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Lecture 15 - Search Advertising & Sponsored Links

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- person types search term into Google or Bing or Yahoo
- search engine returns two things:
  - organic (or algorithmic) search results –the service search engines provides at significant cost
  - sponsored links, ads, etc. –how they support themselves
- millions of people type in millions (billions?) of search terms a day
- value of real estate on search result pages can vary a lot depending on search term
  - e.g., "Mercedes e class" vs "apple pie recipe"
- value can also vary a lot over time
  - e.g., "Christmas gift" on Dec. 15 vs Jan 2
  - or "Obama yard signs" a week before an election vs a week after
  - "San Francisco Giants" during the World Series could be a lot of people looking for game updates or player statistics. afterwards, it's more likely people wanting to buy things.
- and by place
  - e.g. "open gas station" in Orange county, CA vs Mercer County, NJ
  - or "Obama yard signs" in a swing state vs non-swing state
- how could a search engine possibly know what to charge for ads for all of these search terms? auctions!
- so every time anyone types a search term into a search engine, an auction is run (generalized 2nd price)
- Google Ad Words
  - $10 billion in revenue in 2007
  - $28 billion in revenue in 2010
  - $38 billion in revenue in 2011
- key insight #1: weight bids by "quality" of ad
  - this is a big, novel way of thinking about advertising
  - why? every time someone performs a search on Google, Google has valuable virtual real estate on their results page to sell to potential advertisers, but they want ads to be useful to the <u>searcher</u>. Otherwise, searcher will think ads are nuisance, stop paying attention, etc., making ads less valuable for everyone.
  - nuisances here are negative externalities that Google is trying to internalize and correct
  - how is quality measured?
    - ∗ proprietary algorithm, but know it includes:
      - · historical CTR
      - · relevance

        · quality of landing page
        · navigability
        · transparency
        · originality

- key insight #2: auction off all potential advertising slots in one auction (not separate auctions) and give the best spot to highest bidder, second best to second highest bidder, etc.
  - this was also not obvious –if you have 12 spots for ads for the keyword "Mercedes e class," why not run 12 auctions? that's what sellers do on eBay, they don't give item to 12 highest bidders if they have 12 different copies.
  - so why?
    * many search terms would not have as many bidders as potential slots, so bidders could "collude" on which to bid for, effectively eliminating all competition
    * harder to control how many ads get run and where to place them
    * funny strategic games if you have to decide which slots to bid on
- auction mechanism
  - b_i: bid of ith advertiser
  - w_i: quality of weight of ith advertiser
  - advertisers are ordered 1 to n by the value of $w_i b_i$, where 1 is highest and n is lowest
  - advertiser 1 gets best slot, pays $\frac{w_2 b_2}{w_1}$
  - advertiser 2 gets 2nd best slot, pays $\frac{w_3 b_3}{w_2}$
  - and so on....
  - Google reserves the right to choose the number of slots it sells and where the ads are displayed
- running your own ad campaign means you can:
  - target geographically
  - tailor time-of-day
  - bid CPC (cost per click) or other options
  - specify budgets
  - design ad
  - choose different rotation schemes
  - target age and gender groups