

# 网络科学第四讲

2019版

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# 提纲

- Social Media Network



## Agents

- An agent is an actor that has the capacity to adapt their state to some change within their environment
- Control system of this kind consists of a sensor, controller and an actuator

**This lecture's slides adapted from :**

R. Zafarani, M. A. Abbasi, and H. Liu, *Social Media Mining: An Introduction*, Cambridge University Press, 2014.

# Facebook

facebook

Search

Home Profile Account

**Mark Zuckerberg**

Has worked at Facebook Studied Computer Science at Harvard University Lives in Palo Alto, California From Dobbs Ferry, New York Born on May 14, 1984





**Education and Work**

Employers

 Facebook  
Feb 2004 to present - Palo Alto, California  
FBX Profile

College

 Harvard University  
Computer Science · Psychology  
CS182. Intelligent Machines with Andrew Bosworth  
CS121. Introduction to Computational Theory with James Wang and Kang-Xing Jin

High School

 Ardsley High School

 Phillips Exeter Academy  
Class of 2002

**Family**

 Karen Zuckerberg  
Mother

 Edward Zuckerberg  
Father

 Randi Zuckerberg  
Sister

 Donna Zuckerberg  
Sister

 Arielle Zuckerberg  
Sister

**You and Mark**



3 Mutual Friends

**Sponsored**

 Police Auctions  
gsaauctions.gov  
Like a slick deal? Now you can get up to 90% retail with police seized auctions. Get in on the action.

 SF Bucket List  
partners.livesocial.com  
Things to do in San Francisco before you die. One huge coupon emailed daily.

 Stay close to your team  
Check the score and see highlights from the big game with AT&T High Speed Internet for only \$14.95/mo.

 Craft Beer Attorney  
Need legal assistance with your California craft beer?

- How does Facebook use your data?
- Where do you think Facebook can use your data?

# What about Amazon?

The screenshot shows the Amazon.com homepage with a decorative header featuring a floral branch pattern. The top navigation bar includes links for "Your Amazon.com", "Today's Deals", "Gift Cards", and "Help". A "FREE Two-Day Shipping" banner with a "Join Amazon Prime Today" link is visible. The main search bar has a "Search" button and a dropdown menu set to "All". To the right are links for "Hello, Sign In", "Your Account", "Cart" (with 0 items), and "Wish List".

A banner at the top promotes "Amazon Instant Video: The latest TV shows, available instantly." with a "EXPAND TO LEARN MORE" button.

The main content area features two product highlights:

- The All-New Kindle Fire HD**: Described as "The ultimate HD experience". It shows a tablet displaying various apps and media. Price: From \$199. [Shop now](#).
- Introducing Kindle Paperwhite**: Described as "The world's most advanced e-reader". It shows a white e-reader device. Price: From \$119. [Shop now](#).

Below these are promotional banners:

- Friends & Family Gifting**: "Gift Connections Made Easy" with a "Learn more" link.
- Hundreds of Free Songs**: "Play on the Web, Android, and Kindle Fire". It features a large green circle with "\$0". [Shop now](#). **amazon MP3** logo.

At the bottom, there's a section for "THE AMAZON CLOTHING STORE" with a "DRESS SHOP" heading. It features a woman in a black dress and another woman in a black dress. Links include "[Shop Dresses](#)" and "[Shop All Clothing](#)". Text below says "The season's biggest trends from Calvin Klein, BCBGMAXAZRIA, Tracy Reese, and more."

On the right side, there's a "Gold Box Deal of the Day" for "Kindle Inspirational Memoirs and More" at \$1.99.

# Yelp?

English ▾

Friends' Activity Sign Up for Yelp Log In

**yelp**  
Real people. Real reviews. ®

Welcome About Me Write a Review

Try Yelp in... Are You Looking For Yelp Berkeley?

Amsterdam Atlanta Austin Berlin Boston Chicago Dallas Denver Detroit Dublin Honolulu Houston

San Francisco Community Acupuncture San Francisco Food Bank San Francisco Symphony san francisco restaurants San Francisco Movie Tours San Francisco Marriott Fishermans Wharf San Francisco Gay Wedding Video San Francisco Soup Company San Francisco Test Only Smog San Francisco CityPASS

Talk Events Member Search Hide

Near (Address, Neighborhood, City, State or Zip) San Francisco, CA Search

Philadelphia Portland Saint Louis San Diego San Francisco San Jose Seattle Toronto Vancouver Washington, DC More Cities »

**Yelp Berkeley**

Yelp is the fun and easy way to find and talk about great (and not so great) local businesses [Sign Up Now](#)

**Best of yelp**

**Restaurants** 4505 reviewed

1. La Bedaine  
2. Kingston 11 Cuisine  
3. Vital Vittles  
4. Cheese Board Pizza  
5. Emilia's Pizzeria  
[...see more ▾](#)

**Nightlife** 881 reviewed

**Shopping** 4852 reviewed

1. Chestnut & Vine Floral...  
2. Waterside Workshops  
3. UniFormal & UniEleganza Tuxedo...  
4. Lee's Florist & Nursery  
5. Supple Integrative Skin Care  
[...see more ▾](#)

**Beauty and Spas** 2566 reviewed

**Browse by Category**

- Restaurants
- Food
- Nightlife
- Shopping
- Beauty and Spas
- Arts & Entertainment
- Event Planning & Services
- Health and Medical
- Active Life
- Hotels & Travel
- Automotive
- Home Services
- Local Services
- Local Flavor
- Pets
- Education

**Get the Yelp app on your mobile phone**

It's free and helps you find great, local businesses on the go!

[Get it for Free Now](#)

**Review of the Day** [Archive ▾](#)

Voted by our members!

Dopo  
\*Cozy, romantic little neighborhood spot. Nice location right across from good ol' Fenton's. No reservations at this little place, so either come a little

# Or Twitter?

Screenshot of a web browser showing the Twitter "Who to follow" page. The URL in the address bar is [https://twitter.com/#!/who\\_to\\_follow/interests/technology](https://twitter.com/#!/who_to_follow/interests/technology). The browser window also shows other tabs for Gmail, FedEx Tracking, and various social media links.

The Twitter interface displays a list of users to follow based on the "Technology" interest category. The users listed are:

- guardiantech** Guardian Tech  
News and comment from the Guardian's technology team
- kaifulee** Kai-Fu Lee I am the CEO of Innovation Works ([www.innovation-works.com](http://www.innovation-works.com)). I used to work at Microsoft, SGI, Apple, and Google. I have written several Chinese books.
- sacca** Chris Sacca I'm an investor in Twitter & other startups. Learn more at [www.lowercaselle.com](http://www.lowercaselle.com). Just finished bicycling across the USA and am thinking about my next adventure.
- kevinrose** Kevin Rose Tech angel investor. Founder of digg.com, wefollow.com. Random ideas, entrepreneur, climber of rocks, video blogger, & tea drinker.
- arsTechnica** Ars Technica The Art of Technology
- lessig** Lessig law prof, reformer.
- leolaporte** Leo Laporte Podcaster, broadcaster and tech pundit. The Tech

On the right side of the page, there are sections for "You recently followed" (with a "View All" link) and "Similar to Michelle Cale". It also includes a "You recently viewed" section and an "Invite Friends" form. At the bottom, there are "Related Services" links for Microsoft and LinkedIn.

# Definition

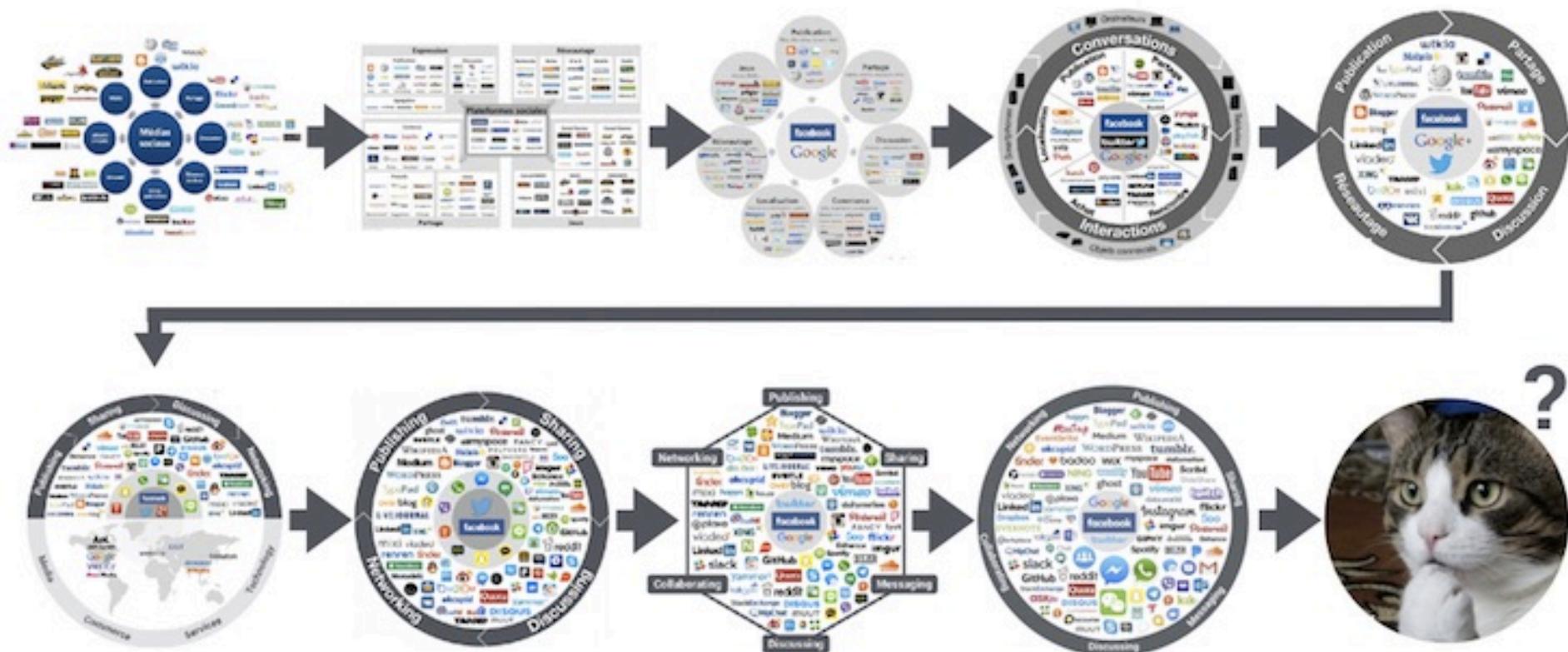
Social Media is the use of electronic and Internet tools for the purpose of sharing and discussing information and experiences with other human beings in more efficient ways.

# Social Media Landscape 2017



# Social Media Landscape 2018





# Social Media: Examples

- A wiki article
- Web reviews and ratings of a popular pizza place in your city
  - E.g., Yelp.com
- An online social network of your professional contacts
  - E.g., Facebook.com, LinkedIn.com
- An iPhone application that informs you where parking is likely available
  - FasPark

# Types of Social Media

- Online Social Networking
- Publishing
  - Blogging
  - Wiki
- Micro blogging
- Social News
- Social Bookmarking
- Media Sharing
  - Video Sharing
  - Photo Sharing
  - Podcast Sharing
- Opinion, Review, and Ratings Websites
- Answers
- Entertainment



# Online Social Networking

Online Social Networks are web-based services that allow individuals and communities to connect with real world friends and acquaintances online

- Interactions
  - Friendship interaction
    - Friends, like, comments, ...
  - Media Sharing
  - Sending and receiving messages

- Examples
  - Facebook.com
  - MySpace.com
  - Bebo.com
  - Orkut.com

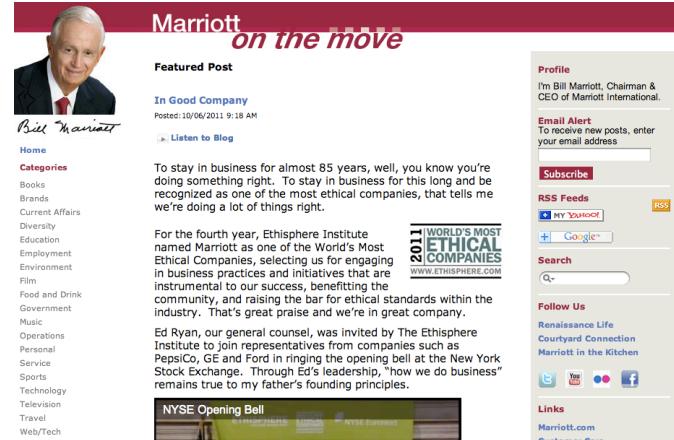
The image displays three separate social media profiles arranged horizontally:

- MySpace Profile (Left):** The profile belongs to "Pei Pei" (Indie / Pop / Rock). It shows a profile picture of a person with long hair, a bio mentioning Seattle, United States, and 208 profile views. It includes sections for "Contacting Pei Pei" (Send Message, Add to Friends, IM / call, Add to Group) and "Upcoming Shows" (Freshy's Cafe, Seattle, Washington, March 20, 2010, 7:00P).
- Facebook Profile (Middle):** The profile is for "Barack Obama". It shows a large profile picture of him in a suit. The bio reads: "Organizing for America, the grassroots organization for President Obama's agenda for America. To learn more about the work we're doing at the grassroots level, visit [www.OFA.org](http://www.OFA.org). OFA is a special project of the Democratic National Committee." It also lists his "Information" such as Current Office (White House), President of the United States, and a list of 15 friends.
- MySpace Profile (Right):** This is another MySpace profile for "Barack Obama". It shows a profile picture of him in a suit. The bio is identical to the Facebook profile. It includes a "Wall" tab with several posts from users like "Barack Obama + Others" and "Just Others".

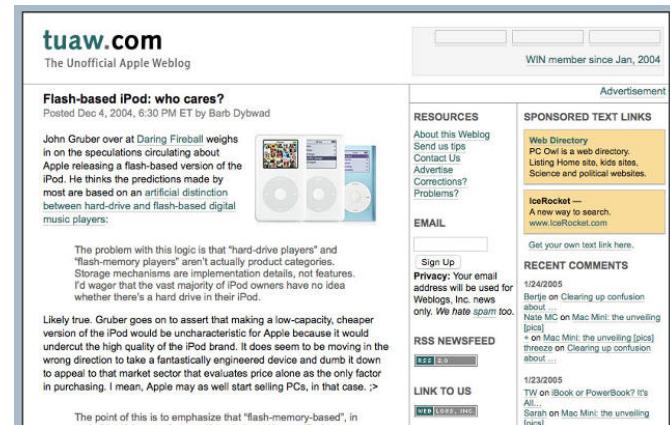
# Blogging

A blog is a journal-like website for users, a.k.a. bloggers, to contribute textual and multimedia content, arranged in reverse chronological order

- Maintained both individually or by a community
  - See a tutorial at KDD  
[http://videolectures.net/kdd08\\_liu\\_briat/](http://videolectures.net/kdd08_liu_briat/)
- Usages:
  - Sharing information and opinions with friends and strangers
  - Disseminating subject-specific content
  - Who is the influential  
[http://videolectures.net/wsdm08\\_agarwal\\_iib/](http://videolectures.net/wsdm08_agarwal_iib/)



The screenshot shows a blog post by Bill Marriott titled "In Good Company". The post is dated 10/06/2011, 9:18 AM. It features a photo of Bill Marriott and includes a link to "Listen to Blog". The sidebar on the right contains a "Featured Post" section, a "Categories" list (Books, Brands, Current Affairs, Diversity, Education, Employment, Environment, Film, Food and Drink, Government, Music, Operations, Personal, Service, Sports, Technology, Television, Travel, Web/Tech, ...), and a "WORLD'S MOST ETHICAL COMPANIES" badge.



The screenshot shows a blog post by Barb Dybwad titled "Flash-based iPod: who cares?". The post is dated Dec 4, 2004, 6:30 PM ET. It discusses John Gruber's prediction about the release of a flash-based iPod. The sidebar on the right includes sections for "RESOURCES", "SPONSORED TEXT LINKS", "EMAIL", "RECENT COMMENTS", and "LINK TO US".

# Microblogging

Microblogging can be considered as a counterpart to blogging, but with limited content

- Usage
  - communication medium
  - social interaction
  - citizen journalism
- Service Providers:
  - Twitter
  - Google buzz



# Wiki

A wiki is a collaborative editing environment that allows users to develop Web pages using a simplified markup language

Wikipedia allows interested individuals to collaboratively develop articles on a variety of subjects.

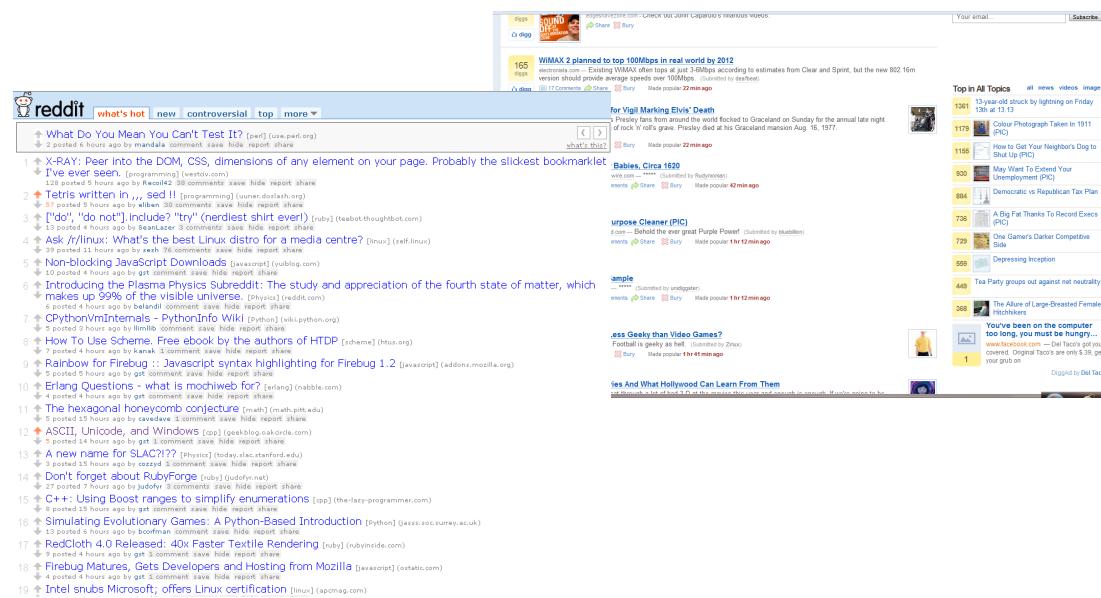
Using the wisdom of crowds effectively, it has become a comprehensive repository of information useful to a variety of individuals

The screenshot shows the Wikipedia article for "Linux". The page title is "Linux" and the subtitle is "The Free Encyclopedia". The main content discusses the history and development of Linux as a free and open-source operating system. On the left, there is a sidebar with various links such as "Main page", "Contents", "Featured content", "Current events", "Random article", "Interaction", "Toolbox", and "create a book". At the bottom of the sidebar, there is a link to "Help:Contents". The right side of the page contains the main article text, which is a good article from Wikipedia. There is also a sidebar on the right with information about the Linux kernel, including its latest stable release (Kernel 2.6.32.1), latest unstable release (Kernel 2.6.33-rc2), supported platforms (x86, MPPC, ppc64, SPARC, DEI Alpha, Itanium, PowerPC, ARM, m68k, PA-RISC, x390, SuperH, M32R and more), and kernel type (Monolithic kernel). A small image of Tux the penguin, the mascot of the Linux kernel, is also present.

# Social News

Social News refers to the sharing and selection of news stories and articles by a community of users.

- Users can share articles that they believe would interest the community
- Samples:
  - Digg.com
  - Slashdot
  - Fark
  - Reddit



# Social Bookmarking

Social Bookmarking sites allow users to bookmark web content for storage, organization and sharing.

- These bookmarks can be tagged with metadata to categorize and provide context to the shared content, allowing users to organize information making it easy to search and identify relevant information.
- Samples
  - Delicious.com
  - StumbleUpon.com

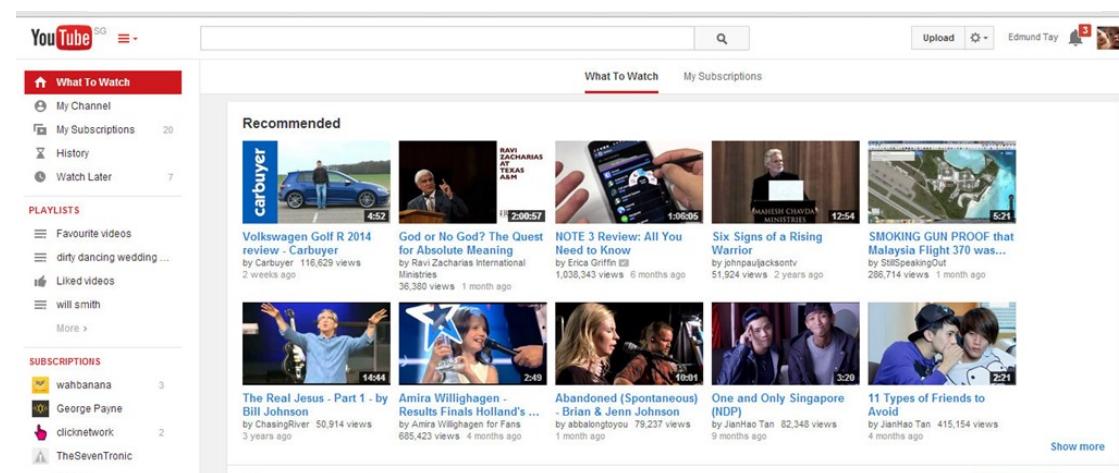
The screenshot shows the Delicious.com homepage. At the top, there's a navigation bar with links for "It's Free!", "Join Now", and "Sign In". Below the header, a large banner features the text "The tastiest bookmarks on the web. Save your own or see what's fresh now!" with a "Learn More" button and three small cupcake icons. A search bar at the top right contains the placeholder "Search the biggest collection of bookmarks in the universe...". To the right of the search bar is a "Search Delicious" button and a "Search" button. Below the search area, tabs for "Popular Bookmarks" and "Explore Tags" are visible. The main content area displays a list of popular bookmarks with their titles, save counts, and associated tags. To the right of the list is a sidebar titled "Popular Tags" with a scrollable list of tags like "design", "blog", "video", etc. At the bottom of the page, there's a footer with links for "delicious", "about", "blog", "terms of service", "privacy policy", "copyright policy", "forums", "support", and "What's new?".

# Media Sharing

Media sharing is an umbrella term that refers to the sharing of a variety of media on the web.

Users share such multimedia content of possible interest to others

- Samples:
  - Video Sharing:
    - YouTube.com
  - Photo Sharing:
    - Flickr.com, picasa.com
  - Document Sharing:
    - Scribd.com,  
Slideshare.com
  - Livecasting:
    - Justin.tv, Ustream.com



# Opinion, Review, and Ratings Websites

Opinion, review, and ratings websites are websites whose primary function is to collect and publish user-submitted content in the form of subjective commentary on existing products, services, entertainment, businesses, places, etc. Some commercial sites may serve a secondary purpose as review sites by publishing product reviews submitted by customers.

- Examples
  - Cnet.com
  - Epinions.com
  - yelp.com
  - tripadvisor.com

The screenshot shows a Yelp page for Tartine Bakery. The search bar has "sf, ca" entered. The main content is a review for a Croissant, priced at \$3.85. Three photos of the croissant are shown. Below the photos is a section for other breakfast pastries. A review by Stephanie S. from Loma Linda, CA, dated 10/23/2012, is displayed with a 5-star rating. The review text is: "This was our first stop from the airport and we were starving! The line was long, but it went pretty fast. This was our first time here and we couldn't decide what to order. We tried the morning bun, chocolate and almond croissant, bread pudding, & the chocolate eclair. Everything was delicious, but the morning bun was sooo amazing. I loved the hints of citrus and the flakiness of the bun. I made my hubby go back & buy me another one to save for later. Oh, Tartine! I wish you were also located in So. Cal." There are buttons for writing a review or adding a photo.

Item	Description	Price
Croissant	Popular	\$3.85
Frangipane Croissant		\$4.50
Double Pain Au Chocolat		\$4.50
Morning Buns		\$3.85
Buttermilk Scones		\$3.25
Tea Cake		\$3.75
Bread Pudding	Popular	\$4.95
Pain Au Jambon		\$4.95
Gougere		\$3.50
Cake Aux Olives		\$4.95
Quiche	Popular	\$3.79
Muesli		Price details

# Socially-Provided Answers

In these sites, users who require certain guidance, advice or knowledge can ask questions. Other users from the community can answer these questions based on knowledge acquired from previous experiences, personal opinions or from relevant research.

- Unlike review and opinion sites, which contain self-motivated contribution of opinions, answer sites contain knowledge shared in response to a specific query.
- Samples:
  - WikiAnswers, Yahoo Answers, Quora, Stackoverflow, .....

Search Google Analytics Questions and Topics Add Question

Question added to topic Google Analytics:  
What percentage of visits would Omniture / Google Analytics / Coremetrics etc miss?  
Assuming client-side integration, compared with the numbers from the web servers and proxy logs.  
Follow · Repost · 0 Answers · 5:55pm

Answer added in topic Google Analytics:  
How can I track Pinterest in Google Analytics?  
1 Ross Allen, Front End Engineer at Airbnb  
Their Javascript pinit.js file (<http://assets.pinterest.com/js/p...>) doesn't seem to add any callbacks, so the best you can do is track clicks on the 'Pin It' button in Goo... (more)  
Upvote · Repost · 2 Answers · 5:17pm

Answer added in topic Google Analytics:  
Google Analytics: Why would someone from an email marketing company tell me that Google analytics does not track visits from Mac users?  
2 Anon User  
The person was seeing if you were gullible enough to be a good fit with their product.  
Sales 101.  
Upvote · Repost · 4 Answers · 3:52pm

Share Topic · Invite People  
Twitter Facebook Quora

Top Answerers  
Mike Sullivan 20 Answers  
Ozberk Olcer 20 Answers Director of Web Analytics in SEM AS. (Google Analytics Certified Partner)  
Shay Sharon 22 Answers  
AJ Kohn 17 Answers  
Christopher O'Donnell 11 Answers

stack overflow Search...

Home PUBLIC Stack Overflow Tags Users Jobs Teams Q&A for work Learn More

Top Questions Ask Question

Interesting Featured Hot Week Month

	votes	answers	views	question title	asked	by
0	0	1		Using Bootstrap 4 To Change Color and Position in One Class	14 secs ago	Christian Begg 3
-1	0	16		Reverse the digits of an integer	15 secs ago	Mike 'Pomax' Kamermans 28.4k
0	0	8		Computing and using Jacobian for solve_ivp method	16 secs ago	Travis Czechorski 6
0	0	1		How to remove padding between nav, article, and footer?	19 secs ago	mcandre 12.5k

If (dev.isBored() || job.sucks()) {  
 searchJobs({  
 flexibleHours: true,  
 companyCulture: 100  
 });  
}  
// A career site that's by  
// developers, for developers.

Get started stack overflow JOBS

Jobs near you

Software Engineer, Mobile Applications (Android/iOS)  
Google 9 Beijing, China  
android ios

# Main Characteristics

- **Participation**
  - social media encourages contributions and feedback from everyone who is interested. It blurs the line between media and audience.
- **Openness**
  - most social media services are open to feedback and participation. They encourage voting, comments and the sharing of information. There are rarely any barriers to accessing and making use of content – password-protected content is frowned on.
- **Conversation**
  - whereas traditional media is about “broadcast” (content transmitted or distributed to an audience) social media is better seen as a two-way conversation.
- **Community**
  - social media allows communities to form quickly and communicate effectively. Communities share common interests, such as a love of photography, a political issue or a favorite TV show.
- **Connectedness**
  - Most kinds of social media thrive on their connectedness, making use of links to other sites, resources and people.

***Social Media Mining is the process of representing, analyzing, and extracting meaningful patterns from social media data***

## 1. Big Data Paradox

1. Social media data is big, yet not evenly distributed.
2. Often little data is available for an individual

## 2. Obtaining Sufficient Samples

1. Are our samples reliable representatives of the full data?

## 3. Noise Removal Fallacy

1. Too much removal makes data more sparse
2. Noise definition is relative and complicated and is task-dependent

## 4. Evaluation Dilemma

1. When there is no ground truth, how can you evaluate?

# 结束语

- 社交媒体网络是复杂系统
- 如何分析社交网络的现象