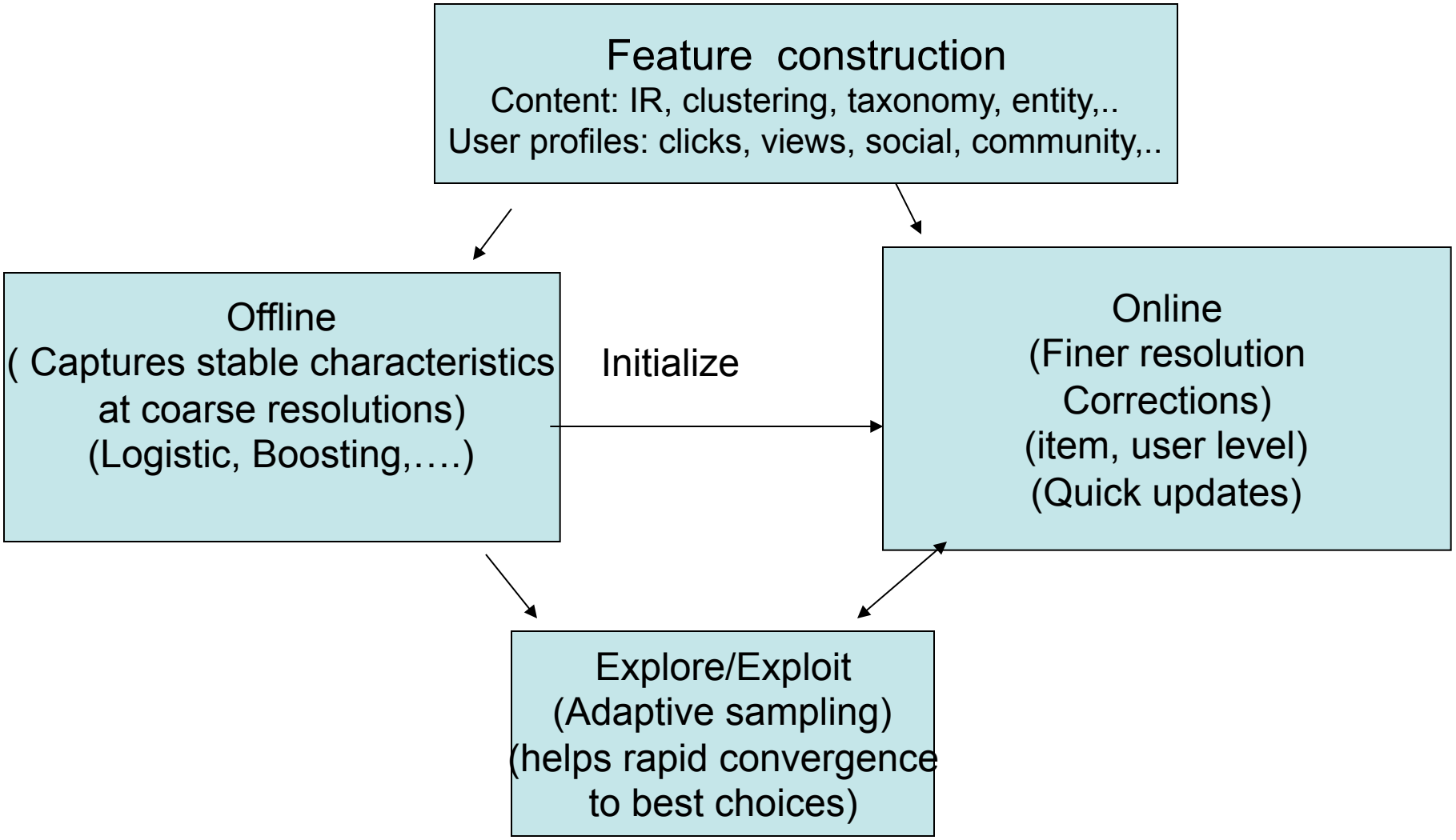
Predicting user-item interaction rates



Post-click: An example in Content Optimization

Recommender + • EDITORIAL

content

Clicks on FP links influence downstream supply distribution

SPORTS

NEWS

OMG

FINANCE

AD SERVER

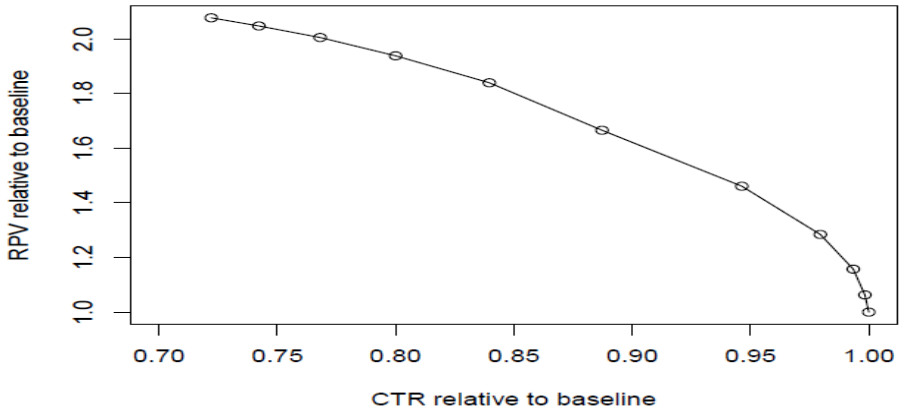
DISPLAY ADVERTISING Revenue

Downstream engagement

(Time spent)

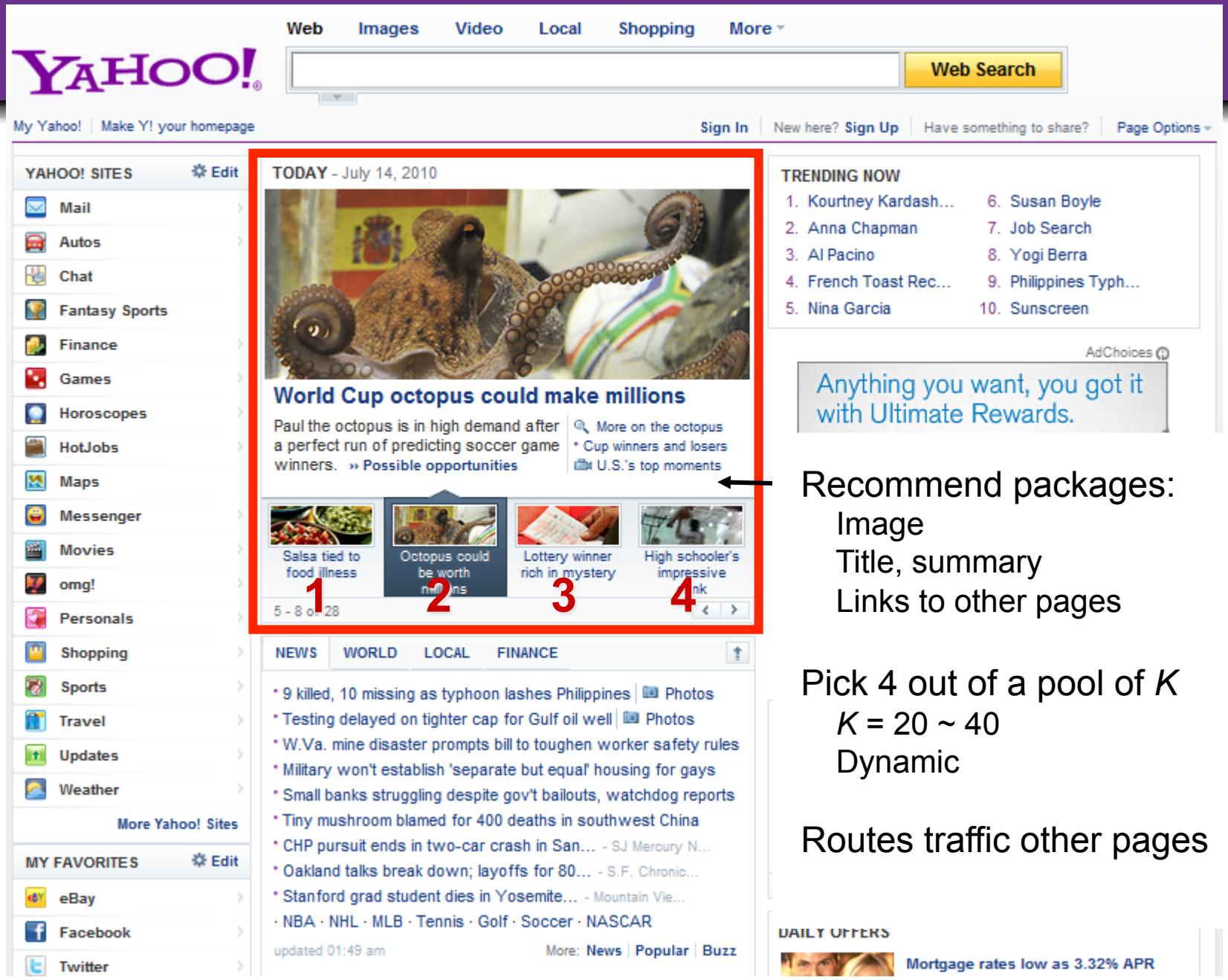
Serving Content on Front Page: Click Shaping

- What do we want to optimize?
- Current: Maximize clicks (maximize downstream supply from FP)
- But consider the following
  - Article 1: CTR=5%, utility per click = 5
  - Article 2: CTR=4.9%, utility per click=10
    - By promoting 2, we lose 1 click/100 visits, gain 5 utils
- If we do this for a large number of visits --- lose some clicks but obtain significant gains in utility?
  - E.g. lose 5% relative CTR, gain 40% in utility (revenue, engagement, etc)



Example Application: Today Module on Yahoo! Homepage

Currently in production, powered by some methods discussed in this tutorial



Recommend packages:

- Image
- Title, summary
- Links to other pages

Pick 4 out of a pool of K

- $K = 20 \sim 40$
- Dynamic

Routes traffic other pages

Problem definition

- Display "best" articles for each user visit
- Best - Maximize User Satisfaction, Engagement
  - BUT Hard to obtain quick feedback to measure these
- Approximation
  - Maximize utility based on immediate feedback (click rate) subject to constraints (relevance, freshness, diversity)
- Inventory of articles?
  - Created by human editors
  - Small pool (30-50 articles) but refreshes periodically

Where are we today?

- Before this research
  - Articles created and selected for display by editors
- After this research
  - Article placement done through statistical models
- How successful ?

"Just look at our homepage, for example. Since we began pairing our content optimization technology with editorial expertise, we've seen click-through rates in the Today module more than double. ----- Carol Bartz, CEO Yahoo! Inc (Q4, 2009)

Main Goals

- Methods to select most popular articles
  - This was done by editors before
- Provide personalized article selection
  - Based on user covariates
  - Based on per user behavior
- Scalability: Methods to generalize in small traffic scenarios
  - Today module part of most Y! portals around the world
  - Also syndicated to sources like Y! Mail, Y! IM etc