

# Searching The Internet

A history of some of the major players involved in search (Google and few others)

James Tam

## Search: In The Early Days Of The Web

- The web was quickly growing but getting access to relevant was hard.
  - The most informative website could be useless if you didn't know how to find it.
- At the time there existed many search engines
  - AltaVista, WebCrawler, Lycos, Magellan, InfoSeek, Excite, HotBot, Inktomi etc.
  - However the search results often fell short (e.g., search engines that couldn't find itself!)

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## Early Search Engines: Typical Approach

- Matching query words with the number of times that the word appeared on a page was one of the factors that determined the ranking of search results.
  - Webmasters could often easily manipulate their rankings.
  - This could result in search results having little or no relevance with the information being searched for.
  - Spamdexing was a common problem.<sup>1</sup>

<sup>1</sup> Spamdexing refers to the process of trying to artificially increase the ranking of a web page.

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## Yahoo!

- Jerry Yang and David Filo



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[https://commons.wikimedia.org/wiki/File:David\\_Filo\\_and\\_Jerry\\_Yang.jpg](https://commons.wikimedia.org/wiki/File:David_Filo_and_Jerry_Yang.jpg)

- Search technology was supplemented with human editors



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## Founding Of Google

- Larry Page and Sergey Brin met as grad students at Stanford (1995).
  - “We all kept crazy hours. I remember once at three in the morning on a Saturday night the office was full” (Tamara Munzner: fellow Ph.D. student)
- Their research goal was to be able to find useful information within a large set of data.

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## ‘Google’ Search: Basic Principles

- AltaVista
  - Along with search results it provided links to additional information.
- Page: what if these links could provide useful information for the search process?
  - Theory: the number of pages that linked to a particular website could be used to determine relevance of the site. (Similar to Nobel prize winners and academic references).
  - However popularity and quality weren’t always related (think about gossip sites about: popular celebrities/entertainers/artists).
  - So the linking sites shouldn’t be ranked equally when ranking a site.
  - This system of ranking search results became known as ‘Page Rank’.
  - Besides determining ranking based on links other traditional factors (match of search words to words on a page) were used but in a more intelligent form than other search engines.

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## Early Form Of Google

- Started out in 1997 in a very primitive form:
  - ‘Backrub’
  - Logo: Larry’s scanned left hand
- Many ‘real’ names came up during the brainstorming process but they settled on ‘Google’:
  - ‘Googol’ (spelled as ‘Google’)
  - Googol: a really big number
  - Google: a program that indexes/searches a really amount of information
- Simple logo
  - Grad students are poor :(
  - A contrast to cluttered and overly flashy web pages of the time

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## Early Form Of Google (2)

- Larry and Page learning to ‘make do’
  - Storing and searching the web required a lot of resources.
  - Even with the \$10,000 in startup funds (Stanford) and some ‘donated’ computers from the university loading docks efficiency had to be considered.
  - The duo learned that a great deal could be accomplished using some cheap PC hardware.

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## Early Efforts To Pass On Google

- Larry and Sergey wanted to completed their studies
- AltaVista 1998:
  - At the time it was the dominant search engine (54% of the market).
  - They were offered the sale price of \$1 million for the 'Page Rank' system.
  - In the end AltaVista passed
    - Page Rank wasn't developed in house and it had other priorities
- Excite and other established search engine companies also turned Larry and Sergey down.

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## Early Efforts To Pass On Google (2)

- Yahoo!
  - Wanted to focus on development of a portal rather than on a search engine (the latter makes visitors leave their site more quickly).
- Finally on the advice of David Filo<sup>1</sup> Larry and Sergey took a leave of absence from their Ph.D. program in order to start their own company.

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<sup>1</sup> Reminder: co-founder of Yahoo!

## Early Funding

- David Cheriton
  - A legendary investor
  - After a meeting he provided Larry and Sergey with \$100,000
- These initial funds gave them enough confidence to seek even more sources of money
- The total startup funds of \$1,000,000 allowed for the purchase of enough hardware to crawl, index and search a good portion of the web.

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## Initial Setup

- Fall 1998: Several rooms of a house and the garage \$1700/month (all expenses in).
- First employee: Craig Silverstein
- 'Beta' version of Google
  - 100,000 queries daily
  - PC magazine's top 100 websites and search engine
- Google's growth was rapid
  - Google focused on search
  - Other search sites focused on other priorities (being an 'acquiree' or becoming a 'portal site').
    - Search was viewed as a 'commodity'



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## Additional Funding

- With the advice of Jeff Bezos<sup>1</sup> Larry and Sergey sought funding from “Kleiner Perkins Caufild” and “Sequoia Capital”
  - “Played both ends against the middle?”
- Sequoia and Yahoo!
  - Interested in using Google to power their search service on their portal.
  - Sequoia: already invested in Yahoo
- The two venture capital companies each provided \$12.5 million in funds with some stipulations from all parties regarding:
  - Who would have majority control over Google.
  - The hiring of an experienced industry executive.

<sup>1</sup> Founder of Amazon.com

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## 1999 Expansion

- Google’s minimal costs gave it an edge over the competition.
- A free version of Linux was used rather than paying for a commercial operating system.
- Rather than buying a supercomputer, cheap microcomputers were used.
  - Super-computer: ~\$1 million
  - Micros: 88 for ~\$250k
  - Pros:
    - Cheaper
    - Greater disk space
  - Cons:
    - Lack of built in redundancy

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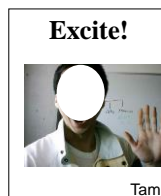
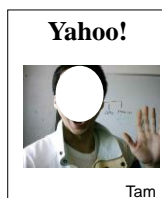
## Google Growth

- Internally the management of Google wanted to expand so the search engine's capabilities could be increased.
  - More money needed for more hardware so more of the web could be copied, downloaded, indexed and searched.
- Externally there wasn't a great deal of interest in search (~late 1990's – 2000).

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## Lack Of Interest Search

1. There wasn't as much competition as there could have been because some believed that search was a commodity.



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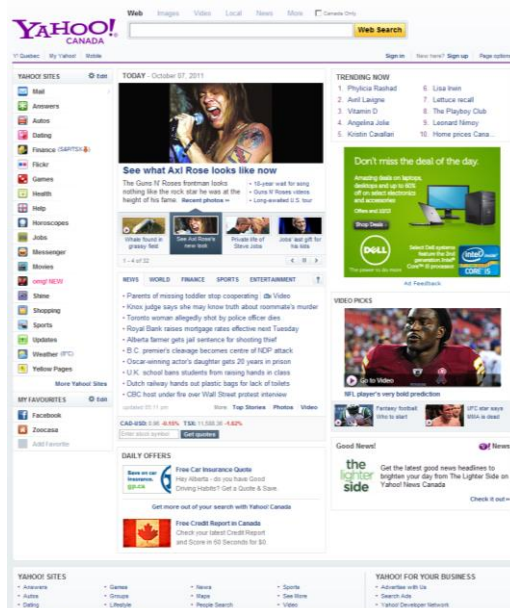
## Lack Of Interest Search (2)

### 2. Some search companies wanted to become all inclusive websites (portal).

- It was believed that portals rather than search sites was where the money (and future) resided.
- An extremely effective search engine was counter to running a successful portal.

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## Portal Sites (Example: Yahoo!)



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## Lack Of Interest Search (3)

3. Other companies were in the middle of reorganizations.
  - a) Acquisitions: of other companies
  - b) Take over target by another company

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## Using Microcomputers: Consequences

- Failure rates were high
  - Typical machines lasted 2 – 3 years.
  - Several would fail each day
  - ‘Dead’ machines were by-passed via software
- Redundancies were created between multiple data centers
  - Generally quite effective



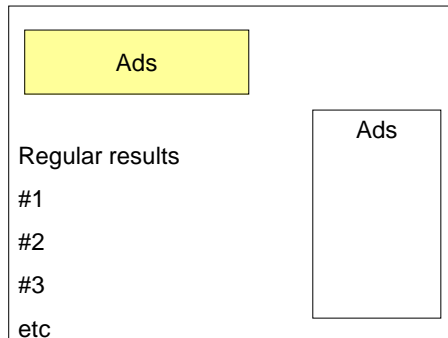
Google

Google

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## Using Microcomputers: Consequences (2)

- Even with all the cost savings additional funds were required
- Early on only Red Hat and Netscape were willing to pay a licensing fee to Google.
- Paid advertisements (“sponsored links”) were included along with search results to provide a steady source of income.



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## Ads: Details

- Ranking
  - Most search engines would rank ads based on the amount paid.
  - Amount paid influenced the ranking of Google ads but rankings could be modified by the frequency of selection.
- Also the ads would only be seen if the user searched for related keywords (increased relevancy).
- Advertisers could sign up to place an ad automatically through a web page.
  - Reduced costs
  - Sped up the process

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## Ads: Details (2)

- Anyone could bid on search terms e.g., \$0.3 “pet food”, \$3 “investment advice”
- Minimum bids were low to allow smaller players to bid (and to encourage many bids).
- Overture (later purchased by Yahoo) sued Google over the bidding system.
  - Google finally settled by giving up stock
- Eventually much of Google’s revenue came from ads
- Staying private allowed Google to hide from it’s competitors how lucrative the search business could be.

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## Eric Schmidt: Outside Help

- To get the \$25 million in financing it was agreed that Google would hire an experienced business person to help run operations.
- After many rejected candidates Eric Schmidt was hired as CEO (Larry and Sergey were co-vice presidents).
  - In order get hired Schmidt had to show a real commitment to the job (\$\$\$).

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## Business Partnerships

- Website owners would add a Google search box
  - \$\$\$ for referral searches
- Yahoo:
  - June 2000: Google provided search results for Yahoo!'s site (Yahoo was well established so this was valuable).
  - 2002: AOL adopted Google as it's search engine (in return for stock).

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## Going Public

- It was advantageous for Google to remain a private entity for as long as possible:
  - Control over the direction of Google.
  - Hiding the profitability of the search business from competitors.
- Eventually (2004) Google went public:
  - Federal rules required that companies with a substantial amount of assets and shareholders had to publically disclose financial results and Google had exceeded those limits.
  - Also selling stock would allow Google to expand.

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## Going Public (2)

- IPO (first public sale of stock by a private company)
  - \$135/share (about 150 times the price per share earnings)....over inflated price?
  - Finally the price was cut to \$85 - \$95 per share.
    - Existing belief that the price was too high.
    - Privacy uproar over Gmail.
    - Geico lawsuit.
    - An interview with Playboy interview that violated the 'quiet period'

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## Search: Later Events

- 2008 saw the profitability and share prices of many corporations (tech, search companies included) decreased
- Steve Ballmer launched a hostile takeover of Yahoo
  - Market share of search (at the time): 60% Google, 20% Yahoo, 10% Microsoft
  - Microsoft offered \$31/share vs. \$19 current share price
  - Yahoo shareholders: yeah! Yahoo top management: nay!
  - To fend off the takeover Google and Yahoo worked out a deal (advertising)
  - The takeover bid failed
- The top management of Yahoo was ousted.
  - Microsoft and Yahoo ended up working together (search results)

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## Search: Newer Developments

- Competition?
  - Anti-monopoly efforts
- “The right to be forgotten”
- Rivals?
  - Facebook

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## References

- "The Google Story" (David A. Vise: Pan Books 2005)

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## After This Section You Should Now Know

- What were (and are) some of the commonly used searched engines
- What was a major weakness of early search engines and how was this weaknesses exploited by web masters
- (Roughly) how were search results ranked by search engines and how Google distinguished itself from the others
- Yahoo
  - Who were the founders
  - How were results organized by human librarians as well through standard searches
- Google
  - Who were the founders
  - How does the 'Page rank' system determine the order of search results

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## After This Section You Should Now Know (2)

- Google (continued)
  - Details about the company in it's early incarnation
  - How (and to whom) Larry and Sergey tried (and failed) to sell Google's search technology
  - Early sources of capital
  - How costs were reduced during the early days of expansion
  - How external events and perceptions allowed for Google's quick rise
  - How does Google's advertising/ranking model work
  - Details of the IPO
  - Later events involving Google, Microsoft and Yahoo!

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