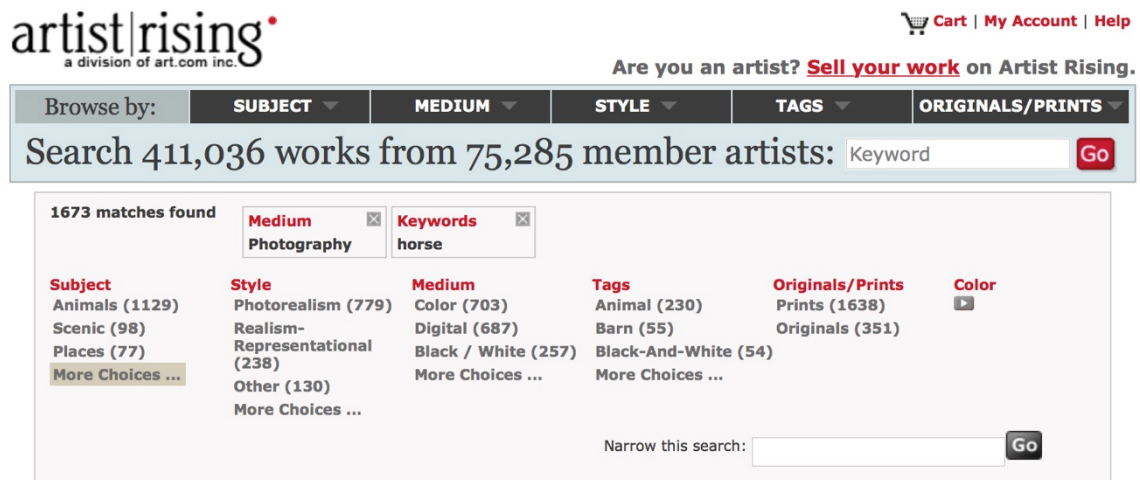
This screenshot shows the same Forrester search results page, but with two filters applied: 'Financial Services' and 'Application Development & Delivery'. A red arrow points to the 'Application Development & Delivery' filter tag, which has an 'X' icon next to it for removal. The results are now limited to 7 items. The first result is 'CHARTS & FIGURES: Information Fabric 3.0 Vendor Landscape' by Noel Yuhanna and Mike Gilpin, dated August 8, 2013. The second result is 'REPORT: SOA Is Anything But Dead In Financial Services' by Jost Hoppermann, dated December 8, 2010. The left sidebar shows the 'Everything' category selected, and the 'Refine Your Results' section shows filters for Methodology (Business Technographics), Industry (Investments, Fintech), and Topics (Packaged Solutions, Governance Risk & Compliance, Financial Management, Architecture & Technology Strategy, Business Process Management).

It is not always user-friendly to show all the facets and metadata filters at once. In some cases you may know from user research that some facets are “primary” facets that users will typically begin their searches with, and some facets are more likely to be needed only as follow-throughs on the lead facets. The previous choice provides a context for determining which subsequent facets need to be presented.

On the Artistrising.com website I can browse by a Subject facet or search by keyword. Once I start searching, for example, with the keyword “horse” other filters appear: Subject, Medium, Style, Tags, and Color.

The first screenshot shows the Artist Rising homepage. At the top, the logo 'artist|rising' is on the left, and navigation links 'Cart | My Account | Help' are on the right. Below the logo, a banner reads 'Offering 411,036 works from 75,285 member artists'. A search bar with the placeholder 'Keyword' and a 'Go' button is present. Below the search bar, there are three main sections: 'Browse:' on the left with a list of categories (Abstract, Animals, Architecture, Beach, Dance, Digital, Fashion, Flowers & Plants, Food, Music, Originals, Painting), 'Recently Added' in the middle showing a grid of artwork, and 'Originals' on the right also showing a grid of artwork. A red arrow points from the 'Browse:' section to the search bar.

The second screenshot shows the search results page for the keyword 'horse'. At the top, the same navigation and banner are present. Below the banner, a search bar contains the text 'Search 411,036 works from 75,285 member artists: Keyword' with a 'Go' button. Below this, a box displays '4445 matches found' and a 'Keywords' filter set to 'horse'. The main content area is divided into six facets: Subject, Medium, Style, Tags, Originals/Prints, and Color. Each facet lists related categories and their counts, with a 'More Choices ...' link for each. The 'Subject' facet lists Animals (3002), Sports (195), Fantasy (172), and More Choices ... The 'Medium' facet lists Photography (1673), Painting (1317), Digital (580), and More Choices ... The 'Style' facet lists Realism-Representational (1044), Photorealism (887), Impressionism (264), and More Choices ... The 'Tags' facet lists Abstract (135), Animal (766), Art (251), and More Choices ... The 'Originals/Prints' facet lists Prints (4341) and Originals (1308). The 'Color' facet has a single 'Color' option with a dropdown arrow. At the bottom, there is a 'Narrow this search:' section with a text input field and a 'Go' button.



artist|rising[®]
a division of art.com inc.

Cart | My Account | Help

Are you an artist? [Sell your work](#) on Artist Rising.

Browse by: SUBJECT MEDIUM STYLE TAGS ORIGINALS/PRINTS

Search 411,036 works from 75,285 member artists: Keyword Go

1673 matches found

Medium ☒ Photography Keywords ☒ horse

Subject	Style	Medium	Tags	Originals/Prints	Color
Animals (1129)	Photorealism (779)	Color (703)	Animal (230)	Prints (1638)	☒
Scenic (98)	Realism-	Digital (687)	Barn (55)	Originals (351)	
Places (77)	Representational (238)	Black / White (257)	Black-And-White (54)		
More Choices ...	Other (130)	More Choices ...	More Choices ...		
	More Choices ...				

Narrow this search: Go

Each decision that is made by the user is taken as input to design the next interface that would be most appropriate to their decision.

What we know about the user context may also determine which facets and which facet sequences to present. In a tax agency, “business activities”, “document types” and “tax types” were important facets to organize and tag the content. However, for officers in the corporate tax division, “tax types” was not presented to them in their department home page since “corporate tax” was already understood as a background filter on what they would see, and only the business activities and content types that were relevant to corporate tax were presented in their filters. Users were only exposed to the full set of facets in the general resources search page.

4.4 Dependencies

Faceted navigation depends on good user needs analysis to identify which facets are important to which users, in which contexts. This needs analysis will also help to identify the other metadata elements that can serve as useful filters. Then there is a need to ensure that content is appropriately tagged with the metadata. You need to be able to configure which facet-filters are presented to which users in which contexts. This feature can be combined with **Search Zones**.

For context-driven presentation of filters (as in a tax agency) or progressive filtering on the artistising.com model, where filtering interfaces change as decisions are made, then the user decision pathways need to be modeled carefully and then tested iteratively with users to ensure that the interfaces do in fact support the typical ways they would work and do not overly restrict their choices. Interfaces also need to record clearly to users the choices they have made, and be reversible, in case they want to expand or change their search strategy.

4.5 Potential Application

The diversity of content types, work types and the diversity of users in large complex organisations requires a faceted approach to taxonomy in support of search. Faceted navigation and progressive filtering is a natural consequence. There is relatively limited real estate to display facets or other metadata filters at any given time. There is an opportunity to combine faceted navigation and progressive filtering with search zones, to show facets and filters that are likely to be most useful to a given user depending on their function, starting point, and as they make progressive decisions. In line with the usability considerations noted above, all filtering decisions need to be visible to the user and reversible.

PATTERN 5. RICH SNIPPETS

5.1 About This Pattern

Rich snippets work like index cards that show the key summary information for the content item in the search results page. They use the webpage markup or metadata to show the key information elements about the item that will help a user decide whether that item is worth clicking through to. For example, results for movies may show the aggregate movie review rating. Results for products may show a small image along with name, summary description and price.

5.2 Benefits

This pattern is a significant improvement on seeing just “top line” information or the first few words in a document. It helps users make an informed decision on whether the item is likely to meet their needs, without forcing them to click through to the item. It provides a consistent way of presenting summary information about known content types, and helps users scan a search results page quickly and identify the items that are most likely to meet their needs. Because the snippet’s information content is present in standardized content markup or metadata, snippets can be ported into multiple environments and platforms (such as mobile) in flexible ways. They can also be customized for certain types of user or environment.

5.3 Illustrations

Rich snippets were introduced by Google in 2009, initially for reviews and people, then for events and videos. They have become a standard search results presentation tool for controlled content types. Here are some examples.

The Formation World Tour - Wikipedia

https://en.wikipedia.org/wiki/The_Formation_World_Tour ▼

The Formation World **Tour** is the seventh **concert tour** by American singer **Beyoncé** in support of her sixth studio album, *Lemonade*. The all-stadium **tour** was ...

Start date: April 27, 2016 **No. of shows:** 32 in North America; 17 in Europ...

End date: October 7, 2016 **Attendance:** 2,242,099

Paris Hilton - Wikipedia

https://en.wikipedia.org/wiki/Paris_Hilton ▼

Paris Whitney Hilton (born February 17, 1981) is an American businesswoman, socialite, television personality, model, actress, singer, DJ, and author. She is the ...

[Nicky Hilton Rothschild](#) · [Richard Hilton](#) · [1 Night in Paris](#) · [Hilton Hotels](#)

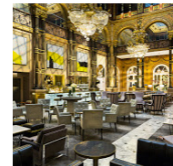
Hilton Paris Opera

4.2 ★★★★★ · 4-star hotel

Chic hotel with refined dining

📶 Free Wi-Fi 🍳 Free breakfast

\$199



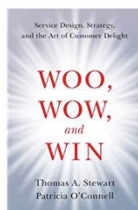
Hilton Paris La Defense

4.0 ★★★★★ · 4-star hotel

Business venue with a refined restaurant

📶 Free Wi-Fi

\$104



Woo, Wow, and Win: Service Design, Strategy, and the Art of Customer Delight Nov 29, 2016

by Thomas A. Stewart and Patricia O'Connell

Hardcover

\$19⁹⁴ ~~\$29.99~~ ✓ Prime

Get it by **Wednesday, Dec 14**

More Buying Choices

\$8.30 used & new (63 offers)

★★★★★ ▼ 3

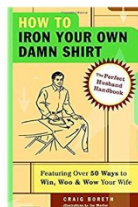
FREE Shipping on eligible orders

Books: See all 3 items

Kindle Edition

\$14⁹⁹

Other Formats: Audio CD



How to Iron Your Own Damn Shirt: The Perfect Husband Handbook Featuring Over 50 Foolproof Ways to Win, Woo & Wow Your Wife Apr 26, 2005

by Craig Boreth

Paperback

\$12²⁵ ~~\$13.00~~ ✓ Prime

In stock on December 16, 2016

More Buying Choices

\$0.01 used & new (97 offers)

★★★★☆ ▼ 30

FREE Shipping on eligible orders

Books: See all 3 items

Kindle Edition

\$11⁶⁴

In September 2016, Google released an experimental markup for science datasets, based on the schema.org/Dataset class. This allows key information about the dataset to be gathered into a structured markup so that it can be presented in a rich search snippet to describe any given dataset, without requiring users to navigate to a dataset site, and try to find all those details by browsing the site. Here is an example of the basic markup for datasets released by Google:

Properties	
name	Text A descriptive name of a dataset (e.g., "Snow depth in Northern Hemisphere")
description	Text A short summary describing a dataset.
url	URL Location of a page describing the dataset.
sameAs	URL Other URLs that can be used to access the dataset page.
version	Text, Number The version number for this dataset.
keywords	Text Keywords summarizing the dataset.
variableMeasured	Text, PropertyValue What does the dataset measure? (e.g., temperature, pressure)
creator.name	Person, Organization The name of the dataset creator (person or organization).

<https://developers.google.com/search/docs/data-types/datasets>

The markup is designed to cover:

- tables or CSV files containing data;
- files in proprietary formats containing data;
- collections of files that together constitute some meaningful dataset;
- structured objects with data in some other format that users might want to load into a special tool for processing; and
- images capturing the data.

5.4 Dependencies

Rich snippets depend on both user and content analysis. User needs analysis is required to discover which elements of information would be most useful to most users in relation to each content type. The snippet (or index card) has limited real estate, so deciding what goes on it requires careful balancing. The content itself needs to be modeled to identify the elements of markup or metadata that need to be present and associated with the content consistently for the snippets to work. Content modeling is a technique for analyzing the structure and uses of different content types. It is used to identify salient parts of the content, who uses it and how. From this, inferences can be drawn about metadata structure, taxonomy facets, workflows, and search exposure strategies. Because there is effort and

standardization involved, rich snippets are typically leveraged for well defined and commonly used content types.

5.5 Potential Application

Search and discovery for documents or other content items is often linked to a need to access people (e.g. experts in a topic or activity area), systems containing relevant data, events or discussions related to the topic. Search snippets for people would be different from search snippets for events or documents or resource pages or software systems. Each content type would need to be modeled and validated against user needs to design rich search snippets, and enhance the search experience.

PATTERN 6. FROM SEARCH TO ACTION

6.1 About This Pattern

In the “search to action” pattern, action buttons or links are placed in the search snippet on the results page, so that users can choose to proceed directly to their intended action without having to navigate to the detail page. Typical actions might be print, save, bookmark, share, buy, review, watch previews, mark events into our calendars, email contacts or request access.

6.2 Benefits

Searches are undertaken for a variety of reasons, not all of them simply to access information. In many cases search is simply a stepping-stone to completion of an intended action. Often the intended action can be inferred from the nature of the search, or the context of the search (where the search takes place). For example, somebody browsing an ecommerce site is very likely to want to buy something. By accelerating the pathway to an intended action, the search functionality becomes more useful.

Monitoring the actions taken by users can also provide useful feedback on the content and layout of **rich search snippets** (Pattern 5).

6.3 Illustrations

The e-commerce site Alibaba.com has several action items on the rich search snippet. The user can:

- add an item to a basket and then compare the features of the selected items in a basket (Compare)
- view similar products in a dropdown set of cards (Similar Products)
- contact the supplier via a message
- open a chat window with the supplier



nato genuine leather watch strap, leather watch band, watch strap for apple watch

US \$1.85 / Pieces

Size: 1.2mm*20mm*280mm
Color: Pantone Color is available
Material: Gold,genuine leather
Type: Fashion
MOQ: 100pcs
Place of Origin: Guangdong,China (Mainland)

100 Pieces (Min. Order)

[Compare](#) [Similar Products](#)

Wholesale Extra Long Genuine Leather Band Double Tour Leather watch band for Apple Watch 38mm

US \$10.35-22.2 / Piece

Material: Leather,Genuine leather
Type: Luxury,leather strap
Style: genuine leather strap
Place of Origin: Guangdong,China (Mainland)
Brand Name: QIALINO
Model Number: for apple watch

100 Pieces (Min. Order)

[Compare](#) [Similar Products](#)

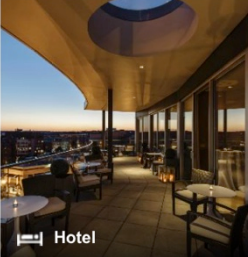
Dongguan Huasong Arts And Gifts Co...
China (Mainland) Trade Assurance
Transaction Level:
18 Transactions(6 months) Response Rate
\$ 140,000+ 89.3%

[Contact Supplier](#) [Chat Now!](#)

Guangzhou Qialino Trading Co., Ltd.
China (Mainland) Trade Assurance
Transaction Level:
32 Transactions(6 months) Response Rate
\$ 70,000+ 90.2%

[Contact Supplier](#) [I'm Away](#)

Tripadvisor allows users to enter check in and check out dates and check prices for hotels directly from the rich search snippet.



The Dupont Circle
 2,687 reviews
1500 New Hampshire Ave NW, Washington DC, ...

bookstore dupont circle matches 31 r...
"Business by Day, Sightseeing by Night" 04 April 20'
"... the taxi's. The DuPont Circle Hotel is locate...

Check In Check Out

Show Prices

At Wine.com clicking on the number of stars on the snippet for a reviewed wine will produce a popup link to the reviews but also an option to immediately provide a review of the wine.

The screenshot shows the wine.com website. At the top, there's a navigation bar with 'WINE | GIFTS | DISCOVER' and a search bar containing 'montalcino'. Below the navigation bar, there's a promotional banner for '1-cent Shipping On Any Order \$49+ With Code SHIPNEW49'. The main content area features a product page for 'Casanova di Neri Brunello di Montalcino Tenuta Nuova 2010'. The product image is a bottle of wine. To the right of the image, there's a 'Top Reviews' section with three reviews, each with a star rating. Below the reviews, there's a 'Review This Product' link. To the left of the product image, there's a sidebar with 'Shop For:' and 'More Ideas:' sections. The 'Shop For:' section lists 'Wine Accessories', 'Glassware', 'Gift Baskets', 'Gift Center', 'Wine Shop', and 'Wine Clubs'. The 'More Ideas:' section lists 'search tips', 'gift certificates', 'most popular gifts', 'business gifts', and 'wine basics'. Below the sidebar, there's a 'Last Items Viewed:' section. To the right of the product image, there's a pricing section showing the product price as '\$199.00' and a discounted price of '\$269.00' (Save \$6.00 (2%)). There's an 'Add to Cart' button and a 'Ships tomorrow' message.

In the Staff Directory example shown earlier, each rich snippet for a staff member has a “Follow” button which allows users to be notified in their newsfeed of all future posts by that person. In principle, it would be possible to initiate an instant messaging conversation from this interface as well.

The screenshot shows a staff directory page. At the top, there's a navigation bar with 'Happenings', 'Resources', 'Apps', 'Team sites', 'Directory', and 'Videos and photos'. Below the navigation bar, there's a search bar with the text 'Directory' and 'Search for expertise or name'. The main content area features a 'Directory' section with a list of departments: 'Biomedical & Chemicals Cluster', 'Corporate Finance Division', 'Food & Lifestyle Cluster', 'Information Technology Division', and 'Infrastructure Development'. To the right of the departments, there's a profile for 'Calvin Lee', Assistant Director, FAD. The profile includes a photo, a 'Follow' button, and contact information: '+65 6856 7456' and '+65 9216 6656'. To the right of the profile, there's a section for 'Organisation expertise' with the text 'Building technologies, Concept design, Smart buildings'.

6.4 Dependencies

Rich snippets have limited real estate, as they are still compiled to the search results page as a search of multiple search results. Effective “search to action” design depends on having a good understanding of the common and important tasks or actions that typically follow any major content type, and then facilitating those actions directly from the search snippet itself. This requires user needs analysis, testing and monitoring via search analytics to see how many times action buttons are actually used.

6.5 Potential Application

Potential actions would vary according to content type. For software systems, an action might be “Access” which gives access if the user is permitted to, and leads them to a “request access function” if they do not have permission. Another action might be “Bookmark” for commonly referenced documents. For people, an action might be “Contact”, or “See Contributions”, “See Collaborators” or “See topics they post on”. For documents, actions might be “View”, “Request Access”, “Bookmark”.

PATTERN 7. SUGGESTIONS / SEARCH EXPANSION

7.1 About This Pattern

Search engines gather a lot of data about associations between people and content, and between content and content. Frequent associations can be turned into suggestions. Amazon's "people who bought this book also bought..." is a good example. Taxonomies also map relationships between concepts. Apart from hierarchical parent-child relationships, they can map "related term" (RT) relationships between terms in the same facet, or across different facets. Hence, if a term is used in search that has RT relationships then the search engine can also suggest additional results that may be related to the user's enquiry.

7.2 Benefits

Whether based on inferences from statistical associations between people and content, or between content and content, or based on known relationships between taxonomy concepts, the search suggestion/ search expansion feature can provide an important discovery function for users, and lead them to useful content that they had not thought to search for explicitly.

7.3 Illustrations

The Wine.com website shows wines whose details were viewed by other customers for a given search query. This provides a form of rapid filtering for a long search results page.

Customers With Similar Interests Also Viewed

Valdicava Brunello Riserva Madonna del...

Price: \$269.99

JS 100

ADD TO CART

Antinori Tignanello 2013

Price: ~~\$110.00~~ \$99.99

Save \$10.01 (9%)

JS 97

ADD TO CART

Casanova di Neri Brunello di Montalcino Cerretalto (1.5 Liter Magnum) 2010

Sangiovese from Tuscany, Italy

JS 100 RP 99 WS 95

★★★★★ (1)

\$799.00

1 Add to Cart

Ships tomorrow if you order in the next 12 hours

Fuligni Brunello di Montalcino Riserva 2010

Sangiovese from Tuscany, Italy

JS 99 RP 96 WE 96

\$195.00 ~~\$179.00~~

Save \$16.00 (8%)

1 Add to Cart

Ships tomorrow if you order in the next 9 hours

Il Poggione Brunello di Montalcino Riserva Vigna Paganelli 2010

Sangiovese from Tuscany, Italy

RP 98 JS 97 V 95

★★★★★ (9)

~~\$133.00~~ \$119.99

Save \$13.01 (10%)

1 Add to Cart

Ships tomorrow if you order in the next 12 hours

Alibaba.com’s “Similar products” action tab opens up an indented list of related products to the one being viewed, based on taxonomy and metadata.



nato genuine leather watch strap, leather watch band, watch strap for apple watch

US \$1.85 / Pieces

100 Pieces (Min. Order)

Size: 1.2mm*20mm*280mm
Color: Pantone Color is available
Material: Gold,genuine leather
Type: Fashion
MOQ: 100pcs
Place of Origin: Guangdong,China (Mainland)

SGS Intertek

China (Mainland) Trade Assurance
Transaction Level: 18 Transactions(6 months) Response Rate \$ 140,000+ 89.3%

Compare Hide

Contact Supplier Chat Now!



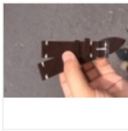
Quality Guaranteed Make To Order Imported Leather italian Leather Watch Strap For Apple

US \$12.75-19.15 / Piece

50 Pieces (Min. Order)

Guangzhou Qialino Trading Co., Ltd.
China (Mainland) Trade Assurance
Response Rate 90.2%

Contact Supplier Chat Now!



Vintage Retro Style Watch Strap Band leather Suede watch strap

US \$2.5-4.5 / Piece

100 Pieces (Min. Order)

Guangzhou KZ Trade Co., Ltd.
China (Mainland) Trade Assurance
Response Rate 86.9%

Contact Supplier Chat Now!



2016 High Quality Vintage Leather Watch Strap Supplier,Leather Watch Band Strap Factory

US \$0.4-4.4 / Piece

500 Pieces (Min. Order)

Shenzhen Weiye Fashion Gift Co., Ltd.
China (Mainland) Trade Assurance
Response Rate 92.4%

My Cart Trade Manager

The artistrising.com website shows other works by the relevant artist when you look at an artwork’s detail page.



Curious Colt
Own a Fine Art Reproduction
Usually ships in 1-2 days

☒ Giclee:
produced on heavy acid-free watercolor paper

☐ Photographic Print:
produced on archival photographic paper

Our Price: \$29.99

[Add to Cart](#) [Frame It](#)

Unframed prints will have white borders. [See a preview](#)

[f](#) [e](#) [t](#) [More](#) [Report this image](#) [Like 0](#) [+](#)

 **Artist: Neil Bramley**
Original Medium: Photography
Neil Bramley, Port Perry, Ontario, Canada

About this work:
A curious colt and mother graze the fields in Ontario, Canada.

Other works by this artist [See all](#)

 Determinat...	 Vision - A...	 "Determina...
 "Opportuni...	 Opportunit...	 Green Sea ...

In a land development agency, the taxonomy has “related term” relationships mapped between Activity Facet: Land reclamation, Document Types Facet: Hydrodynamic study report, Entity Facet: Marine engineering consultant. This allows the search engine to give the user the option to expand their search on any one of those items, to results relating to the other two. This can be very useful where the people searching for documents tend for example only to think about document type. The RT relationship will point to resources that have been tagged by other facets. The same goes for enhancing the quality of tagging – with an RT relationship, users can be prompted to think of adding other tags that may be relevant to their resource.

7.4 Dependencies

As with many of the other search patterns described in this report, good suggestions often depend on a detailed knowledge of different user needs. A good knowledge of the structure of a domain is also useful, since known conceptual relationships can be built into the underlying taxonomy or ontology, so that related resources can be suggested for any given concept.

7.5 Potential Application

Potential suggestion mechanisms within your organisation might include:

- Which documents or pages are most frequently consulted in the same user session as the one currently being viewed by a specific user?
- Which users most frequently access this content type/document, and what other content types/documents do they consult?
- Which users most frequently discuss or cite or comment on this content item, and what other content items do they discuss?
- Which terms are related in the taxonomy to the terms currently being used in a search operation, and what are the people, data and content resources associated with those related terms?

PATTERN 8. CONTEXT BUILDING

8.1 About This Pattern

Several of the search patterns we have looked at so far depend on the ability to make inferences about a user's context and needs and then direct the search in specific ways. The context building search pattern uses a number of mechanisms to understand user contexts, often in combination with each other:

- **Query analytics** – the search query is analyzed for linguistic features that indicate the nature of the enquiry so that the search can be narrowed to specific content types or zones – for example, time/date indicators, question words (e.g. who/what when), currency markers, place names, etc.
- **User-supplied choices** – the user is invited to identify a task they are engaged in, or choose specific **search zones** or content types for their search, or set up personal preferences
- **Automatically inferred context** – from known user roles or functions, or search activity history, or rating activity such as “likes” or bookmarks, or calendared activities.
- **Contextual mobile search** – using time of day, geolocation, social activity.

8.2 Benefits

This pattern abstracts from user needs analysis to reasonable inferences about common sets of contextual needs. It reduces the burden of user needs analysis in the field and scales the activity required for analyzing needs to producing remarkable improvements in targeted search for wider audiences.

8.3 Illustrations

Google uses query analytics to detect currency conversion queries. A query “100 sgd to usd” automatically produces a rich snippet with today's information plus additional information about the exchange rate trends that users might reasonably be curious about, including a way to get to past exchange rates. This is before the general results listing, bringing the searcher to a factual answer even before the search results page loads.

Google search results for "100 sgd to usd". The search bar shows the query and a magnifying glass icon. Below the search bar are tabs for "All", "News", "Maps", "Images", and "More". The "All" tab is selected. Below the tabs, it says "About 5,400,000 results (0.97 seconds)".

The main result is a currency converter widget. It shows "100 Singapore Dollar equals 70.22 US Dollar". Below this, there are two input fields: the first contains "100" and the second contains "70.22". To the right of these fields are dropdown menus for "Singapore Dollar" and "US Dollar". To the right of the dropdowns is a line chart showing the exchange rate from 2012 to 2016. The y-axis ranges from 0.6 to 0.9. The chart shows a fluctuating line that generally trends downwards from 2012 to 2016.

Below the widget, there is a link to "XE: Convert USD/SGD. United States Dollar to Singapore Dollar" with the URL www.xe.com/currencyconverter/convert/?From=USD&To=SGD. Below the link is a description: "USD to SGD currency converter. Get live exchange rates for United States Dollar to Singapore Dollar. Use XE's free calculator to convert foreign currencies and ...".

Below the description, there are two columns of information. The left column is titled "SGD/USD" and shows "SGD/USD close:0.70238 low:0.69266 high:0.74755. View full ...". The right column is titled "SGD to USD" and shows "SGD to USD currency converter. Get live exchange rates for ...".

At the bottom of the widget, there is a link "More results from xe.com »".

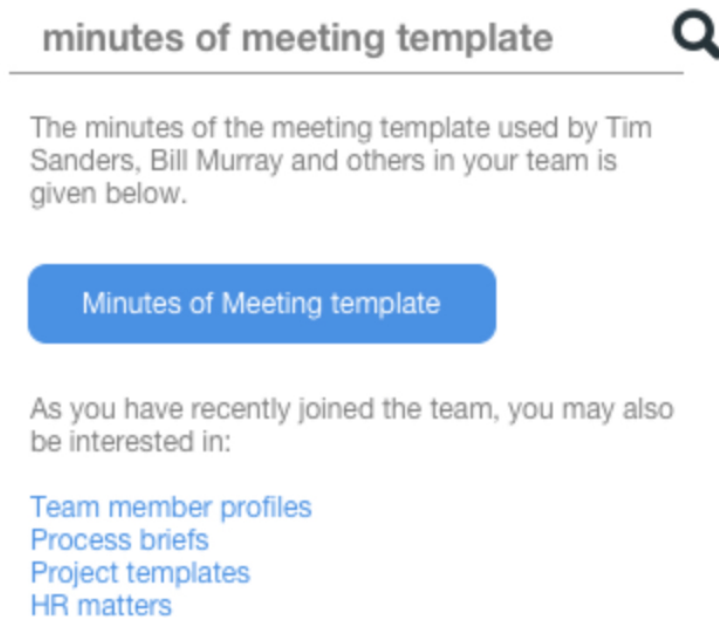
We saw on the BBC news website that users are asked to identify which area of news they were most interested in, and narrow down the search zones most relevant to them, before conducting their query. In Google search, users are able to direct the same search query towards specific content types, such as maps, images, videos and news.

Google search results for "100 sgd to usd". The search bar shows the query and a magnifying glass icon. Below the search bar are tabs for "All", "News", "Maps", "Images", and "More". The "Maps" tab is highlighted with a red arrow. Below the tabs, it says "About 5,400,000 results (0.97 seconds)".

The main result is a currency converter widget. It shows "100 Singapore Dollar equals 70.22 US Dollar".

In a project management system, when a new project teamsite is set up, the project type is selected from the taxonomy by the project manager. This allows the system (using search) to automatically populate the site with the relevant templates, specialized vocabularies for that project, and previous lessons learnt relating to projects of that type.

In the example below, a search engine has detected that an employee has only recently joined the company. A search for a Minutes of Meeting template produces a result that is designed to be helpful to new employees.



In a manufacturing facility, lessons learnt from safety incidents relating to plant equipment are kept on a database, which is linked to an app on employee mobile devices. Whenever employees are approaching a location where there has been a previous incident, the system sends them a proactive alert with a message and link to the details of the safety incident.

8.4 Dependencies

Context-building patterns involve customized search functionalities directed at specific needs and contexts. Hence the utility of this pattern is limited to contexts and needs that will scale – where the investment in radically improving search functionality is matched by the benefits it will bring. This means high frequency or high impact situations.

8.5 Potential Application

Potential context-building patterns within your organisation might include:

- **Query analytics** – the search query can be analyzed for linguistic features that indicate the level of granularity of the query, whether it is a document level query (e.g. "... report"), a query that indicates a "search zone" of a

broader topic area (e.g. “clean technology”), or a very broad query that requires a more traditional browse and faceted filtering interface.

- **User-supplied choices** – the user could be invited to identify a task from a known list that would usefully help to target the search at content types or search zones; user roles and department affiliation could be used to produce custom starting interfaces and starting facets; users could be allowed to save and re-use common searches (e.g. for common tasks they engage in);
- **Automatically inferred context** – search interfaces could be designed and configured to be resident within users’ normal workspaces, and to make calls on the larger content management systems from those workspaces, carrying with them the known contextual information about that workspace; “likes” or bookmarks, or previous access requests could be used to make search expansion suggestions, along with RT related term relationships.
- **Contextual mobile search** – using known organisational activity cycles associated with specific documents, to tweak the “best bets” – e.g. budget and work planning cycles to return templates and prior year documents to the top of search results pages.

PATTERN 9. HIGHLIGHTING

9.1 About This Pattern

Highlighting is a very simple search pattern where term matches between the query term and the target content are snipped and highlighted so that the user can see the keywords in context and make an assessment as to whether the content contains the relevant information.

9.2 Benefits

This pattern helps users to scan large amounts of content quickly and either (a) make an assessment on the usefulness of the content or (b) find the most relevant information within a large content resource very quickly.

9.3 Illustrations

MS Word uses simple highlighting in document search, allowing the user to skip quickly through all occurrences of a term in a document.



The BBC News website helps its users to navigate an extremely rich and dynamic site by inviting them to focus their searches by explicitly selecting the search **zones** they want.



Google Books presents snippets containing the search terms highlighted in context, from any given book, allowing the user to quickly locate a concept, identify the passage where it is best described, and/or make a decision as to whether to buy the book.

The screenshot shows a Google Books search interface. At the top, the Google logo is on the left, and the search bar contains the text 'szostak classifying science'. Below the search bar, there are buttons for 'Books', 'Add to my library', and 'Write review'. A status bar indicates 'Page 276'. The main content area shows search results for the book 'Classifying Science: Phenomena, Data, Theory, Method, Practice' by Rick Szostak. The book cover is visible on the left, along with a 'BUY EBOOK - MYR728.99' button. The search results are displayed in a list format, showing page numbers and snippets of text. The first result is for Page 219, which discusses 'FACETED. OR. ENUMERATIVE?' and 'facet-based' systems. The second result is for Page 5, which discusses 'types of science' and 'facets of science'. The third result is for Page 151, which discusses 'triangulation' and 'facets of a question'.

9.4 Dependencies

Technically, this is a relatively easy pattern to implement. However from a search interaction point of view, the sequence of search interactions by content type needs to be carefully modeled. This pattern works best when there is a large amount of content to be scanned quickly, so it depends on being able to recognize when a search query relates specifically to a piece of complex content such as a research paper or manual or policy document.

9.5 Potential Application

This search pattern is probably most suited to searches relating specifically to complex documents or research products, to help users determine whether a given document is relevant to their search needs. In this case, the Google Books strategy of showing highlighted keywords in context would likely be the most useful.

PATTERN 10. VISUALIZING RELATIONSHIPS AND INTENSITY

10.1 About This Pattern

Search results can also be presented as visualizations, and clicking on details in the search visualizations can lead the user to detailed search results. In a visualization, proximity, color coding and explicit linkages can be used to suggest related resources, or display the intensity of resources or activity in an environment.

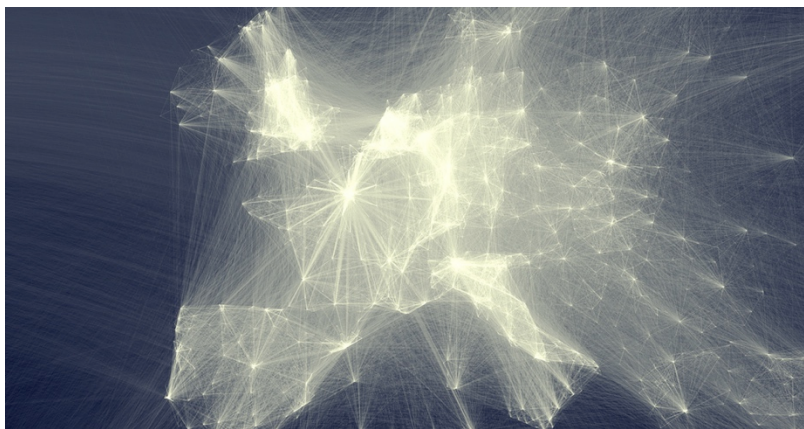
10.2 Benefits

Visualizations can help users to see interesting associations between resources, or hotspots of content or activity, or gaps in intensity or coverage, in a way that simple text-based lists of search results cannot. They are particularly amenable to supporting browse and discovery on large and complex resource bases, although they can also be used to generate specific search queries and results.

10.3 Illustrations

In the field of scientometrics Olivier Beauchesne has mapped scientific collaborations around the world. His visualization shows particular hotspots of collaboration. This visualization is not linked to search but in principle it could be, if clicking on any given connection generated a search query. This could produce the biodata of the collaborators, and the research products of that collaboration.

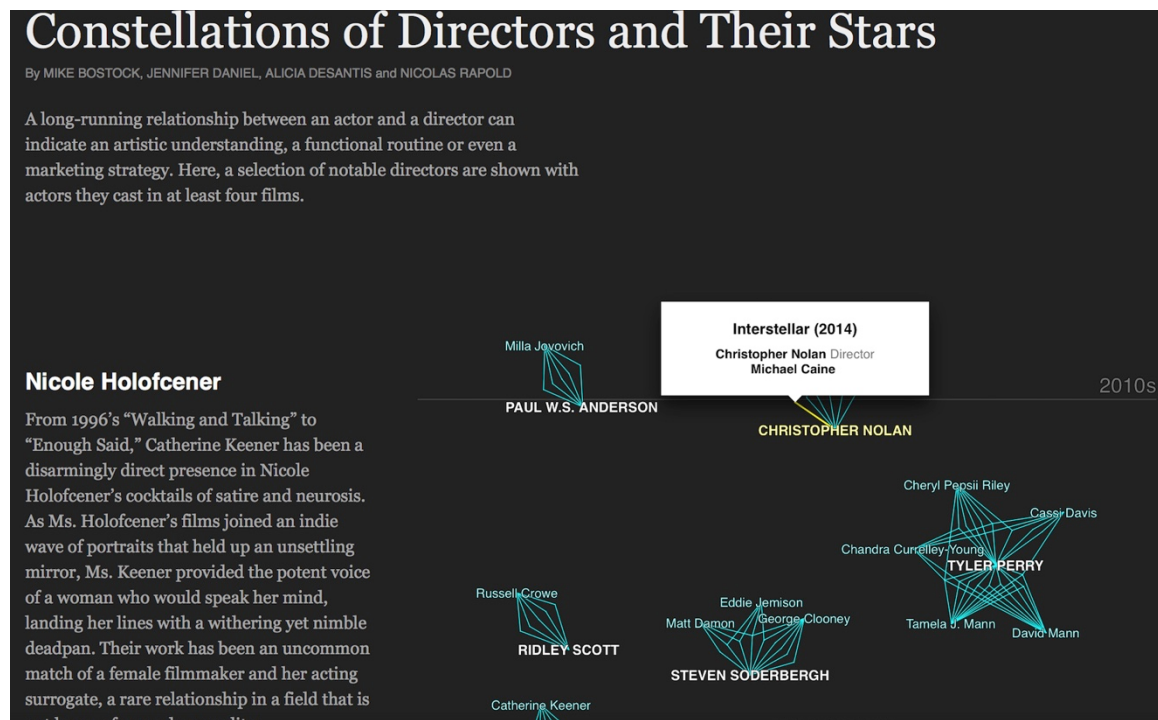
<http://www.openculture.com/2013/08/mapping-scientific-collaboration.html>



In 2010, the New York Times published an interactive visualization of collaborations between directors and actors on movies, based on the IMDB movie database. Hovering over any of the relationships produces a rich snippet giving the relevant

movie details, and clicking on the link takes the user to the search result detail page on IMDB.com. It is particularly effective at calling out the intensity of relationships between specific players in the movie universe.

<http://www.nytimes.com/newsgraphics/2013/09/07/director-star-chart/>



Music-map.com allows users to search for an artist and make suggestions: "if you like this artist you might also like music from ... artist". The closer the artists are to the search term in the visualization, the more likely it is (based on listening analytics) that the user will like that music. If you click on any of the other artists in the map, it will re-orientate itself around the newly selected artist, and will present the newly suggested artists to explore. This visualization supports a search suggestion pattern, and is designed to allow an interactive browsing and discovery experience.



Foamtree by getcarrotsearch.com is a browsable javascript-based treemap visualization tool that can visualize hierarchies, facets and statistical data to show intensity of activity or population of content. When connected to a search engine it can provide innovative and engaging ways to interact with a taxonomy and a resource base. This visualization could support a faceted navigation search pattern.



10.4 Dependencies

Data visualization to support search requires information representation skills as well as proficiency in the various visualization tools, and how to connect them to search engines to generate search queries.

10.5 Potential Application

Within any organisation, data visualization might be a useful avenue to explore for visualizing:

- associations between people and datasets, and people and topics
- intensity of population of taxonomy tags by datasets or content (e.g. how much content for subject topics, industries, institution types etc)
- intensity of use of certain types of content, or of taxonomy topics or search queries.

When connected to search, the visualization should allow users to drill down to the search snippets, the metadata or the content itself behind the visualization.

REFERENCES

This paper is inspired by the following resources:

Jeffery Callender and Peter Morville *Search Patterns: Design for Discovery* (O'Reilly, 2010) <http://searchpatterns.org>

Maish Nichani "Search experience" series of articles (Ola Search, 2017)
<https://olasearch.com/articles>