Web Search Basics

Introduction to Information Retrieval
INF 141/ CS 121
Donald J. Patterson

Content adapted from Hinrich Schütze
http://www.informationretrieval.org

Overview

- Introduction
- Classic Information Retrieval
- Web IR
- Sponsored Search
- Web Search Basics
  - Size of the Web
- Web Users
- Spam

Classic IR assumptions

- Corpus: Fixed document collection
- Goal: Retrieve information content relevant to information need

Classic IR Goal

- Classic "Relevance"
  - For each query, Q, and stored document, D, in a corpus there exists a relevance score: R(Q,D)
  - R(Q,D) is averaged over users, U, and contexts, C
- Maximize R(Q,D) instead of R(Q,D,U,C)
  - Context is ignored
  - Individuals are ignored
  - Corpus is static

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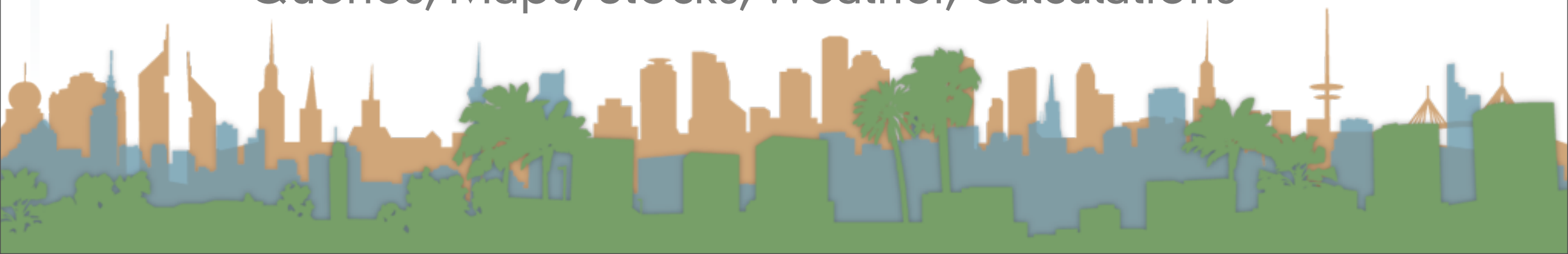
Web IR: Differences from traditional IR

- On the web, search and ads are intricately connected
- The web is huge
- The web is a rapidly changing collection.
- There is spam on the web
  - Adversarial IR
  - Huge difference from traditional IR
- One interface for hugely divergent needs
  - Queries, Maps, Stocks, Weather, Calculations



History

- Early keyword-based engines
  - (1995-1997) Altavista, Excite, Infoseek, Inktomi
- Paid placement ranking
  - Goto.com -> Overture.com -> Yahoo!
  - Results based on auction for keyword placement

www.goto.com/d/search/;$sessionid$A04214AAAH0R5QFIEF3QRJQ?type=home&tm=18&keywords=Wilmington+

Wilmington real estate.

Access 75% of all users now!
Premium Listings reach 75% of all Internet users. Sign up for Premium Listings today!

1. **Wilmington Real Estate - Buddy Blake**
   Wilmington's information and real estate guide. This is your on
   anything to do with Wilmington.
   www.buddyblake.com (Cost to advertiser: $0.38)

2. **Coldwell Banker Sea Coast Realty**
   Wilmington's number one real estate company.
   www.cbseacoast.com (Cost to advertiser: $0.37)

3. **Wilmington, NC Real Estate Becky Bullard**
   Everything you need to know about buying or selling a home c
   on my Web site!
   www.iwwc.net (Cost to advertiser: $0.35)

History

- (1998+) Link-based ranking pioneered by Google
  - Links added the idea of "authoritativeness" to "relevance"
  - Blew away all early engines save Inktomi
  - Great user experience looking for a business model
  - Meanwhile Goto/Overture's annual revenues were nearing $1 billion

History

- Result
  - Google:
    - Added paid placement ads on the side
    - Differentiated from search results
- Yahoo! built a similar architecture
  - Buys Overture for paid placement
  - Buys Inktomi for search

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Sponsored Search

Google search engine optimization Search Advanced Search Preferences

Web Blogs News Personalized Results 1 - 1 ,000,000 for search engine optimi econds)

Search Engine Optimize
SEOP.com Guaranteed Top Ranking w/ Warranty. Free Site Analysis! 877-231-155

Guaranteed Page 1 Ranking
www.berankednumber1.com Guaranteed Page 1 Rankings $49.95 No Charge Until You are on Page 1

Ads

sored Links

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Search engine optimization (**SEO**) is the process of improving the volume and quality of traffic to a web site from **search** engines via "natural" ("organic" or **...**
en.wikipedia.org/wiki/**Search_engine_optimization** - 87k - Cached - Similar pages - Note this

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Offers **search engine optimization** (SEO) marketing services & placement since 1998. Submit your website URL to 40 major **search** engines for FREE!
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Algorithmic Results

News results for **search engine optimization**

CIBER Selected as E-Commerce Vendor by Elite Island Resorts - Jan 3, 2008
Their **search engine** marketing program will help us lower acquisition costs **...** CIBER's advanced **search engine** marketing services will help Elite direct more **...**
FOX News - 10 related articles »

bruceclay.com - **Search Engine Optimization** - **SEO** Training, Tools **...**
Search Engine Optimization, ranking, placement, and submission tutorial. Free step-by-step **SEO** tools and advice. **SEO** training and services offered. **...**
www.bruceclay.com/web_rank.htm - 87k - Cached - Similar pages - Note this

Inteliture™ **Search Engine Optimization**, Internet Marketing, and **...**
Inteliture™ a professional **search engine optimization** and internet marketing company. Offers internet marketing solutions, **search engine optimization ...**
www.inteliture.com/ - 12k - Cached - Similar pages - Note this

Ads

Sp

Search eng
Use Network Solutions online tools to drive business to your web site.
marketing.networksolutions.com

Search Optimization Firm
Looking for top rankings? Get real results. Receive a free analysis.
www.customermagnetism.com

SEO Company
Search Engine Optimization services since 1998 with proven results.
www.iClimber.com

Get **Optimization** Help Now
Top SEO Firms Want Your Business. Fast, Free Competitive Quotes!
www.TopSeos.com/SEO

Check your SEO for Free
PPC vs Natural **search** Keyword ranks costs & robot stats: 15 days free
www.ClickTracks.com/15_Days_Free

Search Engine Marketing
Boost Online Traffic and Sales!
Free Site **Optimization** Analysis.
www.corporate**searchoptimization**.com

Free Website Visitors
Free Visitors Plus Top 10 Positions In 8 Hours! FREE Trial Offer.
www.**Engine**Seeker.com

Ads vs. Search Results

- Google has maintained that ads (based on vendors bidding for search queries) do not affect vendors ranking in search results

Sponsored Links

Search engine optimizer
Use Network Solutions online tools to drive business to your web site.
marketing.networksolutions.com

Search Optimization Firm
Looking for top rankings? Get real results. Receive a free analysis.
www.customermagnetism.com

SEO Company
Search Engine Optimization services since 1998 with proven results.
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Ranking of ads

- Other search engines (Yahoo!, MSN) have made similar statements on occasion
  - Any of them can change at any time
  - Facebook is currently testing the waters in their "Newsfeeds"
- We will ignore the possibility of paid placement ads being interspersed in search results.

Ranking of ads

- Goto model:
  - Rank according to how much advertiser pays
- Current model:
  - Balance auction price and relevance
- Irrelevant ads (few click-throughs)
  - Decrease opportunities for relevant ads
  - Harm the user experience
- Idea: Well-targeted advertising is good for everyone

Paying for advertisements

- CPM
  - "Cost Per Mil"
  - Pay for 1000 eyeballs
  - Important for branding campaigns
- CPC
  - "Cost per Click"
  - Pay for clicking on ads
  - Important for sales campaigns

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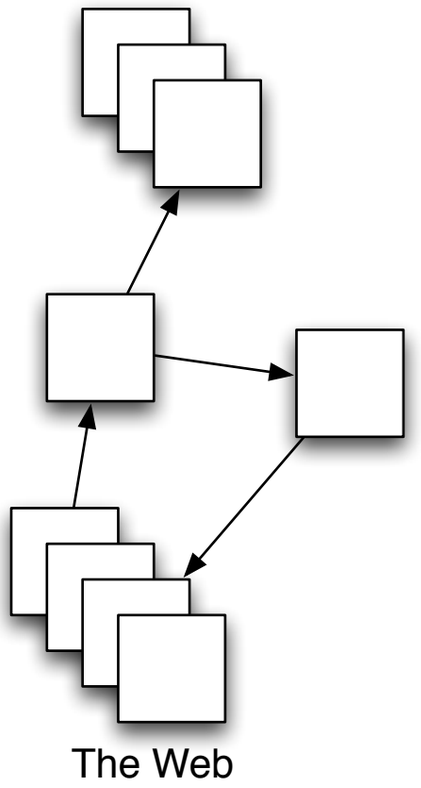
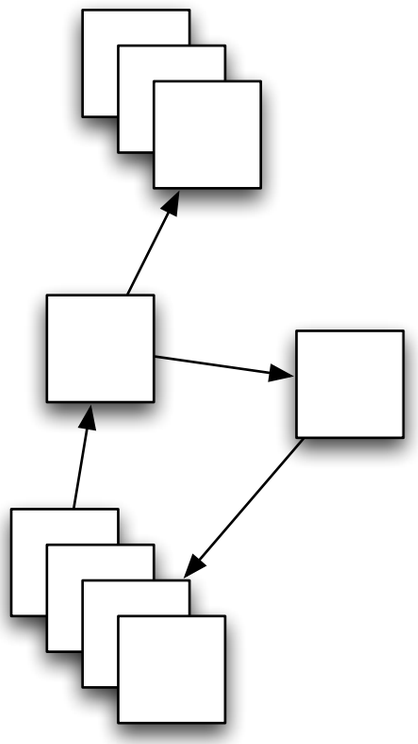
The Web Corpus



- No design/coordination
- Distributed content creation, linking
- "Democratization of publishing"
- Content includes truth, lies, contradictions, etc.
- Unstructured Data (text, html)
- Semi-Structured (XML, annotated photos)
- Structured (Databases)
- Scale is much larger than previous text corpora

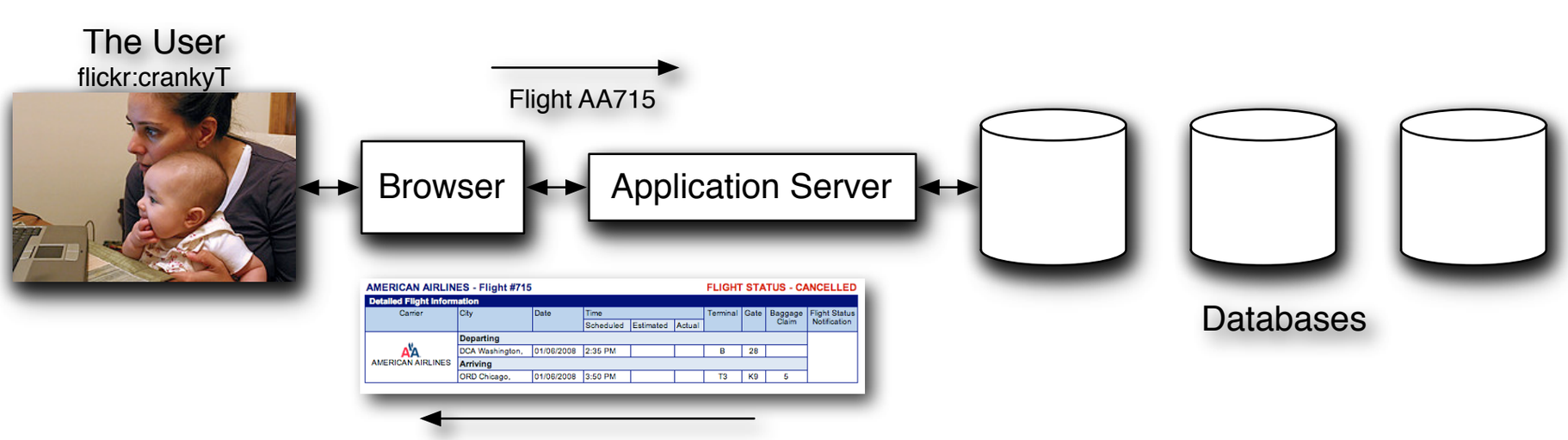
The Web Corpus

- Growth - slowing from "doubling every few months", but still expanding



Dynamic Content

- Content can by dynamically generated
  - There is no static html version
    - Flight status information, evite responses
  - Assembled on request (“?” in URL is a clue)



Dynamic Content

- Most (truly) dynamic content is ignored by web spiders
  - Too much to index
  - Static information is more important for search
  - Spider Traps look dynamic
- Actually a lot of “static” content is assembled on the fly also
  - ASP, PHP, JSP, ads, etc....