

INFO 320: The Use of Context in Search

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Examples: When Context Is Important

People use a lot of context to find information

If I asked for a **restaurant** recommendation, what would you recommend?

Context used: location, demographics, etc.

Other examples:

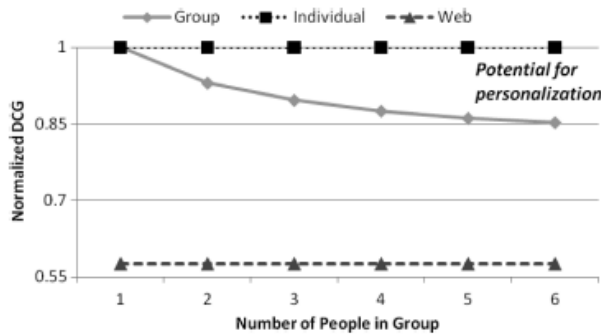
- **UW**: Washington, CS related (but if I were a high school student, admissions info)
- **William**: William Jones, social context

Note: these are not just ambiguous topics (e.g., jaguar)

Measuring Variation

To measure variation, collect different judgments of relevance for the same query

Potential for personalization



Construct a P4P curve (example: UW)

- Start with what I consider relevant
- Think about what you consider relevant
- Results can't be as good for both of us

x-axis: Number of people

y-axis: Best quality results for that many

Room for improvement without personalization

Potential for personalization is the gap

Hard: Need personal relevance, but for the same query for multiple people (How would you do it?)

- Explicit judgments (challenge: motivating the query)
 - o Study a group of people with the same interests
 - o Ask people to choose a query from a list
 - o Interrupt people in situ
- Implicit judgments (challenge: accurate interpretation of implicit behavior)
 - o Clicks (= smaller gap, why?)

Entropy

Entropy: The expected value of the information contained in a message

$$-\sum_{i=1}^n p(x_i) \log_b p(x_i)$$

If everyone finds the top 2 results were equally relevant, a query would have an entropy of two bits

If most find the 1st result more relevant, the query's entropy is lower (we can predict relevance better)

Common measure of query ambiguity is “click entropy” (How much variation is there in people’s clicks?)

But variation in clicks can come from many sources

Which has lower click entropy (i.e., less variation)?

- “www.usajobs.gov” v. “federal government jobs”
- “find phone number” v. “[msn live search](http://msn.live.search)”
- “[singapore pools](http://singapore.pools)” v. “singaporepools.com” ??? Results change (measure: result entropy)
- “tiffany” v. “[tiffany’s](http://tiffany.s)”
- “nytimes” v. “[connecticut newspapers](http://connecticut.newspapers)” ??? Result quality varies (measure: click position)
- “[campbells soup recipes](http://campbells.soup.recipes)” v. “vegetable soup recipe”
- “[soccer rules](http://soccer.rules)” v. “hockey equipment” ??? Task matters (measure: clicks per user)

Types of Context

Brainstorm types of context that can be used to meet a person’s information need

Important axes:

- Type of information captured
 - o Explicit: Categories, relevance judgments
 - o Content: Past queries, desktop
 - o Behavior: Visited URLs
- Time frame: Short term, long term
- Who: Individual, group
- Where the profile resides
 - o Local: Richer profile, privacy and security less of a concern
 - o Server: Ricker results to draw from, group information available

Using Context Algorithmically

People have rich, contextual needs, but want to express as little of the context as possible

Capture and use context algorithmically

Examples: localization, contextualization, personalization, groupization

Personal Navigation

Log analysis suggests a huge opportunity to support re-finding

	Repeat clicks	Unique clicks	
Repeat query	29%	4%	33%
Unique query	10%	57%	67%
	39%	61%	

Many of these repeat queries are “navigational” (i.e., targeted at a particular website)

Identifying navigational behavior

- General Navigation: Consistent behavior across people
 - o Popular queries with low click entropy (e.g., “facebook”)
 - o Coverage: 5% Accuracy: 90%
- Personal Navigation: Consistent behavior within an individual
 - o (Query, Click, User) x 2 → High P(Click | Query, User)
 - o Coverage: 12% Accuracy: 94%

- Examples:
 - Enquirer: National Enquirer or Cincinnati Enquirer
 - Bed bugs: Mostly used as informational query, but someone finds a good result
 - Etsy: Most people go to etsy.com, someone discovers regreetsy.com

Personal navigation queries are uncommon (most occur fewer than 25 times ever)

Click entropy: General navigation < web queries = personal navigation (query use varies)

Click rank: General navigation > web queries > personal navigation (opportunity to rank better)

Category Promoted Search

A “session” consists of the queries and clicks issued by the same person in a short period of time

60% of queries have some sort of session context

Using session history for ranking (illustrated with an example)

- Compute the topics of the different search results for the query
- Compute the topics of the queries and clicks from earlier in the session
- Bias the results towards the earlier topics

Exposing Context to People

People may be able to do a better job understanding context than algorithms

Faceted Search

Expose the information that goes into search result ranking for searchers to manipulate

Examples:

- Recipe search: Ingredients, course, dietary considerations, ratings, ease
- Shopping: Price, category, features
- Image search: Size, layout, color, style, people

Best practices:

- Combine search + facets
 - People only need to express the minimal, easiest information necessary
 - Should facets be sticky across queries?
- Expressing ranges (e.g., prices): Bin ranges, sliders
- Combining facets (AND v. OR): AND across facets, OR within facets
- Helping people stay oriented: Breadcrumbs, preview number of items in a facet

Brainstorm what makes faceted search particularly hard for Web search

- Metadata often not explicitly available, noisy, or wrong
 - Ranking by facet v. filtering
- There are many more potential facets than people can use at once
 - Consistency v. most relevant facets
- Available facets can be hard to understand and preview
 - Expose complex concepts (e.g., page rank) v. create summary facets (e.g., popularity)
 - Size of items in bins hard to estimate with billions of documents

Supporting Question Asking

Others can often understand context that is hard for a machine to understand – so we ask questions

Example: I might ask friends for a restaurant recommendation on Facebook versus searching

Study comparing searching and asking

- Asked a question on Facebook (e.g., “any tips for tiling a kitchen backsplash?”)
- Searched for half an hour
- Compared responses

Brainstorm the benefits of searching versus asking

- Searching
 - o Answers found quickly
 - o Can refine queries as more is learned
 - o Content is objective, unbiased
 - o Behavior is private
- Asking
 - o Auxiliary social benefits (awareness, connections)
 - o Answers highly personalized
 - o Receive answers not found through search
 - o Answers found other places can be validated

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