

10 – Analytics & Optimization

From Code to Product
gidgreen.com/course

Lecture 10

- Introduction
- Data collection
- Website metrics
- Optimization
- Competitive intelligence
- Surveys
- Tools and books

Why analytics?

- Quantify success/failure
 - For yourselves
 - For investors
 - Against competition
- Scientific decisions
 - No blind faith
 - Fewer arguments
 - Avoid HiPPO = highest paid person's opinion

Good analytics

- Simple
- Few in number
- Relevant
- Unambiguous
- Actionable
- Instant (or nearly)
- Repeatable

AARRR — Metrics for pirates

A cquisition	Site visit or app download
A ctivation	Registration or usage
R etention	Repeat usage
R eferral	Brings other people
R evenue	Generate cash

Dave McClure, 500 Startups

Some quotes

“What gets measured, gets managed.”
— Peter Drucker

“The only metrics that entrepreneurs should invest energy in collecting are those that help them make decisions.”
— Eric Ries, *The Lean Startup*

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In-app analytics

- Home rolled or third party
- Store usage information locally
 - ‘Call home’ when online
- Privacy concerns
 - Confirmation dialog?
- Complete access to device
 - But you will be caught!
- Problem: slow iteration

In-app integration

1. Download the [Flurry Android SDK](#)
2. Add the FlurryAgent.jar to your classpath
3. Configure you AndroidManifest.xml to have access to the Internet and optionally location
4. Incorporate the following three lines of Flurry code:

```
import com.flurry.android.FlurryAgent;

@Override
protected void onStart()
{
    super.onStart();
    FlurryAgent.onStartSession(this, "YOUR_API_KEY");
}

@Override
protected void onStop()
{
    super.onStop();
    FlurryAgent.onEndSession(this);
}
```

Reporting app events

3. Optional / Advanced Features

You can use the following methods (during a session only) to report additional data:

```
FlurryAgent.logEvent(String eventId, Map parameters)
FlurryAgent.onError(String errorId, String message, String errorClass)
FlurryAgent.onPageView()
FlurryAgent.setUserID(String);
FlurryAgent.setAge(int);
FlurryAgent.setGender(byte);
```

Web analytics

- All activity visible to site
 - Users don't expect privacy
- Web servers log requests
 - Also: Javascript solutions
- Page view centric
 - Other events require integration
 - Coffee break?
 - Events not sessions

A web server log line

www.websudoku.com

24.186.55.113

[06/May/2012:08:13:02 -0400]

"GET / HTTP/1.1"

200

1045

"http://www.google.com/search?q=sudoku"

"Mozilla/5.0 (iPhone; CPU iPhone OS 5_1
like Mac OS X) AppleWebKit/534.46 (KHTML,
like Gecko) Mobile/9B179 Safari/7534.48.3"

Javascript tracking code

```
<script type="text/javascript">
  var _gaq = _gaq || [];
  _gaq.push(['_setAccount', 'UA-1165533-3']);
  _gaq.push(['_trackPageview']);

  (function() {
    var ga = document.createElement('script'); ga.type =
'text/javascript'; ga.async = true;
    ga.src = ('https:' == document.location.protocol ?
'https://ssl' : 'http://www') + '.google-analytics.com/ga.js';
    var s = document.getElementsByTagName('script')[0];
s.parentNode.insertBefore(ga, s);
  })();
</script>
```

Web metrics alternatives

	Server logs	Javascript	Home-made
Integration	None	Via HTML	Server code
Convenience	Download + analyze	Web-based access	Up to you
Delay	None	Up to 24 hours	Up to you
Reporting	Varies	Advanced	Up to you
Other events	Hard	Via API	Easy
Data leakage	None	Total!	None

Track web users by...

- IP address
 - Given for every web request
 - Good for geography
 - But: proxies, classrooms, router resets
- Cookies
 - Track ~~user~~ browser over long term
 - But: clearing, multi-browsing, first request
 - Customization of web server

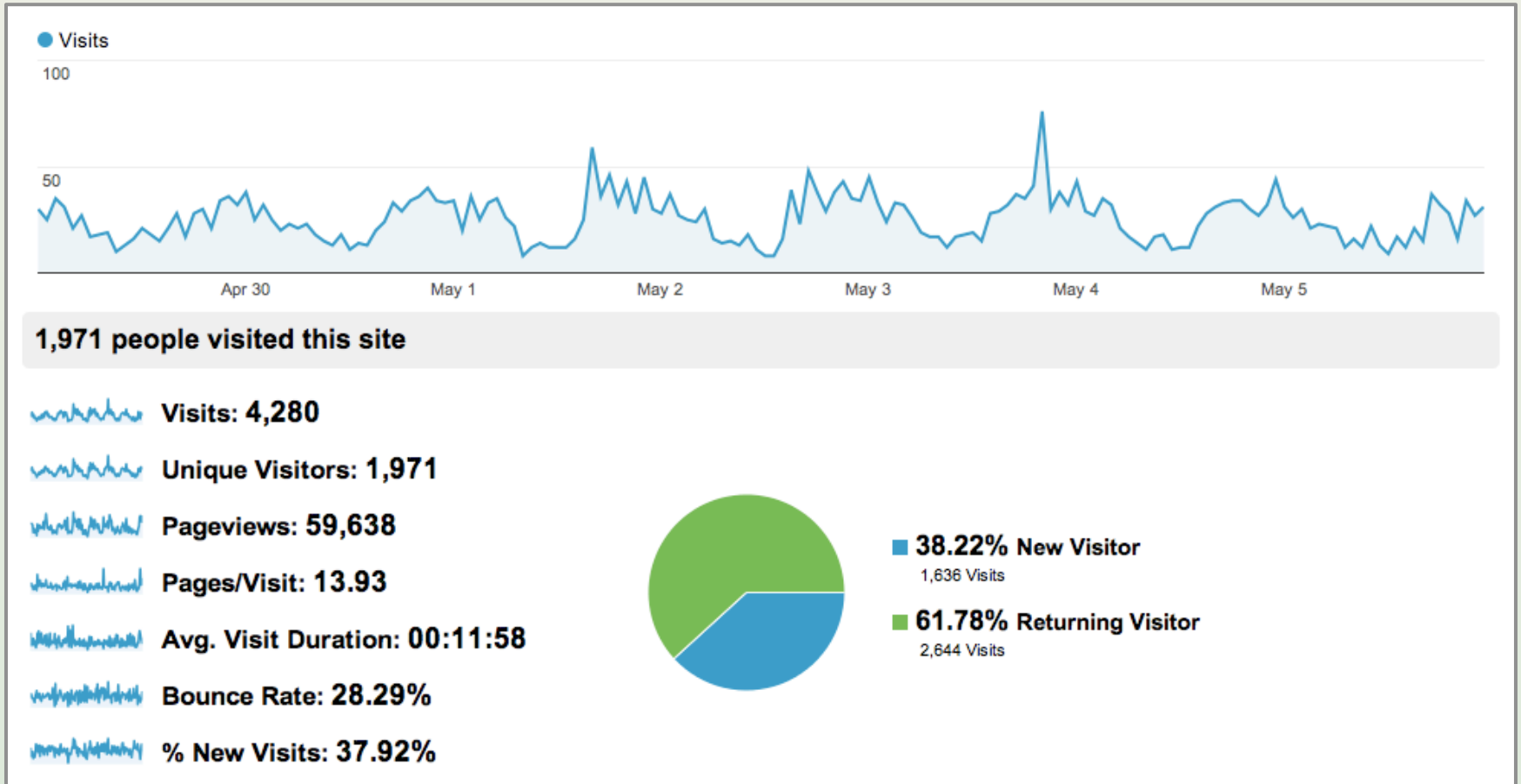
Track web users by...

- Log in
 - Reliable for registered users
 - But: anonymous users, multiple accounts
 - Requires custom logging tools
- Solution: combine!
 - Intelligently tie IPs, cookies and accounts
 - Example: user registration
- Data always incomplete

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Basic website metrics



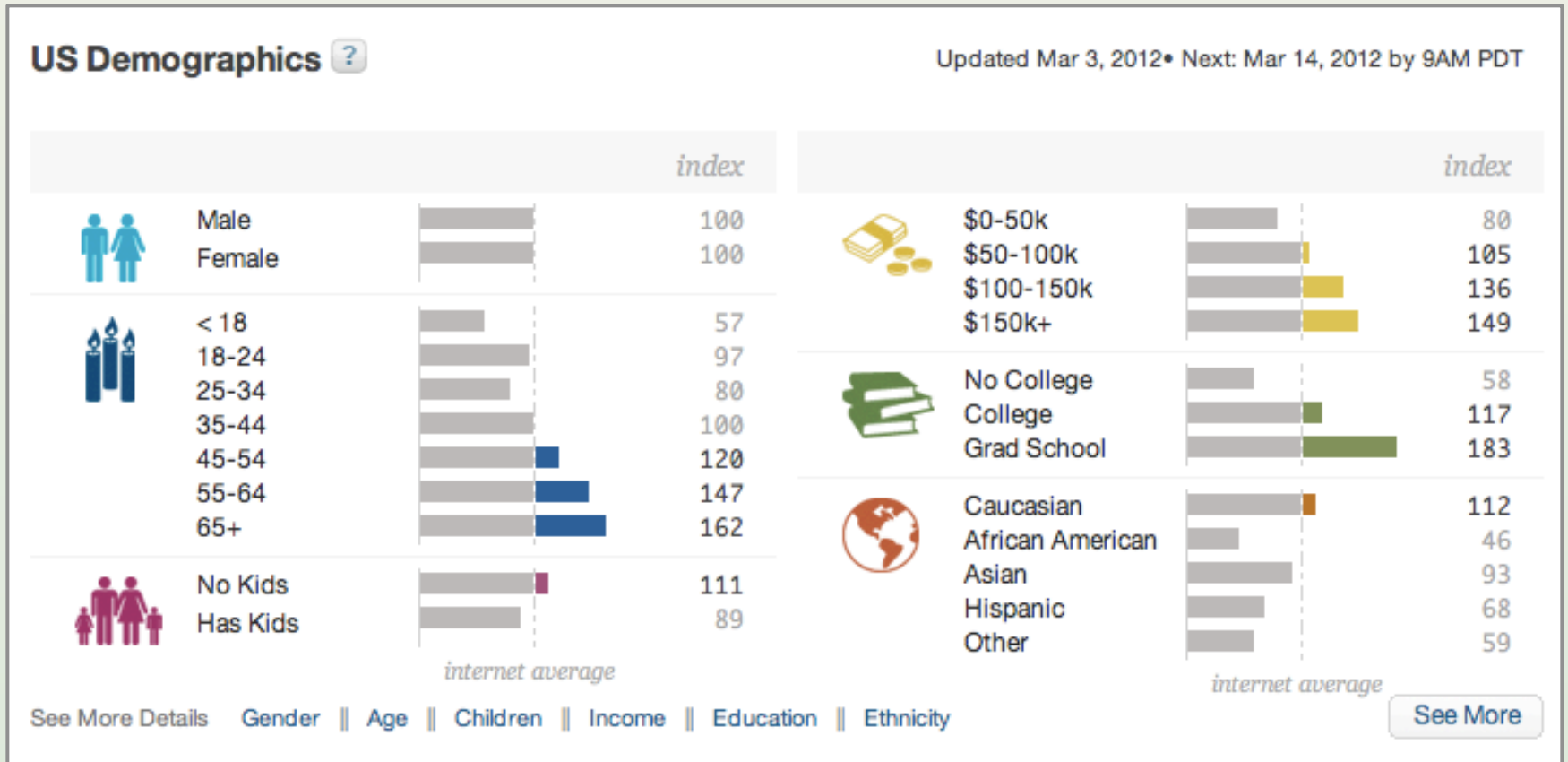
Immediate questions

- When does one visit end?
 - GA: 30 minutes without activity
- What makes a visitor unique?
 - GA: Tracking cookie
- How is duration calculated?
 - GA: Time between first and last pages
- What makes a visitor new?
 - GA: Never visited your site before

Geography

Countries			Cities		
Country	Uniques (Cookies)	Index	City	Uniques (Cookies)	Index
United States	978,006	121	London (GB)	23,979	149
Canada	142,532	259	Toronto (CA)	17,763	268
United Kingdom	137,109	161	Unknown (US)	13,596	93
India	42,494	121	Singapore (SG)	11,545	247
Australia	33,100	142	Chicago, IL (US)	11,223	92
More Countries			More Cities		
US States			US DMAs		
State	Uniques (Cookies)	Index	DMA	Uniques (Cookies)	Index
California	115,457	70	New York	63,146	101
Texas	63,536	106	Los Angeles	44,915	98
Florida	56,865	116	Chicago	37,833	116
New York	56,753	100	San Fran-Oak-SJ	37,324	39
Illinois	47,757	116	Boston (Manchr)	32,171	153
More States			More DMAs		

Demographics



Frequency report

Count of Visits	Visits	Pageviews	Percentage of total	
			Visits	Pageviews
1	1,636	14,107	38.22%	23.65%
2	228	3,955	5.33%	6.63%
3	111	2,031	2.59%	3.41%
4	80	1,716	1.87%	2.88%
5	59	992	1.38%	1.66%
6	52	992	1.21%	1.66%
7	43	821	1.00%	1.38%
8	39	495	0.91%	0.83%
9-14	140	2,284	3.27%	3.83%
15-25	162	2,344	3.79%	3.93%
26-50	214	2,067	5.00%	3.47%
51-100	139	2,256	3.25%	3.78%
101-200	348	5,685	8.13%	9.53%
201+	1,029	19,893	24.04%	33.36%

Sources of traffic

- Type-in (no referrer)
 - Includes browser bookmarks
- Search engines
 - Navigational search = type-in
- Referrals
 - Website links or social media
- Paid advertising
- Email campaigns

The multitouch problem

- There's history before the referrer
 - Who deserves the credit, e.g. affiliates
- So who gets the credit?
 - Last click (standard)
 - First click (unrealistic)
 - Even split
 - Split weighted to last

Search engine queries

	Keyword	Visits	↓	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
<input type="checkbox"/>	1. carbon catalog	258		8.95	00:06:58	33.97%	33.07%
<input type="checkbox"/>	2. carbon catalogue			8.50	00:09:15	19.16%	41.21%
<input type="checkbox"/>	3. global tan energy	258			00:12:15	37.60%	34.88%
<input type="checkbox"/>	4. carbon offset projects	240			00:05:36	72.92%	29.58%
<input type="checkbox"/>	5. carbon offset canada				00:05:08	80.79%	27.68%
<input type="checkbox"/>	6. tree planting australia				00:00:54	97.59%	71.08%
<input type="checkbox"/>	7. scolel te	157			00:01:13	78.98%	71.97%
<input type="checkbox"/>	8. carbon credit companies	151		1.66	00:00:18	1.99%	97.35%
<input type="checkbox"/>	9. carbon conscious ltd carbon catalog			1.68	00:00:15	0.00%	91.34%
<input type="checkbox"/>	10. envirotrade 253 grays inn road telephone	125		1.02	00:00:07	0.00%	98.40%










Also: internal site search

Popular pages

	Page		Pageviews ↓	Unique Pageviews	Avg. Time on Page	Bounce Rate	% Exit
<input type="checkbox"/>	1. /index.php		4,508	2,242	00:01:34	22.23%	17.70%
<input type="checkbox"/>	2. /updates.php		3,640	1,520	00:01:29	14.99%	11.87%
<input type="checkbox"/>	3. /browse.php		3,520	1,105	00:00:45	9.92%	5.68%
<input type="checkbox"/>	4. /forum.php		2,711	940	00:00:48	18.97%	5.35%
<input type="checkbox"/>	5. /gallery.php?theme=all&by=me		1,770	829	00:00:27	13.04%	4.69%
<input type="checkbox"/>	6. /forumTopics.php?forumId=3		1,486	525	00:00:22	30.77%	2.22%
<input type="checkbox"/>	7. /showcase.php		1,005	628	00:01:11	22.22%	8.96%
<input type="checkbox"/>	8. /top5.php		694	403	00:00:53	55.56%	7.93%
<input type="checkbox"/>	9. /index.php?theme=animals		555	421	00:01:52	16.22%	13.51%
<input type="checkbox"/>	10. /gallery.php		552	238	00:00:46	10.48%	7.43%

Landing/entry pages

	Landing Page		Visits	↓	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
<input type="checkbox"/>	1. /index.php		1,732		14.15	00:10:36	41.92%	22.23%
<input type="checkbox"/>	2. /updates.php		427		17.68	00:19:53	0.47%	14.99%
<input type="checkbox"/>	3. /gallery.php		210		16.03	00:16:12	8.10%	10.48%
<input type="checkbox"/>	4. /index.php?t1=		151		3.99	00:03:32	89.40%	39.07%
<input type="checkbox"/>	5. /browse.php		131		28.81	00:22:52	1.53%	9.92%
<input type="checkbox"/>	6. /index.php?t2=		86		2.17	00:01:30	87.21%	66.28%
<input type="checkbox"/>	7. /profile.php?user=mum23&tab=comment		67		13.70	00:12:15	19.40%	0.00%
<input type="checkbox"/>	8. /forum.php		58		26.40	00:23:36	5.17%	18.97%
<input type="checkbox"/>	9. /gallery.php?theme=all&by=me		46		19.20	00:16:35	4.35%	13.04%
<input type="checkbox"/>	10. /index.php?t3=		45		4.22	00:04:04	84.44%	64.44%

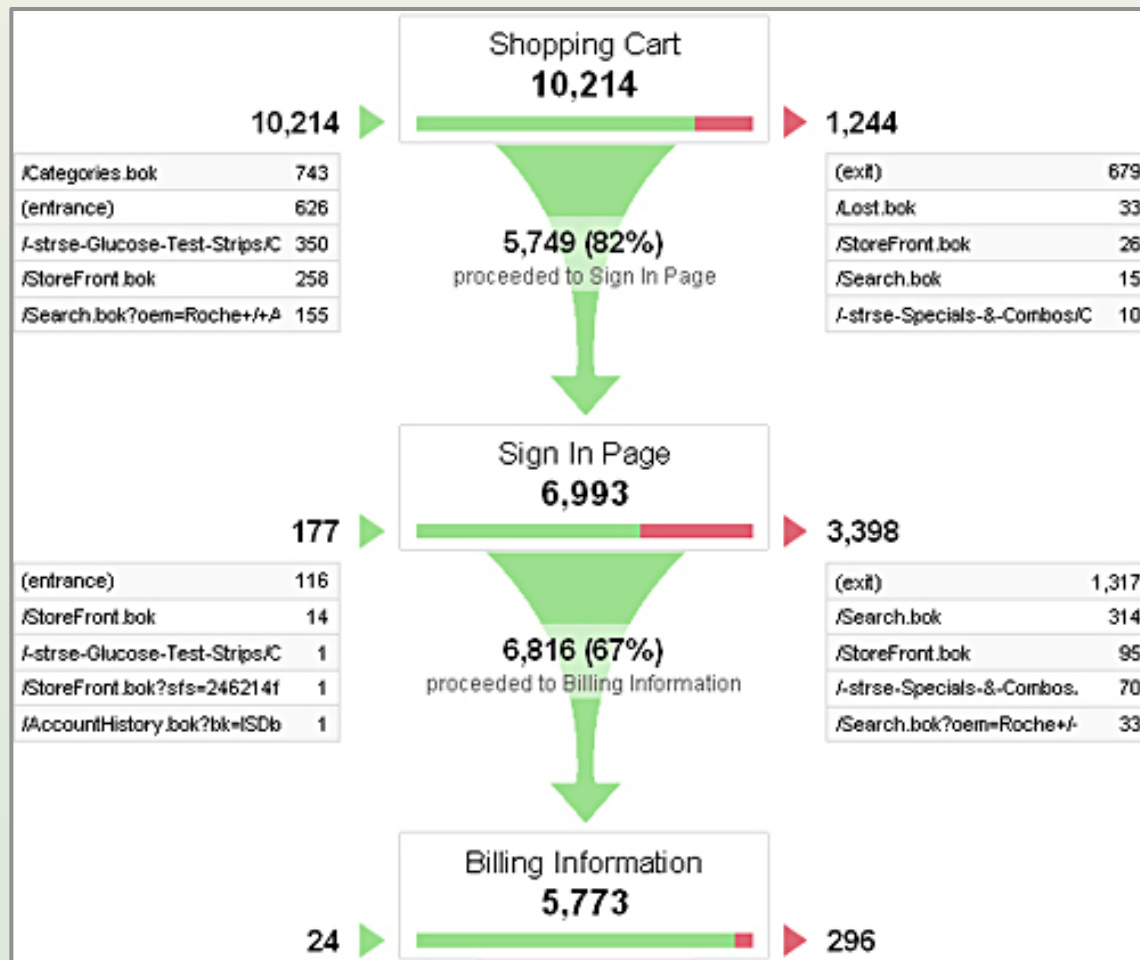
“You can’t choose your home page” – A. Kaushik

Clickmaps and heatmaps

Web Sudoku				
6.7%	Feedback on Web Sudoku Comments and suggestions and wishlist for www.websudoku.com Moderators: WebSudoku	333	71	average time Today at 06:28 AM by Manishsharma
6.7%	JigSawDoku Feedback How to improve the game on www.jigsawdoku.com ? Moderators: WebSudoku	136	6.7%	New computer 03/04/12 at 04:00 AM by WebSudoku
6.7%	Web Sudoku Deluxe For users of the downloadable Sudoku game for Windows and Mac Moderators: WebSudoku	97	26	New Aly-Sudoku 2012 02/12/12 at 03:24 PM by Alybadix
Sudoku Puzzles				
30%	Sudoku Solving Methods Generate and tricks for solving Sudoku puzzles Moderators: WebSudoku	477	99	Help with Puzzle and techniqu... 03/27/12 at 11:21 PM by philandy
10%	Specific Puzzles			Visual Techniques for AI
6.7%	Get help on a Web Sudoku puzzle... or just brag about how fast you solve it!	782	175	Esca... 03/31/12 at 02:02 AM by

~20% Clicks below ↓

Conversion funnel



Source: www.searchenginejournal.com

Sampling methods

- Popular site => lots of data
 - Burden to collect, slow to analyze
- Don't record all events
 - Choose important pages
 - Random subset of visitors
 - ~~Random subset of pageviews~~
- Sub-sample when analyzing
 - By page or visitor

Staleness due to changes in...

- Content
- User familiarity
 - Early adopters vs ...
- Search engine rankings
- Market needs
- Devices
- Cookies

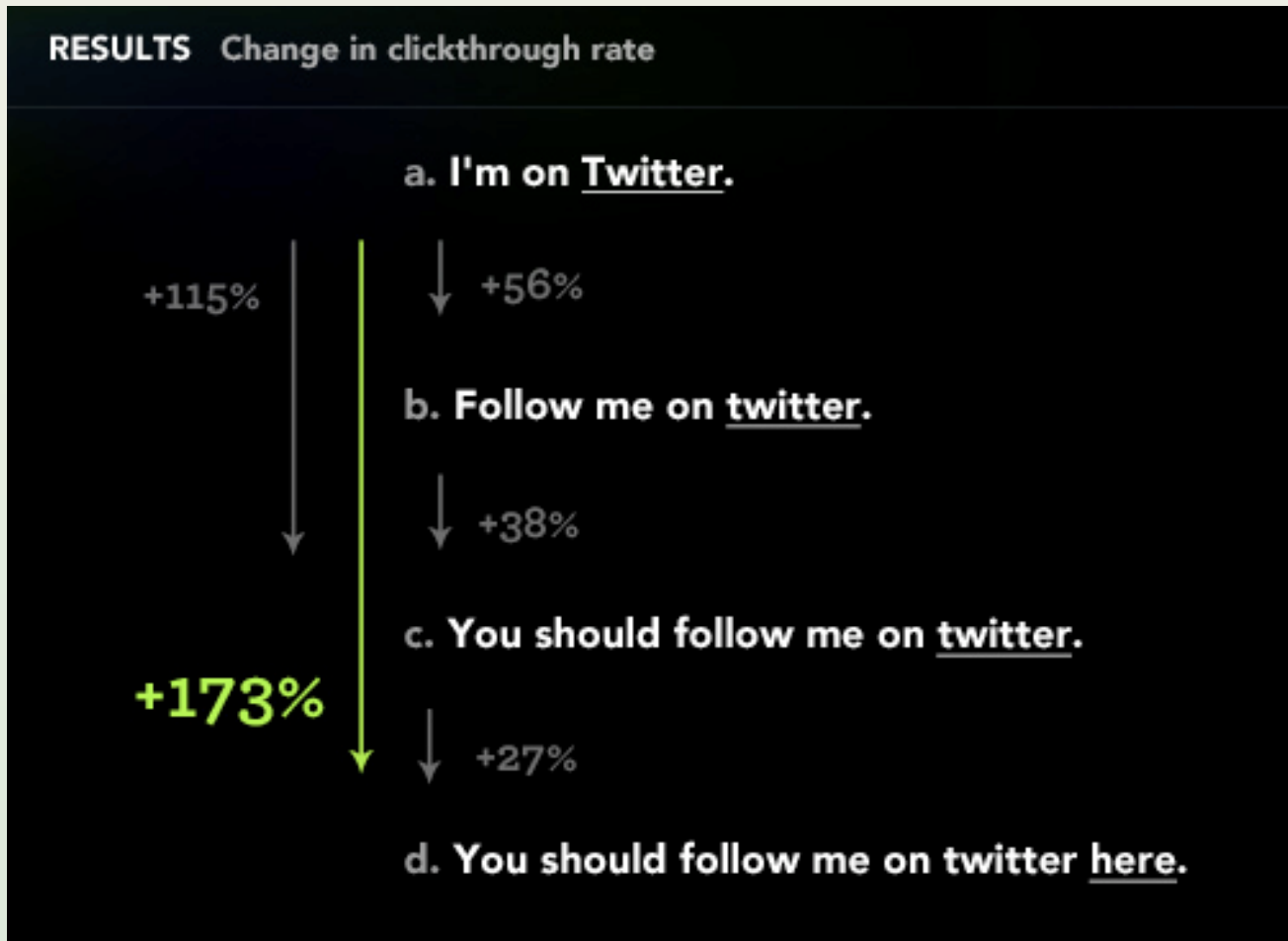
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Optimization

- You don't know how users behave
 - Example: show price early on?
- Small changes => big results
 - But which small changes?
- Use a scientific methodology
 - Easy to set up
 - Easy to get report
 - Statistical significance

Wording example



Source: http://www.dustincurtis.com/you_should_follow_me_on_twitter.html

A/B testing

- Two parallel variations
 - Current vs challenger
- Assign randomly and evenly
 - What about previous visitors?
 - Repeat requests within a session?
- Set test length in advance
 - Length of time or number of visits
- Chi-squared (or similar) test

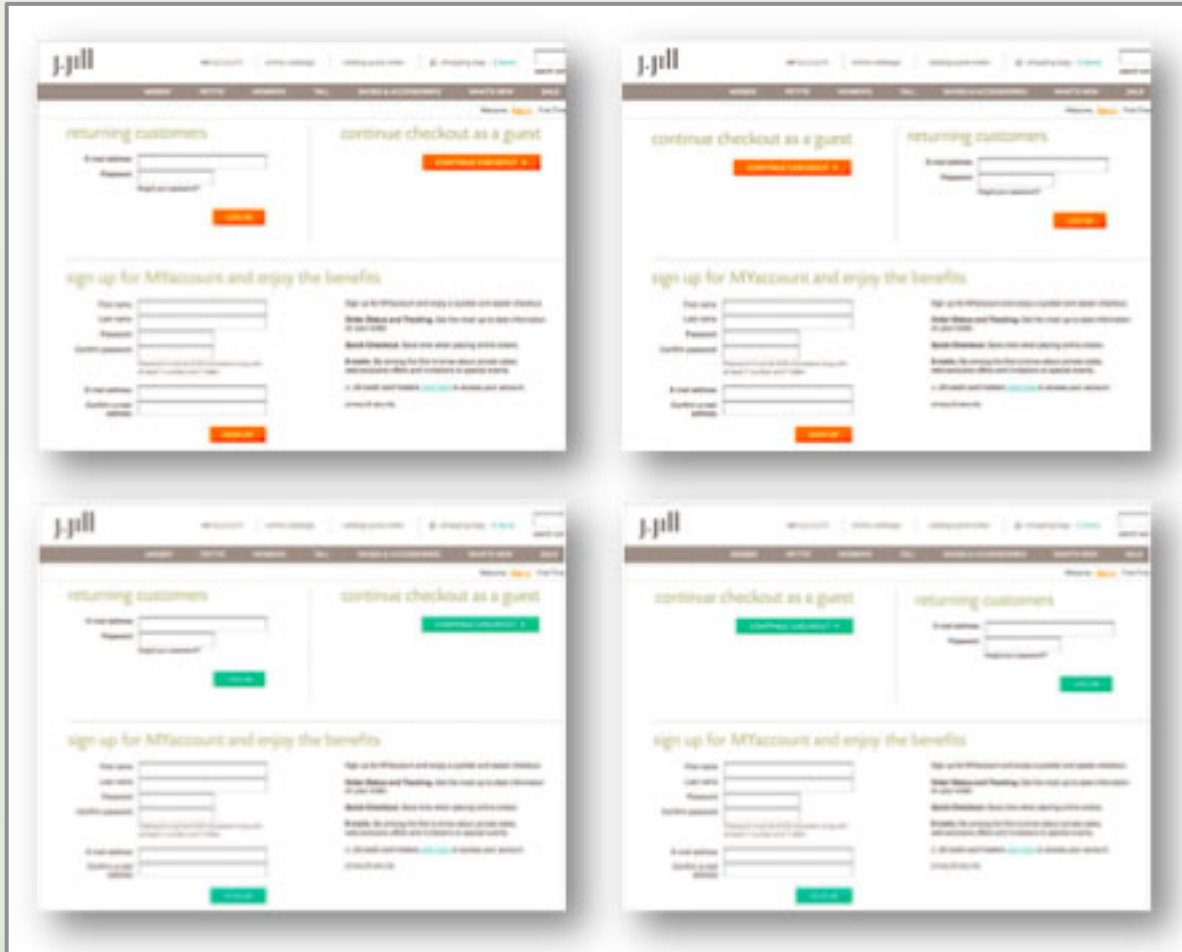
Contingency table

	Product purchased	Not purchased
BUY NOW Full Version \$14.95	9	575
BUY NOW Full Version	13	563

Significant?

Not really... P-value=0.186






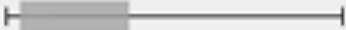



Multivariate testing



Source: <http://www.getelastic.com/testing-part-1/>

Multivariate testing

- Best to use third-party tool
- Full factorial vs partial factorial
 - Certainty vs efficiency

Relevance Rating [?]	Variation	Estimated Conversion Rate Range [?]	Chance to Beat Orig. [?]	Chance to Beat All [?]	Observed Improvement [?]	Conversions / Impressions [?]
Section 2 	Original	29.1% ± 1.0% 	—	0.11%	—	951 / 3273
	Variation 2	32.5% ± 1.0% 	99.9%	99.8%	11.9%	1099 / 3380
	Variation 1	29.1% ± 1.0% 	52.8%	0.13%	0.26%	975 / 3347
Section 3 	Original	28.3% ± 1.2% 	—	0.02%	—	684 / 2417
	Variation 1	32.6% ± 1.2% 	100%	89.7%	15.2%	833 / 2555
	Variation 3	30.9% ± 1.2% 	97.9%	10.1%	9.33%	758 / 2450
	Variation 2	29.1% ± 1.1% 	73.2%	0.18%	2.80%	750 / 2578

Optimization pitfalls

- Preconception driven
 - Too many similar tests
 - Checking before it's done
- Wrong goal
 - e.g. started vs completed purchases
- Unfair test
 - Different time periods
 - New vs returning users

More complex tests

- Non-binary outcomes
 - Size of purchase, length of stay
- Cohort / longitudinal tests
- Whole-site multivariate testing
- Pricing
 - How to prevent a riot?
- Spot diminishing returns
 - Focus on registration, payment, etc...

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Finding competitors

waze vs|

waze vs **google navigation**

waze vs **trapster**

waze vs **mapquest**

waze vs **telenav**

waze vs **navigon**

waze vs **google**

waze vs **motionx**

waze vs **skobbler**

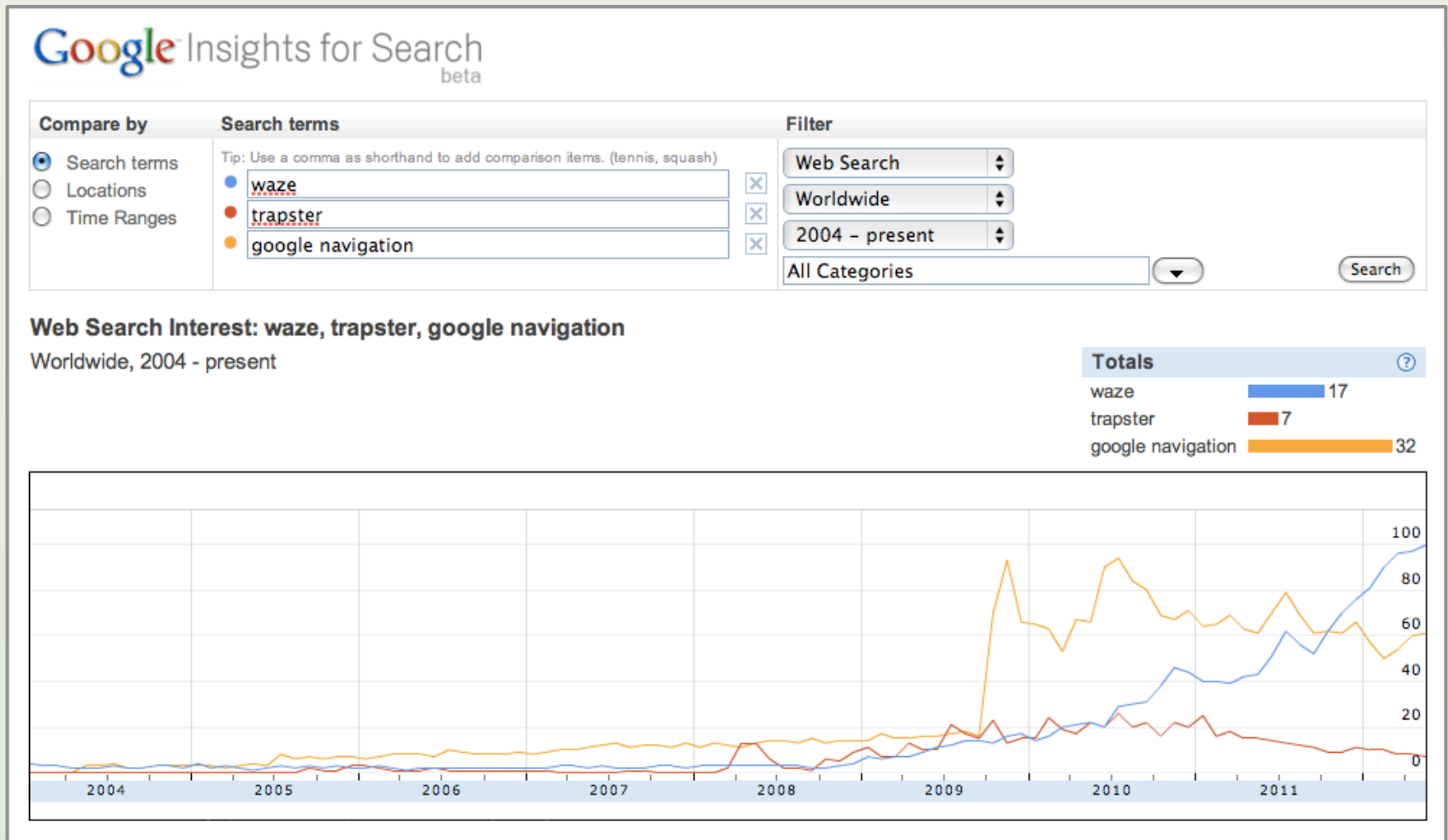
waze vs **inrix**

waze vs **navfree**

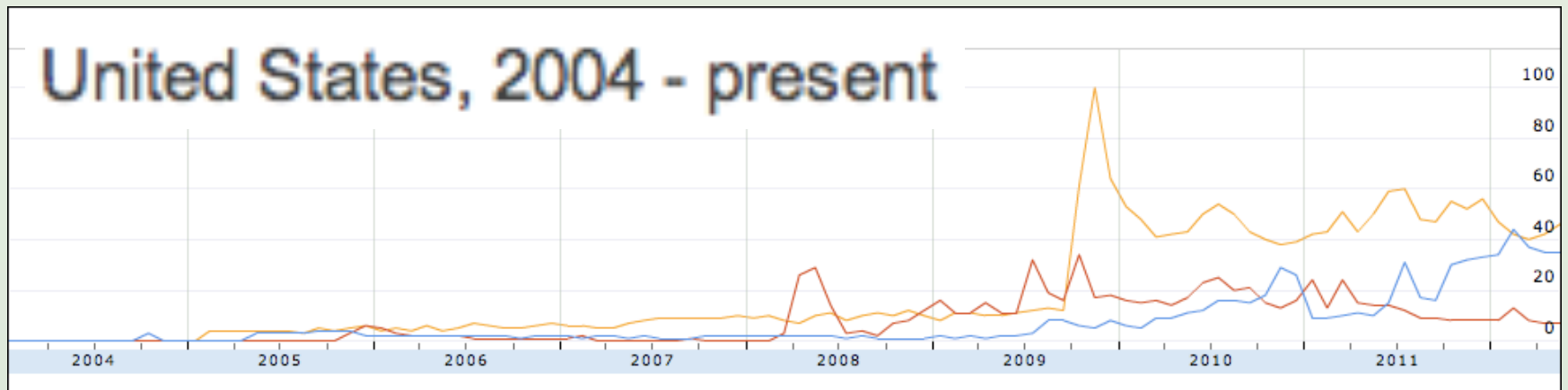
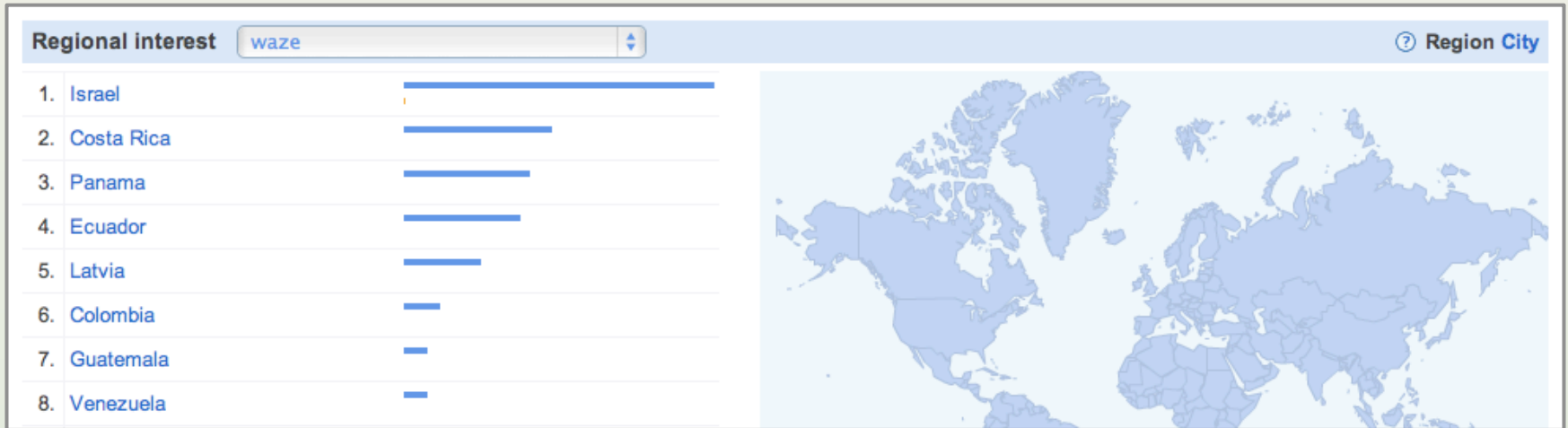
Google Search

I'm Feeling Lucky

Searches for product



But...



Ranking for general searches

navigation iphone

About 664,000,000 results (0.16 seconds)

[The Best Turn-by-Turn Navigation App for iPhone](#)
lifehacker.com/.../the-best-turn+by+turn-navigation-app-for...
by Adam Dachis · in 17,920 Google+ circles · More by Adam Dachis
21 Dec 2011 – The **iPhone**, being without a built-in turn-by-turn navigations app, has found itself with a number of third-party options. We've test a lot of them ...

[Apps with Maps: 11 iPhone GPS apps compared | Macworld](#)
www.macworld.com › Software › Mobile › Navigation
You need iOS 4 installed on an **iPhone** 3GS or 4 to take advantage of background navigation. The **iPhone** 3G has a GPS chip, but lacks the specs to run ...


[Avoid iPhone navigation and typing hassles | Macworld](#)
www.macworld.com › Smartphones
New to the **iPhone**? Then you'll need to learn how to master its MultiTouch interface. In this excerpt from the new Take Control of Your **iPhone** ebook, Ted ...

[iPhone Navigation App Comparison Chart](#)
www.pocketgpsworld.com/iphone-navigation-app-comparison-xr51...
A comparison chart for SatNav (Turn by Turn) apps available for the Apple **iPhone** 3G and 3GS.

IPHONE APP DIRECTORY

The Best Turn-by-Turn Navigation App for iPhone

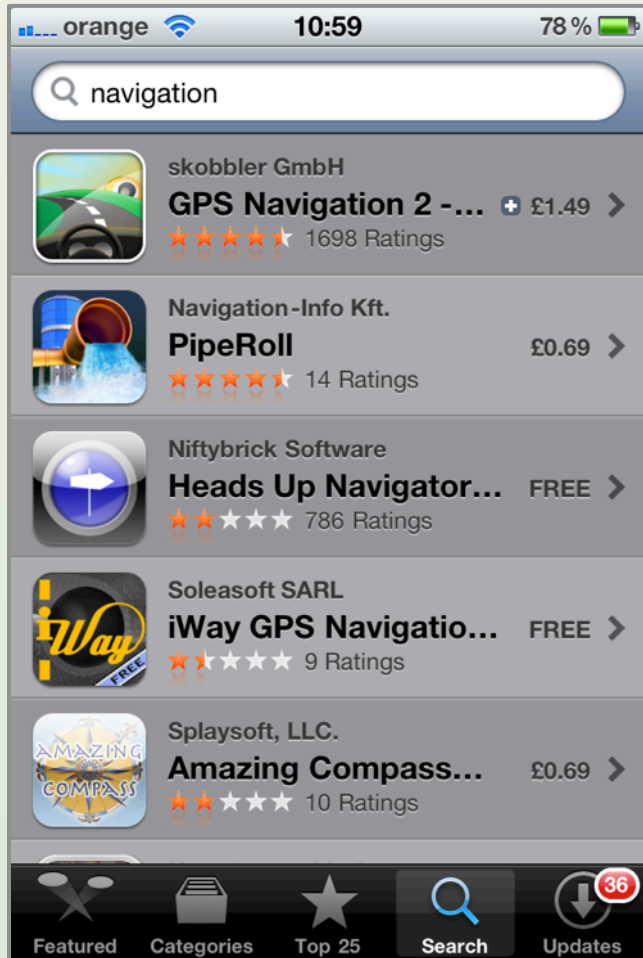
The iPhone, being without a built-in turn-by-turn navigations app, has found itself with a number of third-party options. We've test a lot of them and found the best to be Waze, the free socially-aware app with live traffic and plenty of other awesome features.



Waze

Platform: iPhone
Price: Free
[Download Page](#)

App Store searches



Online mentions

waze iphone

About 1,740,000 results (0.10 seconds)

trapster iphone

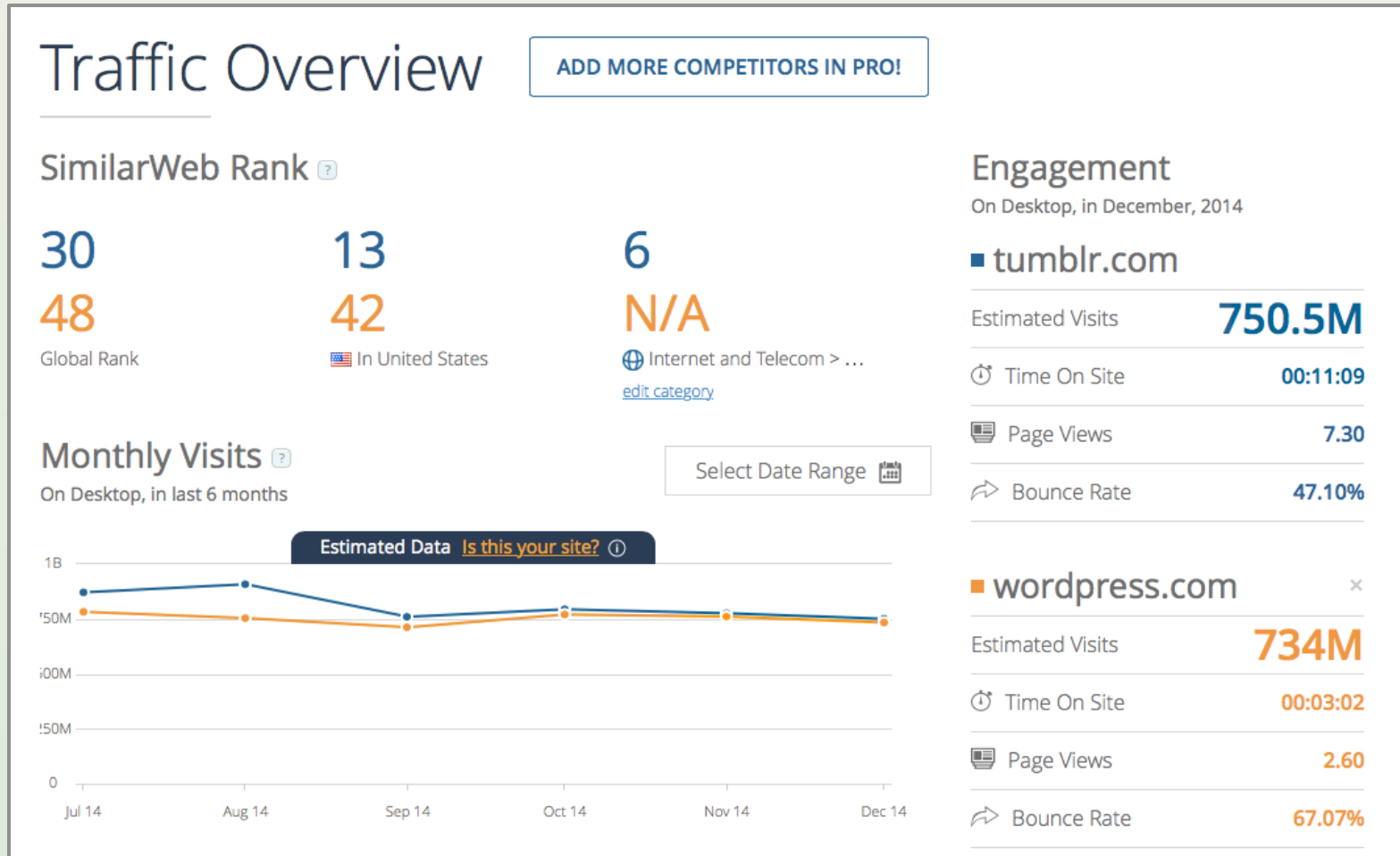
About 555,000 results (0.11 seconds)

"google navigation" iphone

About 321,000 results (0.15 seconds)

Is this fair?

Website traffic



Website traffic




Downloads/installs

Top Free iPhone Navigation Apps


Sort By: **Bestsellers** ▾

- **Navfree GPS Live UK & ROI**
Navigation
Updated 03 May 2012
[+](#) **UPDATE** ▾
- **Waze GPS & traffic - Social, f...**
Navigation
Updated 16 March 2012
[+](#) **UPDATE** ▾
- **London Tube Map**
Navigation
Updated 02 April 2012
[+](#) **FREE** ▾
- **Phone Tracker for iPhones (...**
Navigation
Updated 27 January 2012
[+](#) **FREE** ▾
- **London Live Bus Countdown**
Navigation
Released 09 November 2011
[+](#) **FREE** ▾
- **Shell Motorist**
Navigation
Updated 30 January 2012
[+](#) **FREE** ▾




RATING:
★★★★★
(138,430)

INSTALLS:
1,000,000 - 5,000,000



last 30 days




VLC Media Player
Play audio and video files in real-time and streaming modes.
[Read editor's review...](#)
Added on March 18, 2012 | Version 2.0.1

Editors' rating: ★★★★★
User rating: ★★★★★

42,627,542 total downloads
207,808 last week

[Download Now](#) ▾
[Add to my list](#)



GOM Media Player
Play video files of multiple video formats.
[Read editor's review...](#)
Added on April 18, 2012 | Version 2.1.40.5106

Editors' rating: ★★★★★
User rating: ★★★★★

43,087,709 total downloads
182,525 last week

[Download Now](#) ▾
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Registrations



MarkSmith is not available.

GideonSmith is not available.

Gideon.Smith is not available.

GideonGreenspan is not available.

GideonDovGreenspan is available



"MarkSmith@mail.com" is not available,

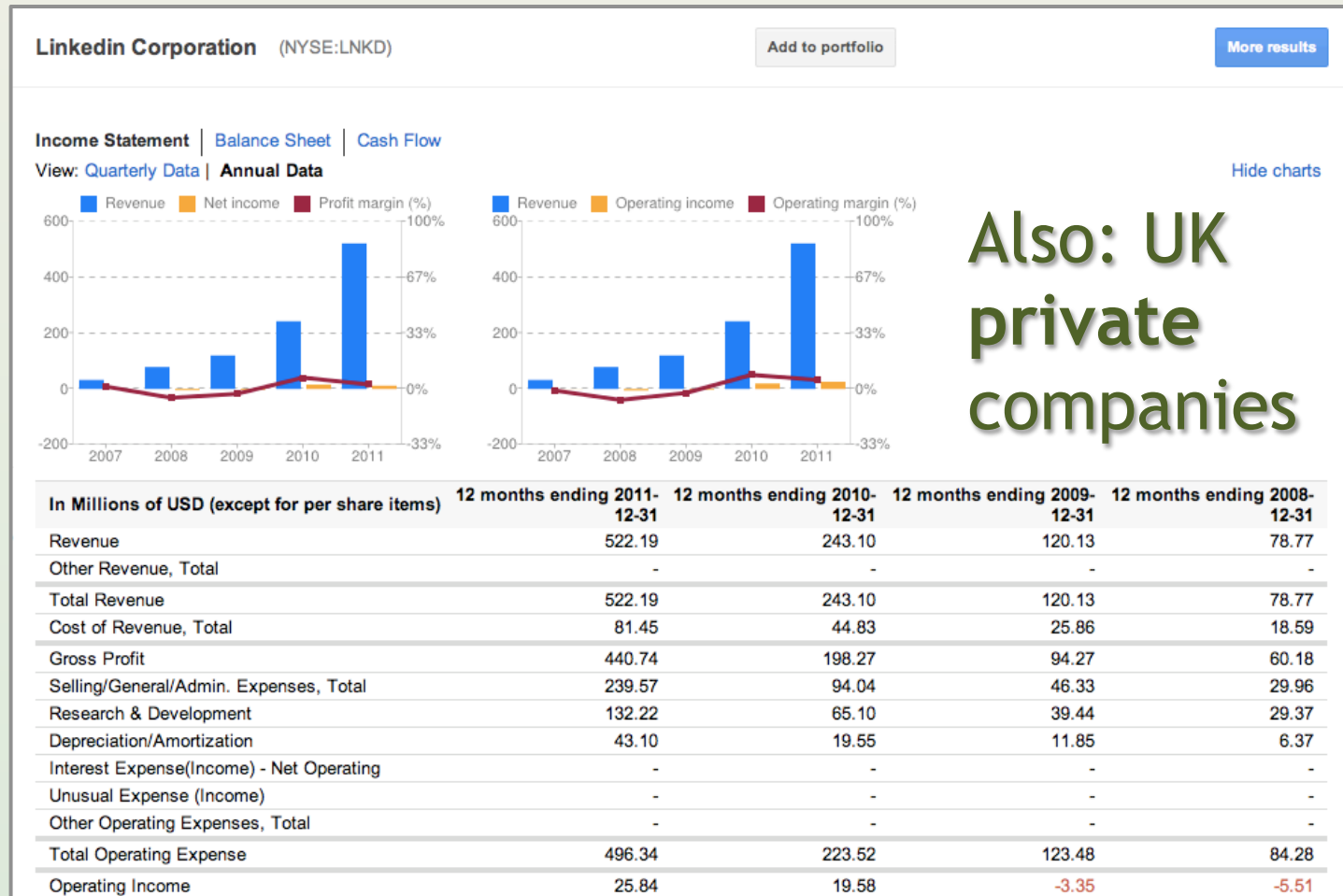
"GideonSmith@mail.com" is not available,

"Gideon.Smith@mail.com" is available

"GideonGreenspan@mail.com" is available

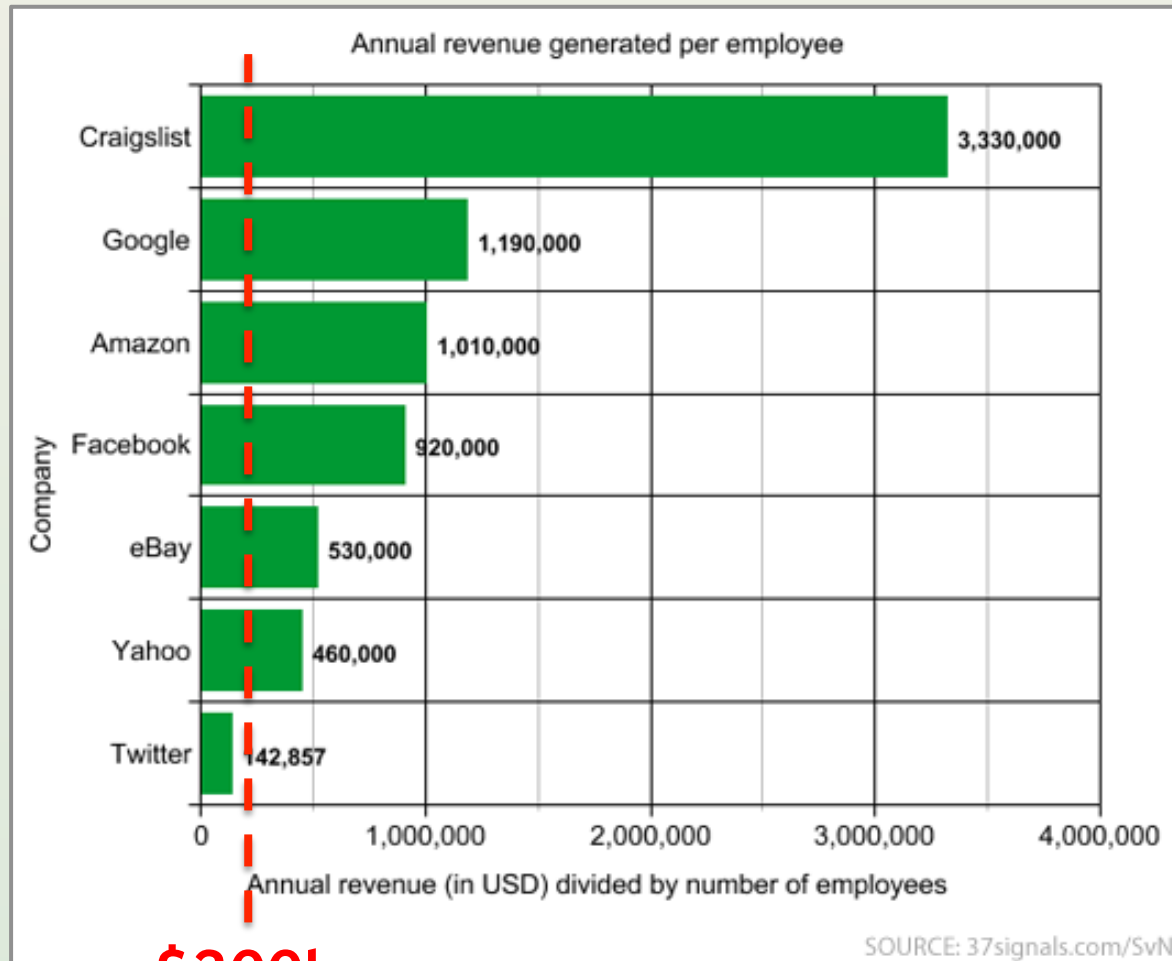
"GideonDovGreenspan@mail.com" is available

Revenue



Also: UK private companies

Revenue



\$200k

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- **Surveys**
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Why surveys?

- Customer feedback en masse
 - Initiated by you (email/web)
 - Avoid vocal minority
- Understand market
 - Job descriptions
 - Size of company
 - Use of product
- How did you find me?

Why surveys?

- Help with strategic decisions
 - Premium offerings
 - Major new versions
- Customer satisfaction
 - Quantify word of mouth
- Understand abandonment
 - But hard to motivate response
- Open-ended feedback

Sources of bias

- Non-response bias
 - Busy customer \neq bad customer
- Response bias
 - Word questions objectively
- Predictions vs facts
 - Would you pay? How much?
- Snapshot in time
 - Lots of data vs ongoing data

Getting users to survey

- Prominent link in product
- Prize giveaway
- Response to support email
- Mass mailing
- Cold calling
- Bias bias bias ...

Good survey design

- Keep it short!
 - Focus on objectives
- Minimize burden on user
 - Easy questions, especially at start
 - Multiple choice
- Make it feel anonymous
 - Social desirability bias
- Free text at end

Bad questions

When did you last go online and buy something?

Would you buy our superior product?

Are you willing to pay for things online?

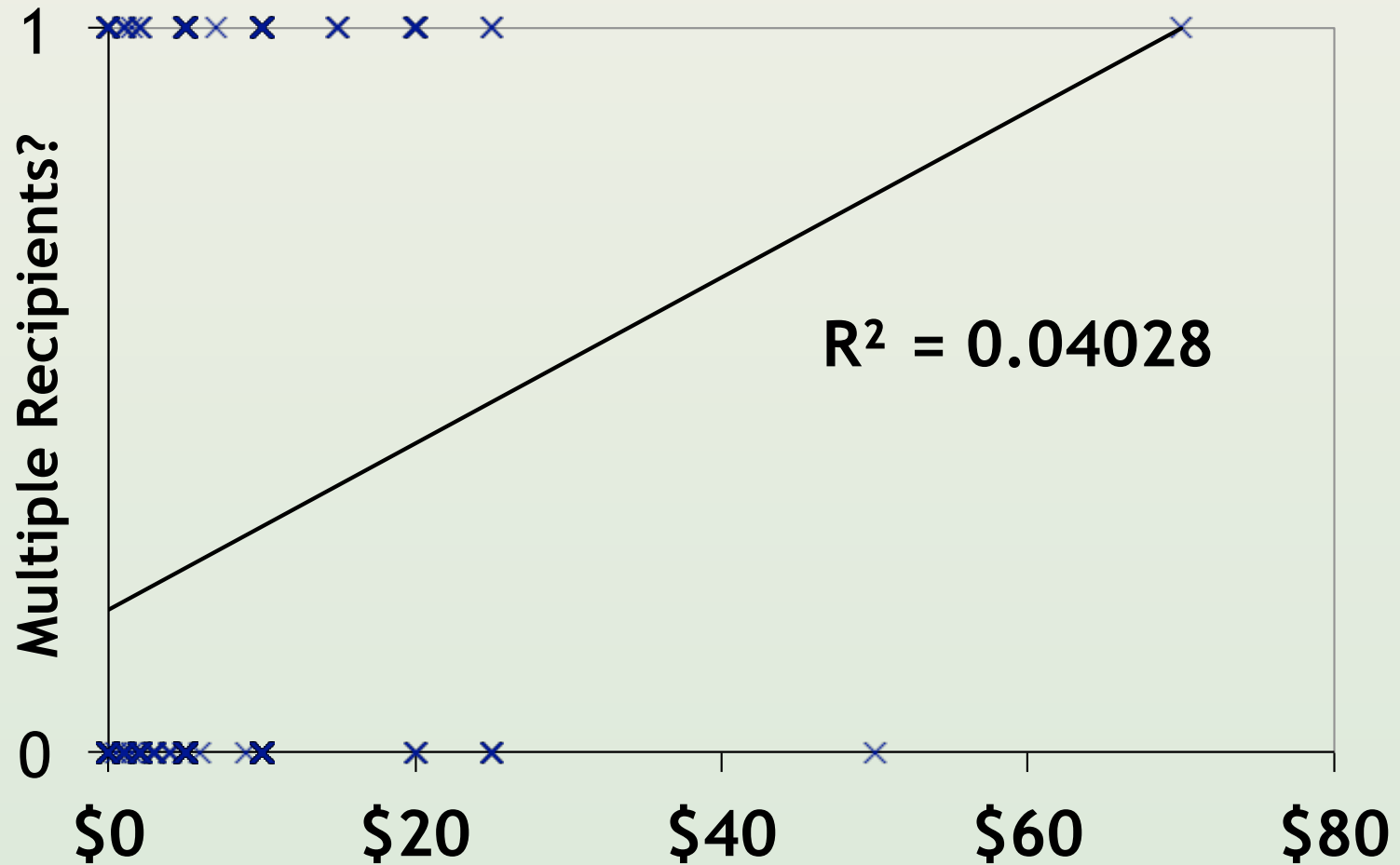
If we created a reliable and bug-free product which had all of the features that you requested in response to the questions in this survey, would you be willing to pay us \$10 per month for it?

What are you looking for?

Analyzing survey data

- Manual review
 - At least for free text field
- Histograms
- Pairwise correlations
 - Especially against price
- Clustering
 - Identify price points
 - Decide who is worth serving

Pairwise correlation

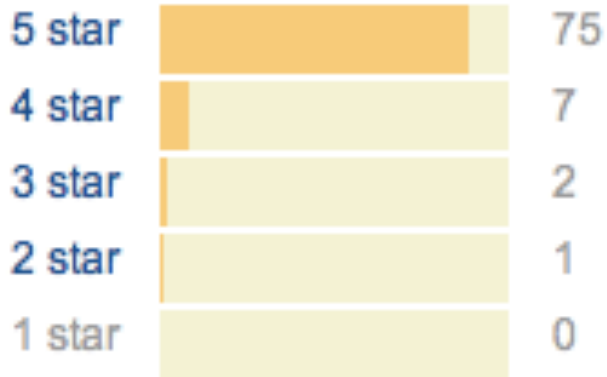


Mini surveys

How do you rate this item? ★★★★★

★★★★★ (85)

4.8 out of 5 stars



[See all 85 customer reviews](#)

web analytics book like this is really a reference and while the author does do a good job of s... "ninja" level, this is not a work of fiction. Yo

as others have said, is engaging and highly ch from this book. If you are new to the spa

Was this review helpful to you?

15 of 16 people found the following review helpful

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- Competitive intelligence
- Surveys
- **Tools and books**

Analytics tools

Google Analytics



mixpanel



Localytics



Other tools

CLIC  TALE[®]

qu α ntcast


 compete


crazyegg[™]

 SimilarWeb

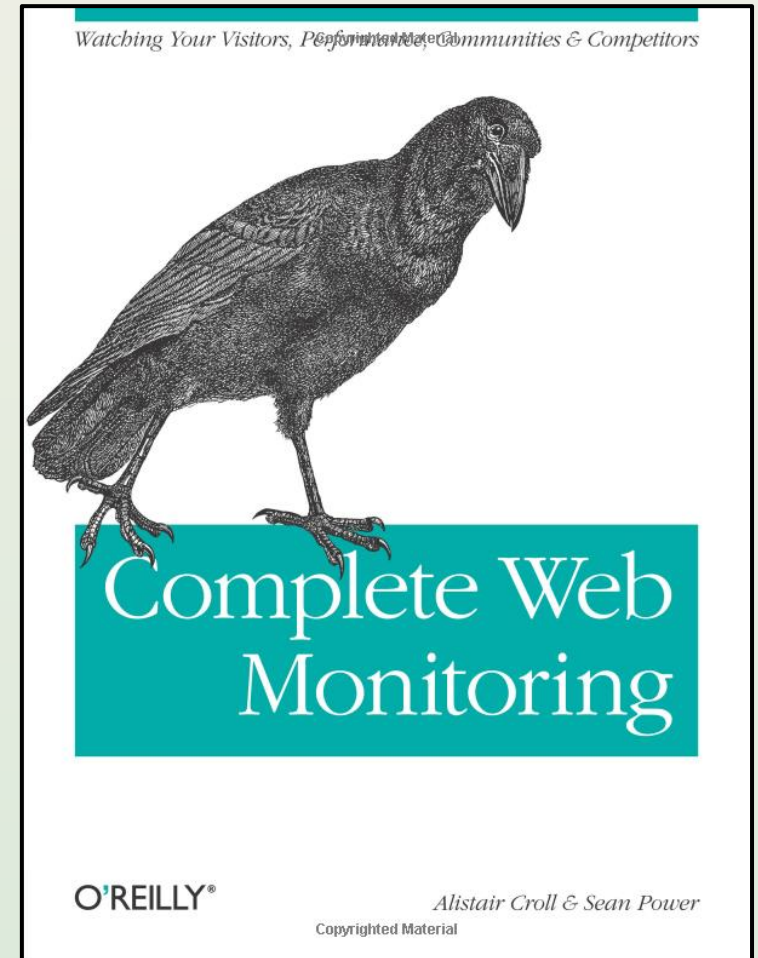
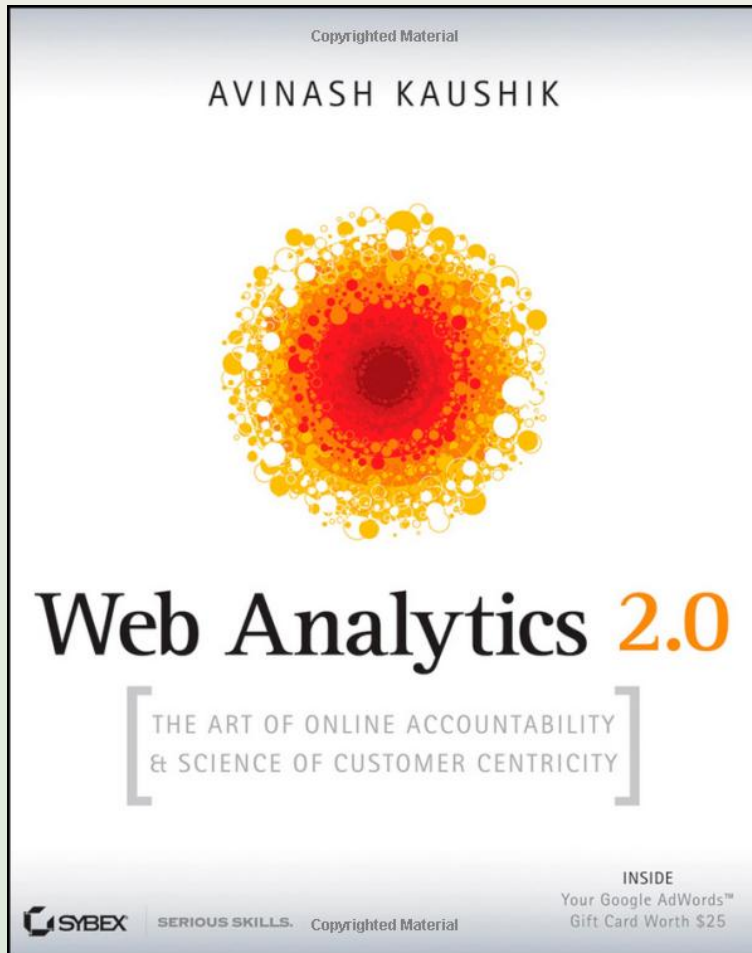
Google[™] Website Optimizer

 SurveyMonkey[™]

 Visual Website Optimizer

 Polldaddy

Books



We didn't cover...

- Social media analytics
 - Popularity
 - Sentiment analysis
- Video analytics
 - Attention
 - Embeds
- Content reuse