Internet Advertising

UW CSE454
5/5/09
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Agenda

- Industry context
- Advertiser view
- Publisher view
- Audience view
- Testing/optimization

I know I’m wasting half of my ad budget. I just don’t know which half.

2009 Global Ad Spend

$458 Billion

Industry Structure

The Great Divide

Brand

- Emotions
- Indirect benefits
- Banners, TV, stadiums

Direct Response

- Transactions
- Gross profits
- Search, coupons, 1-800, radio, mail
Conversion Funnel

Monetizing Traffic

Share of Voice Costs $$$

Conversion Potential vs. Price
**Real World Example**

- Impressions: 4.4M
- Clicks: 2078
- Registrations: 69
- CTR: 0.0469%
- CPC: $0.65
- eCPM: $0.31
- CPRegClick: $19.69
- CPReg: $46.76

**Bid Management**

<table>
<thead>
<tr>
<th>Term</th>
<th>Clicks</th>
<th>CPC</th>
<th>Pos</th>
<th>CR</th>
<th>Leads</th>
<th>CPA</th>
<th>RegPrice</th>
<th>Revenue</th>
<th>Spend</th>
<th>GM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing School</td>
<td>5,000</td>
<td>$1.00</td>
<td>1</td>
<td>5%</td>
<td>250</td>
<td>$7.50</td>
<td>$1,875</td>
<td>$5,000</td>
<td>-63%</td>
<td></td>
</tr>
<tr>
<td>Nursing Schools</td>
<td>5,000</td>
<td>$2.00</td>
<td>3</td>
<td>20%</td>
<td>1,000</td>
<td>$10.00</td>
<td>$30,000</td>
<td>$10,000</td>
<td>200%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10,000</td>
<td>$1.50</td>
<td>2</td>
<td>12.5%</td>
<td>1,250</td>
<td>$12.00</td>
<td>$25,50</td>
<td>$31,875</td>
<td>$15,000</td>
<td>133%</td>
</tr>
<tr>
<td>Optimized</td>
<td>8,000</td>
<td>$2.43</td>
<td>1</td>
<td>22%</td>
<td>1,760</td>
<td>$11.05</td>
<td>$30.00</td>
<td>$52,800</td>
<td>$19,440</td>
<td>172%</td>
</tr>
</tbody>
</table>

**Bid Optimization**

- Find shape of the volume, CR, and price curves as f(pos)
- Linear programming to maximize goal (e.g. LTV, gross profit, volume)
- Challenges
  - Sample size
  - Price changes
  - Seasonality

**Industry Structure**

**Online Advertising Risks**

- Revenue Share
- Cost Per Action (CPA)
- Subscription / Sponsorship
- Cost Per Click (CPC)
- Cost Per Impression (CPM)

- Publisher
- Balance of Risk
- Advertiser
“Low-CPM” Innovation (circa 2001)

- CPC Marketplace Formation
- Advertiser Growth
  - Text-based ads
  - Self-serve ads
  - RPV optimization
  - Keyword suggestion
- Increased Bids
  - Max Bids
  - Keyword opacity
- Click Volume
  - Syndication
  - Text ad network
  - International
- Better Matches
  - Landing page analysis
  - Ad inhibition

RPV Optimization: Problems with Sort by CPC

<table>
<thead>
<tr>
<th>Example Term: &quot;mba&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad Title</td>
</tr>
<tr>
<td>Ad Body</td>
</tr>
<tr>
<td>CPC</td>
</tr>
<tr>
<td>CTR</td>
</tr>
<tr>
<td>Position</td>
</tr>
<tr>
<td>RPV</td>
</tr>
</tbody>
</table>

RPV Optimization

Sort by (CPC_Bid x CTR)

Keyword Opacity

<table>
<thead>
<tr>
<th>impr</th>
<th>CTR</th>
<th>Clicks</th>
<th>CPC</th>
<th>CR</th>
<th>Leads</th>
<th>CPA</th>
<th>Spend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing School</td>
<td>100,000</td>
<td>5%</td>
<td>5,000</td>
<td>$1.00</td>
<td>5%</td>
<td>250</td>
<td>$20.00</td>
</tr>
<tr>
<td>Nursing Schools</td>
<td>10,000</td>
<td>50%</td>
<td>5,000</td>
<td>$2.00</td>
<td>20%</td>
<td>1,000</td>
<td>$10.00</td>
</tr>
<tr>
<td>Total</td>
<td>110,000</td>
<td>9%</td>
<td>10,000</td>
<td>$1.50</td>
<td>12.5%</td>
<td>1,250</td>
<td>$12.00</td>
</tr>
<tr>
<td>MatchDriver</td>
<td>110,000</td>
<td>9%</td>
<td>10,000</td>
<td>$2.00</td>
<td>12.5%</td>
<td>1,250</td>
<td>$16.00</td>
</tr>
</tbody>
</table>

Landing Page Analysis

What?? No “Christmas”

Landing Page Analysis

No “Christmas” here either!
Industry Structure

End Users

Don’t bug me

Unless I like what you have to offer

Better Matching

- Context detection
  - GPS, location
  - App vs. content
  - Info seeker vs. transactor
  - Calendars/schedules/events
  - Social networks/status
  - Twitter - now
  - Behavioral - esp. w/knowledge of specific site behaviors
- Contextual

- Privacy
  - Google "AOL search data"

Context?

- Flowers
- Mentos gum
- Trial Prep
- Credit score
- Cosmetics
- Hampton Inns
- Weight Watchers
- Vacation Home Rentals
- Home Depot
- Web Hosting
- WebMD
- Colon Cleanse - Warning
- My Teeth Aren’t Yellow
- Classmates.com

Testing

\[
\text{Gross Margin} = \text{Conversion Rate} \times \text{CPA} \times \text{RPV}
\]

TESTING
Testing

Sample Size, margin of error, confidence

\[ x = Z^2 \frac{c^2}{100}(100-r) \]

\[ n = \frac{N}{1} \left( \frac{E^2 + x}{(N-1)E^2 + x} \right) \]

\[ E = \text{Sqrt}\left[ \frac{N - n}{n(N-1)} \right] \]

Sample Size Problems

- So many ideas, so little to sample...
  - Disproportionate advantage to scale
- Multivariate testing
  - Taguchi Method
    - Method for calculating signal-to-noise ratio of different parameters in an experimental design
    - Allows optimization with A/B test of each cross-product
Repetition

Professional Photos

Before

We observed an immediate 30% increase in conversion rates.

After

Fact Sheet Design

<table>
<thead>
<tr>
<th>Existing Schools (n=1,428)</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best</td>
<td>99.1%</td>
</tr>
<tr>
<td>Worst</td>
<td>0.0%</td>
</tr>
<tr>
<td>Average</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th># Schools</th>
<th>CR Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. photos</td>
<td>1</td>
<td>30%</td>
</tr>
<tr>
<td>More X buttons</td>
<td>4</td>
<td>21%</td>
</tr>
<tr>
<td>Marketing value, more programs listed</td>
<td>1</td>
<td>78%</td>
</tr>
<tr>
<td>Photos + Marketing value, more programs</td>
<td>1</td>
<td>50%</td>
</tr>
</tbody>
</table>

Analytics

Opportunities

- Advertisers
  - Low-RPV
  - Minimize waste
  - 10x simplicity

- Publishers / Search Engines / Ad Networks
  - Scaling local, hyperlocal
  - Other value judgments than rank
    - Under-monetized sites
    - Audience prediction
    - Duplicate detection
  - Google’s path to lead gen
  - Advertiser behavioral tracking
Further Reading

- Sample size calculators
  - www.ezsurvey.com/samplesize.html
  - www.surveysystem.com/sscalc.htm

- Google Analytics – www.google.com/analytics
  - www.google.com/analytics

- Taguchi Method commercial products/whitepapers
  - www.vertster.com
  - www.omniture.com/en/products/conversion/testandtarget

- Online marketing sites
  - searchengineland.com
  - searchenginewatch.com
  - www.marketingsherpa.com
  - www.dmnews.com
  - www.imediaconnection.com
  - www.iab.net (industry group)