

Privacy

CSE 120 Winter 2018

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U.S. soldiers are revealing sensitive and dangerous information by jogging

“An interactive map posted on the Internet that shows the whereabouts of people who use fitness devices such as Fitbit also reveals highly sensitive information about the locations and activities of soldiers at U.S. military bases, in what appears to be a major security oversight. In war zones and deserts in countries such as Iraq and Syria, the heat map becomes almost entirely dark — except for scattered pinpricks of activity. Zooming in on those areas brings into focus the locations and outlines of known U.S. military bases, as well as of other unknown and potentially sensitive sites — presumably because American soldiers and other personnel are using fitness trackers as they move around.”

- https://www.washingtonpost.com/world/a-map-showing-the-users-of-fitness-devices-lets-the-world-see-where-us-soldiers-are-and-what-they-are-doing/2018/01/28/86915662-0441-11e8-aa61-f3391373867e_story.html



Administrivia

- ❖ Assignments:
 - Creativity Assignment due tonight (2/2)
 - Mid-quarter Survey due Tuesday (2/6)

- ❖ Midterm on Monday
 - Make an organized cheat sheet!
 - Important concepts, definitions, and maybe examples
 - Go back through the lectures
 - Start with summary slides, focus on things that are highlighted and that you don't remember
 - Re-try all section worksheet questions *on paper*
 - It's really important that you understand the *concepts*

Outline

- ❖ **Privacy**
- ❖ Online Interactions
- ❖ Multimedia Retrieval
 - Geotagging
- ❖ Apps and Access

Being Online

- ❖ It's the *World Wide Web*
- ❖ When we're online, we typically only think about our *intended* audience
 - "Small" circle of friends and organizations
- ❖ Things to consider:
 - The Internet is a real, physical place
 - Digital information is "permanent" and easy to distribute
 - ★ ■ Who can access your stuff?

Privacy

- ❖ The right of people to *choose freely* what circumstances and to what extent they will reveal themselves, their attitude, and their behavior to others.
- ❖ Privacy is an *explicit* human right in many countries
 - Strong privacy protections mean that receivers of information must keep it private
 - Unfortunately, the US has almost no privacy protections

Privacy and Technology

- ❖ How did privacy work in the past?
 - Taking someone else's stuff is illegal: theft, burglary, robbery, extortion
 - The 4th Amendment protects from search and seizure by the government
- ❖ Technology has changed the game!
 - It is now possible (and easy?) to violate people's privacy *without their knowledge*

Privacy and Technology

- ❖ Former Supreme Court Justice Louis Brandeis:
 - *“The narrower doctrine [of illegal search] may have satisfied the demands of society at a time when the abuse to be guarded against could rarely have arisen without violating a contract or a special confidence; but now that **modern devices** afford abundant opportunities for the perpetration of such wrongs without any participation of the injured party, the protection granted by the law must be placed upon a broader foundation. – “The Right to Privacy” (1890)*
- ❖ An interesting conundrum at the intersection of technology and policy
 - e.g. Who is liable in today’s sharing economy?
<https://backchannel.com/the-most-important-law-in-tech-has-a-problem-64f5464128b6>

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An Experiment



Audience Responses

- ❖ In what ways do you produce information (“digital footprints”) online?
 - Post to social media
 - Location services
 - Google searches
 - Youtube video
 - Online shopping

Your Information

- ❖ Profile
 - Name, birthdate/age, job, photo, contact info, etc.
- ❖ Transactions
 - Timestamp, store, product, price, payment info
- ❖ Preferences
 - Clicks, advertisements, “likes”, browsing history
- ❖ Location
 - Geotags, location tags, GPS data
- ❖ Can these be connected to you? *Yes!*
 - Payment info, customer IDs, login accounts
(memberships)


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 - Geotags, location tags, GPS data
- ❖ What happens to all of this information?
 - Targeted advertising, sold for \$, Big Data analysis

What Should Be Private?

- ❖ Birth Certificate demo

What Should Be Private?

- ❖ Birth Certificate demo
- ❖ Is this a violation of my privacy?
 - Maybe not: birth certificates are public record
- ❖ Did this need to be online?
 - No... but it is and there's nothing I can do about it
- ❖ Back to transactions:
 - Socks might not be a sensitive product to buy meh
 - Pregnancy tests might be a sensitive product to buy 

Security Aside

- ❖ “Security questions” usually ask for personal information that is specific to you:
 - Mother’s maiden name
 - Place of birth
 - Street that you grew up on
 - Model of first car
 - Name of first pet
 - Favorite sports team

- ❖ How close would someone need to be in your social circles in order to know the answer to these questions?

Social Cause

- ❖ Increasingly, people use the Internet for regular activities
 - *e.g.* communication, shopping, information gathering
 - People *like* a highly-personalized web experience
- ❖ Industry is working to improve search and retrieval techniques
 - Improve the user experience (and their bottom lines)
- ❖ Governments improve search and retrieval to do forensics and intelligence gathering

Observations

- ❖ Internet sites and mobile apps encourage sharing of data too easily
 - Users often blindly follow along
- ❖ User *and* engineers are often unaware of search and retrieval possibilities of shared data
- ❖ Local privacy protections are often ineffective against inference across websites
 - ↳ combining public data from multiple sites to paint a broader picture

Consequences: Cybercasing

- ❖ **Cybercasing**: Using online data and services to enable “real-world” crimes (that would not otherwise be possible)



Image courtesy of Mitch Blunt

G. Friedland and R. Sommer. “Cybercasing the Joint: On the Privacy Implications of Geotagging.” *Proceedings of the Fifth USENIX Workshop on Hot Topics in Security (HotSec 10)*, Washington, D.C., August 2010.

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***Note:** The work shown in this section is entirely that of Dr. Gerald Friedland, director of the Audio and Multimedia Group at the International Computer Science Institute (ICSI) in Berkeley, CA: <https://www.icsi.berkeley.edu/icsi/projects/multimedia>*

Question

- ❖ On average, how often do you post images and/or videos on the Internet?
 - e.g. Facebook, Instagram, Craigslist, Youtube, Twitter
 - Vote at <http://PollEv.com/justinh>

- A. **Never**(2)
- B. **About once a month or less**(22)
- C. **About once a week**(13)
- D. **About once a day**(3)
- E. **More than once a day**(1)

Internet Multimedia is Growing

- ❖ Youtube gets 300 hours of video uploaded every *minute* [2016]
- ❖ Instagram gets more than 80 million photos uploaded every *day* [2016]
- ❖ Twitter gets 6000 tweets per *second* (~ 500 million per day) [2017]

Multimedia Retrieval

- ❖ Can you search for an image, video, or audio file by anything other than file name?
- ❖ Multimedia retrieval is improving, but still really difficult
 - e.g. SoundHound/Shazam, <http://images.google.com>
identify song by audio snippet *identify image from partial or similarities*
- ❖ Yet multimedia retrieval is already good enough to cause major privacy issues that are not easy to solve
 - We will focus on *geotagging* here

Workaround: Manual Tagging

- ❖ User provides information that can be used for search and retrieval later


Title:	Party In the U.S.A.
Artist:	Miley Cyrus
Album:	The Time of Our Lives [Walmart Exclusive]
Composer:	Claude Kelly; Jessica Cornish; Lukasz "Doctor Luke
Genre:	Dance
Copyright:	-
Rating:	4 stars (really like it)
Description:	-

← find all songs by artist



find all photos of yourself

Image	
Dimensions	1069 x 343
Width	1069 pixels
Height	343 pixels
Bit depth	24
File	
Name	projects_geotube_new.png
Item type	PNG File
Folder path	C:\Users\justi\Dropbox\teaching\CSE120 ...
Date created	4/27/2017 11:47 PM
Date modified	4/27/2017 11:47 PM
Size	444 KB



I kind of #hate when people use #hashtags for their #tweets.

Tweet by @wilshipley

March 29, 2012

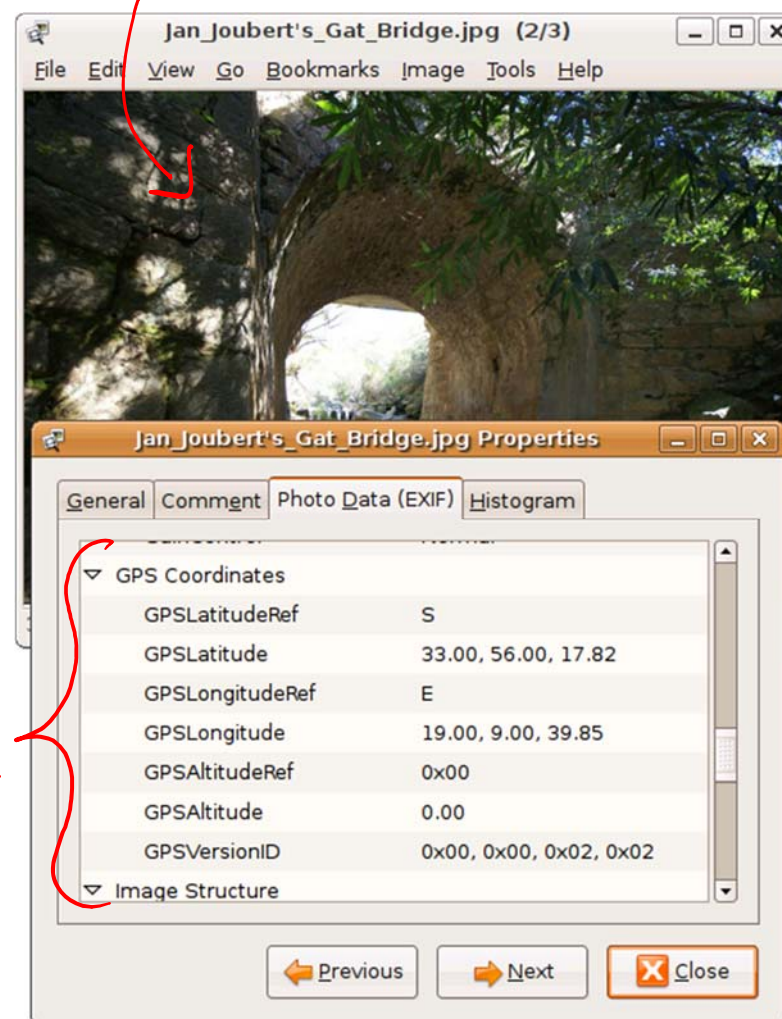
↑ find all tweets by hashtag

Workaround: Geotagging

- ❖ **Geotagging** is the process of adding geographical identification metadata to media

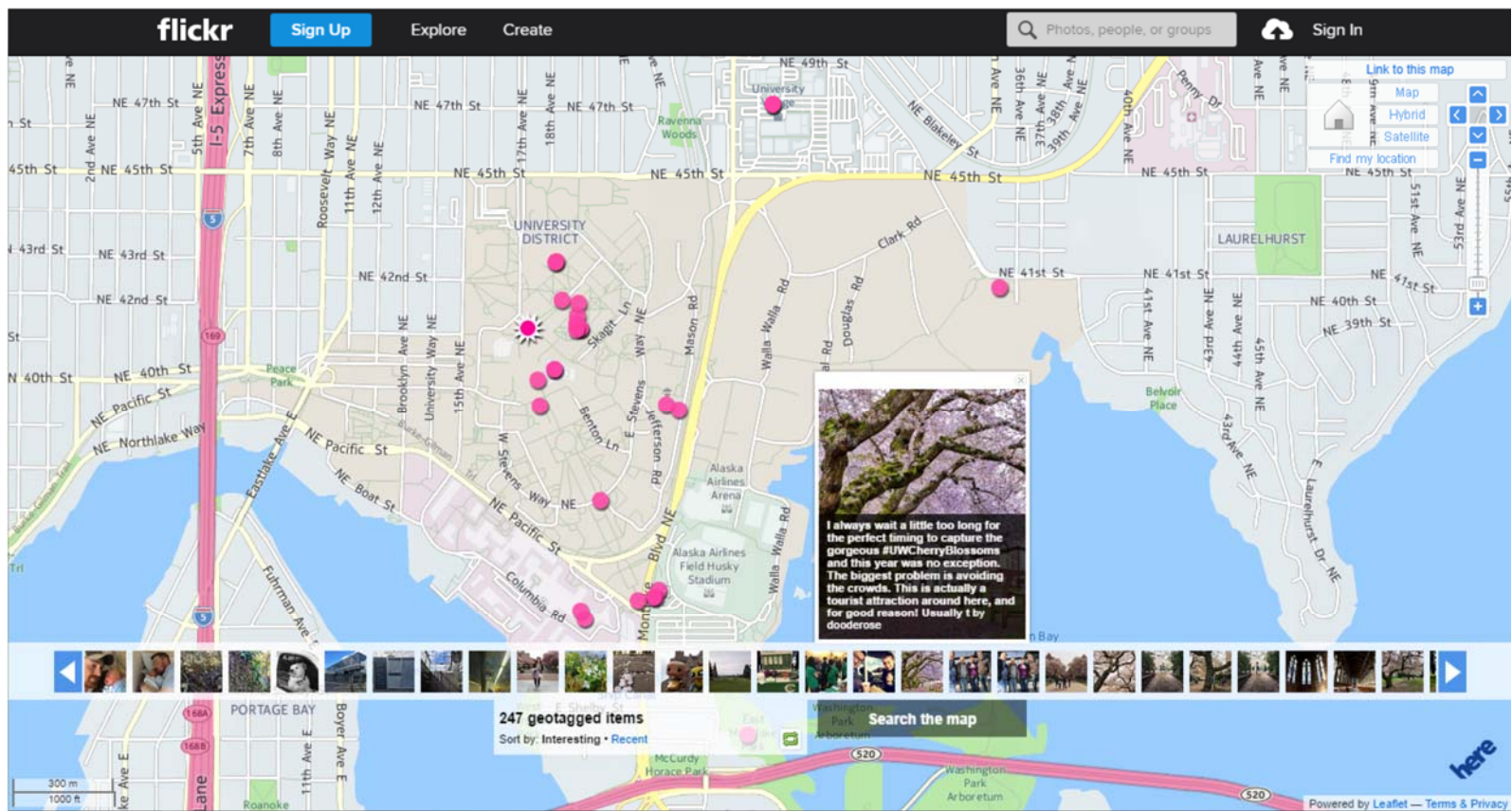


not part of picture, but included in file



Workaround: Geotagging

- ❖ **Geotagging** is the process of adding geographical identification metadata to media
 - Allows for easier clustering of photo and video series



Workaround: Geotagging

- ❖ **Geotagging** is the process of adding geographical identification metadata to media
 - Allows for easier clustering of photo and video series
- ❖ Many social media portals provide Application Programming Interfaces (APIs) to access geotag data – along with other user data!
 - This includes Youtube, Twitter, Instagram, Flickr, ...

Unintended Consequences

Burglars Said to Have Picked Houses Based on Facebook Updates

By NICK BILTON SEPTEMBER 12, 2010 10:24 AM 50



PLEASE ROB ME

Raising awareness about over-sharing

Check out our [guest blog post](#) on the CDT website.

Like Share 32K people like this. Be the first of your friends.

Check your own Twitter timeline for checkins

Are you curious if people can see your checkins? Enter your Twitter username and find out.

More Info

- Home
- Why

Made Possible By

- Foursquare
- Twitter

News Feed Top News · Most Recent 63

Share: Status Question Photo Link Video

Going to the beach for the weekend! (Someone else will be home though so think again Facebook Bandits!)

Share

Illustration by Nick Bilton/The New York Times

- ❖ Ready or Not? <http://app.teachingprivacy.org/>
 - Map out geotagged data from unsecured Twitter or Instagram accounts

Case Study: Craigslist

- ❖ Many ads on Craigslist are anonymized... except for geotags on photos
 - More geotagged photos = higher coordinate accuracy
 - Sometimes ad is for high-valued goods (e.g. cars, diamonds)
 - Sometimes ad specifies availability (e.g. “call Sunday after 6pm”)



Question

- ❖ What do you think has to be done?
 - Vote at <http://PollEv.com/justinh>
 - A. Nothing can be done – privacy is dead**
 - B. We need to educate people about this and try to save privacy [fight]**
 - C. I agree with (A) and will really think before I post**
 - D. I agree with (B) and will really think before I post**
 - E. I won't post anything anymore [flee]**

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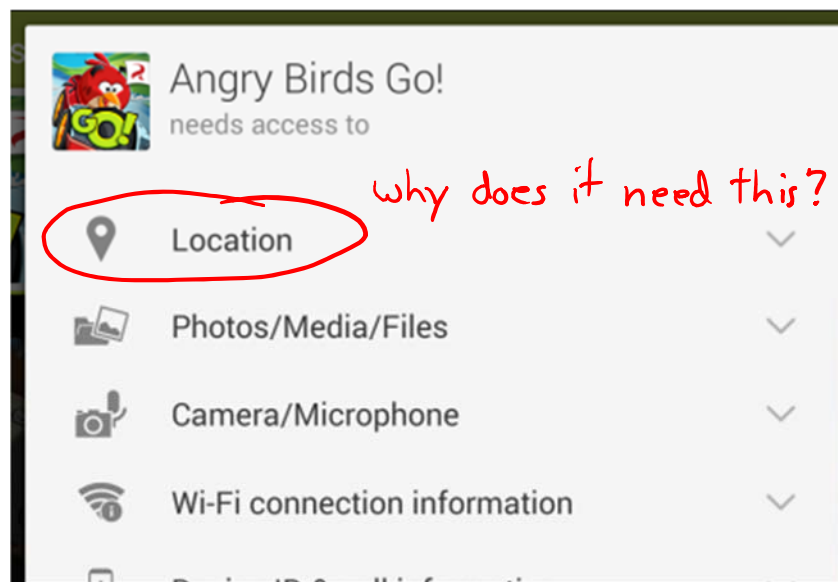
How Secure is Your Phone?

- ❖ Nowadays, your smart phone contains or has access to all sorts of personal information about you
 - How do you keep it safe?
 - Do you cover your screen when you unlock?
 - How often do you change your lock?
- ❖ Even if our phones are physically secure, we often *give away* our privacy!



Permissions: Android


- ❖ Contacts 
 - “Use your device’s contacts, which may include the ability to read and modify your contacts”
- ❖ Calendar 
 - “Read, add and modify calendar events as well as send email to guests without owners’ knowledge”



Permissions: Facebook

- ❖ In general, be very wary of “quizzes”
 - <http://www.itscovarr.com/2016/05/the-trouble-with-online-quizzes/>


Which Facebook user are you?



Andrew

THE SCHMUCK


You like to take online quizzes, and websites take advantage of that for access to your personal info and friends list, which they sell to advertisers at best and scammers and con artists at worst.



Continue as Andrew

Meaww Quiz will receive the following info: **your public profile, friend list, email address, Timeline posts and photos.**

[Edit the info you provide](#)

 This does not let the app post to Facebook.

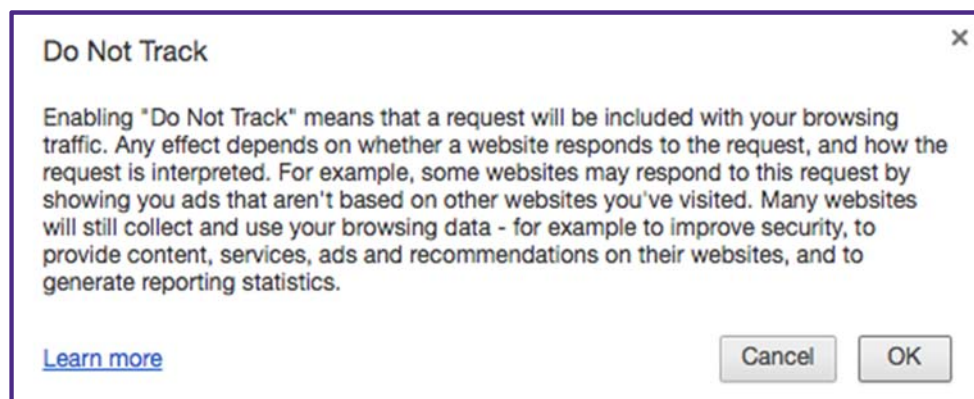
[Privacy Policy](#)

Privacy Settings

- ❖ *Always* pay attention to privacy settings
 - Usually dictates visibility, ownership, and distribution of data
- ❖ Actually read the Terms of Service (ToS)
 - tos;dr <https://tosdr.org/>

Website Tracking

- ❖ Recall the connectivity model of the Internet
 - Info sent between machines, meaning not everything is local
 - This is why “private browsing” is not truly anonymous
- ❖ Individual websites sometimes store information about you in “cookies”
- ❖ Browsers often collect data on you as well



Be Deliberate About What You Reveal

- ❖ Remember that you're not really anonymous and that the WWW is accessible to *everyone*
 - Even on “closed” sites like Facebook
- ❖ Remember that digital information on the Internet rarely ever goes away, even if you try to delete it
 - Archives, or copies on other machines
- ❖ Even if you choose to do the revealing (no privacy violation), might not be wise to reveal “all”
 - What image do you want to present?

Privacy in Our New Reality

- ❖ Everything is “public” and persistent
 - People have lost jobs based on Facebook and Twitter posts
 - <https://medium.com/@aristoNYC/social-justice-bullies-the-authoritarianism-of-millennial-social-justice-6bdb5ad3c9d3>
 - Resurfacing of digital information (old posts, emails, photos) is almost an inevitability

- ❖ People are aware of availability of information
 - Human Resources (HR) departments sometimes check your social media profiles when you apply for jobs
 - People often “cyberstalk” others before or after meeting

Want to Learn More?

❖ <http://teachingprivacy.org/>

The grid contains 11 illustrations, each with a caption below it:

- You're Leaving Footprints**: A blue character walking, leaving small green footprints behind.
- There's No Anonymity**: A green character with a question mark for a head talking to a pink character.
- Information Is Valuable**: A red character handing a bag of money to a grey character who is holding a document.
- Someone Could Listen**: A green character and a purple character holding megaphones, with two grey silhouettes in the background.
- Sharing Releases Control**: A yellow character running, with papers and documents flying around.
- Search Is Improving**: A pink character in a crowd of grey characters, being pointed at by a telescope.
- Online Is Real**: A purple character looking up at a cloud of binary code (0s and 1s) falling.
- Identity Isn't Guaranteed**: An orange character, a green character, and a black devil character.
- You Can't Escape**: An orange character being held by a large green hand made of binary code.
- Privacy Requires Work**: A pink character in a boat on a sea of binary code.