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DATA ETHICS

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Overview – Data Ethics

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What are ethics?

Data ownership

Privacy

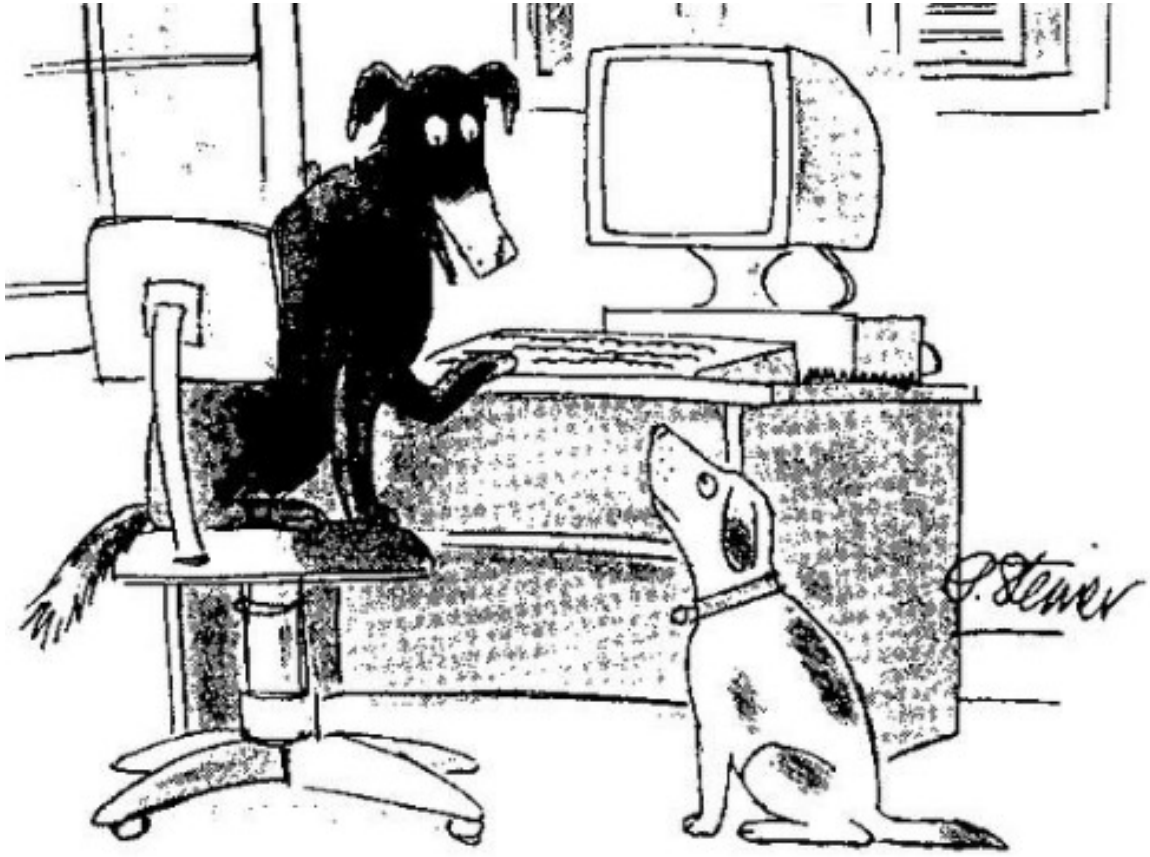
Anonymity

Data validity

Algorithmic fairness

“On the Internet Nobody Knows You’re a Dog”

Cartoon in the New Yorker, July 5, 1993



“On the Internet, nobody knows you’re a dog.”

Fake Profiles

- **Fake Profiles/accounts** are on the rise
- Facebook already deleted nearly **1.3 billion fake accounts**
- “Anonymous” posting is **exploited**

https://innewsweekly.com/wp-content/uploads/2019/02/How-to-Spot-a-Fake-Profile-on-Social-Media.jpg
https://www.dumblittleman.com/wp-content/uploads/2018/02/fake-social-media-account.jpg

The Internet as a “Crime-Free Zone”

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- **Hate speech**
- **Discrimination** and **Racism**
- **Crimes** such as the **denial of the Holocaust**
- **“Freedom of speech”?**

https://www.globalr2p.org/wp-content/uploads/2020/02/Screen-Shot-2020-02-21-at-9.46.30-AM.png
https://static.india.com/wp-content/uploads/2021/07/Bukayo-Saka-Racially-Abused.jpg?impolicy=Medium_Resize&w=1200&h=800

Anonymous Transactions are Possible

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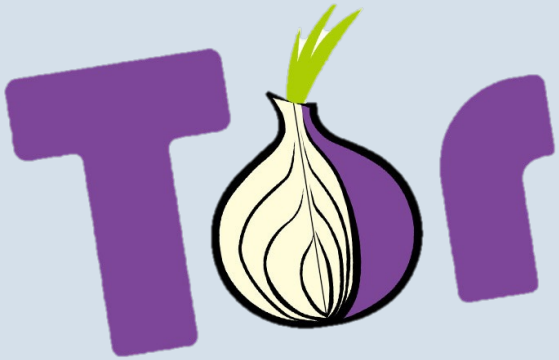
Post anonymously



Pay anonymously

But Many Transactions Need ID

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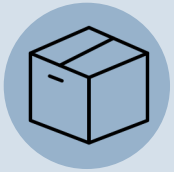


You must provide an **address** if **goods are to be shipped** to you.

You must provide your **name** for **travel bookings**.

You must reveal your **location** to get **cellular service**.

You must **disclose intimate details** of your **health** and lifestyle to get **effective medical care**.

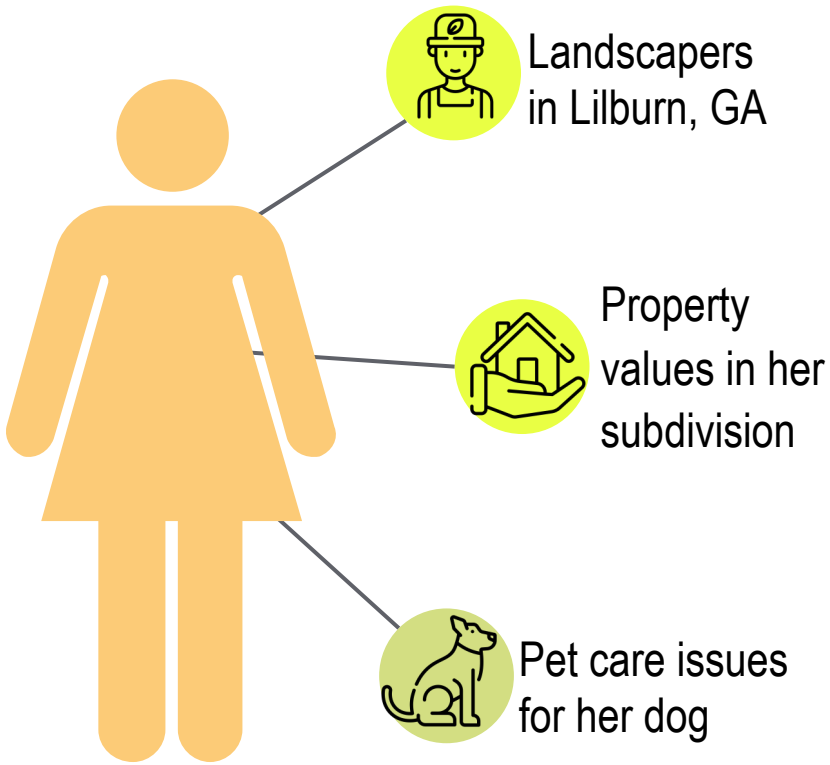
Enough History Tells All

If we have a **log of all your web searches** over some period, we can form a very good **picture of who you are**, and quite likely **identify** you.

If we have a log of all your **credit card purchases** over some period, we can do the same.

AOL Search Log Release

Web-based mail service AOL released **3 months of search logs for 650,000 users** for **research purposes**. The New York Times journalists Michael Barbaro and Tom Zeller were able to **use the data to identify several users**.



Thelma Arnold from Lilburn, GA

What Exactly Is Personally Identifying?

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Given **zipcode, birth date, and sex**, about 87% of **Social Security Numbers** can be determined uniquely.

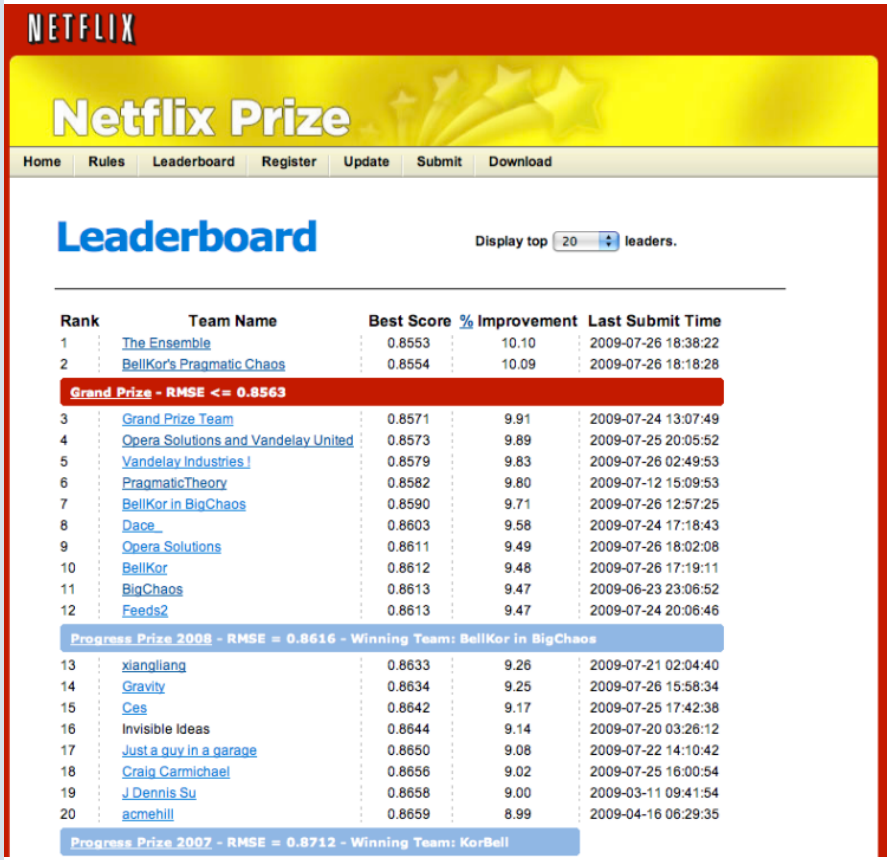
This is possible although that information is **not considered PII!**

Netflix Prize

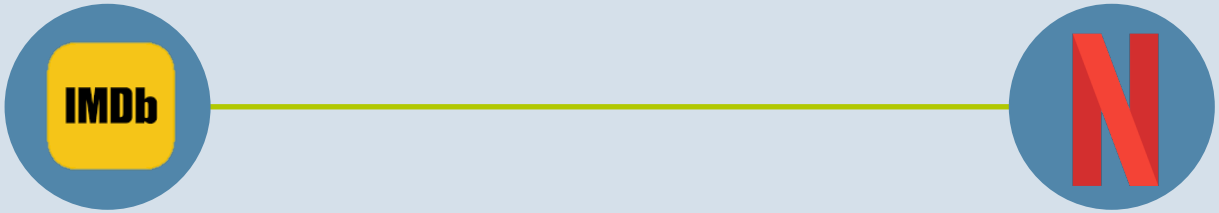
Netflix offered a million dollars to the winning team that could **beat Netflix's own movie recommendation** algorithm by more than 10%.

Released a **data set** comprising **user ID, date, movie name, rating**.

"Completely de-identified"



Netflix Re-identification



Many users had posted **movie reviews on IMDb**…

…and at the same time they had **rated movies** on **Netflix**.

By **date of review**, users could be **linked across the two systems**, even if they only reviewed a few movies on IMDb. Their Netflix movie choices could be used to **determine sexual orientation**, even if all their IMDb reviews revealed no such information.

Netflix Saga Conclusion

Netflix was **sued** by a lesbian mom, who had not (yet) come out, for "outing" her.

Case **settled** for $9m after 2+ years of litigation.

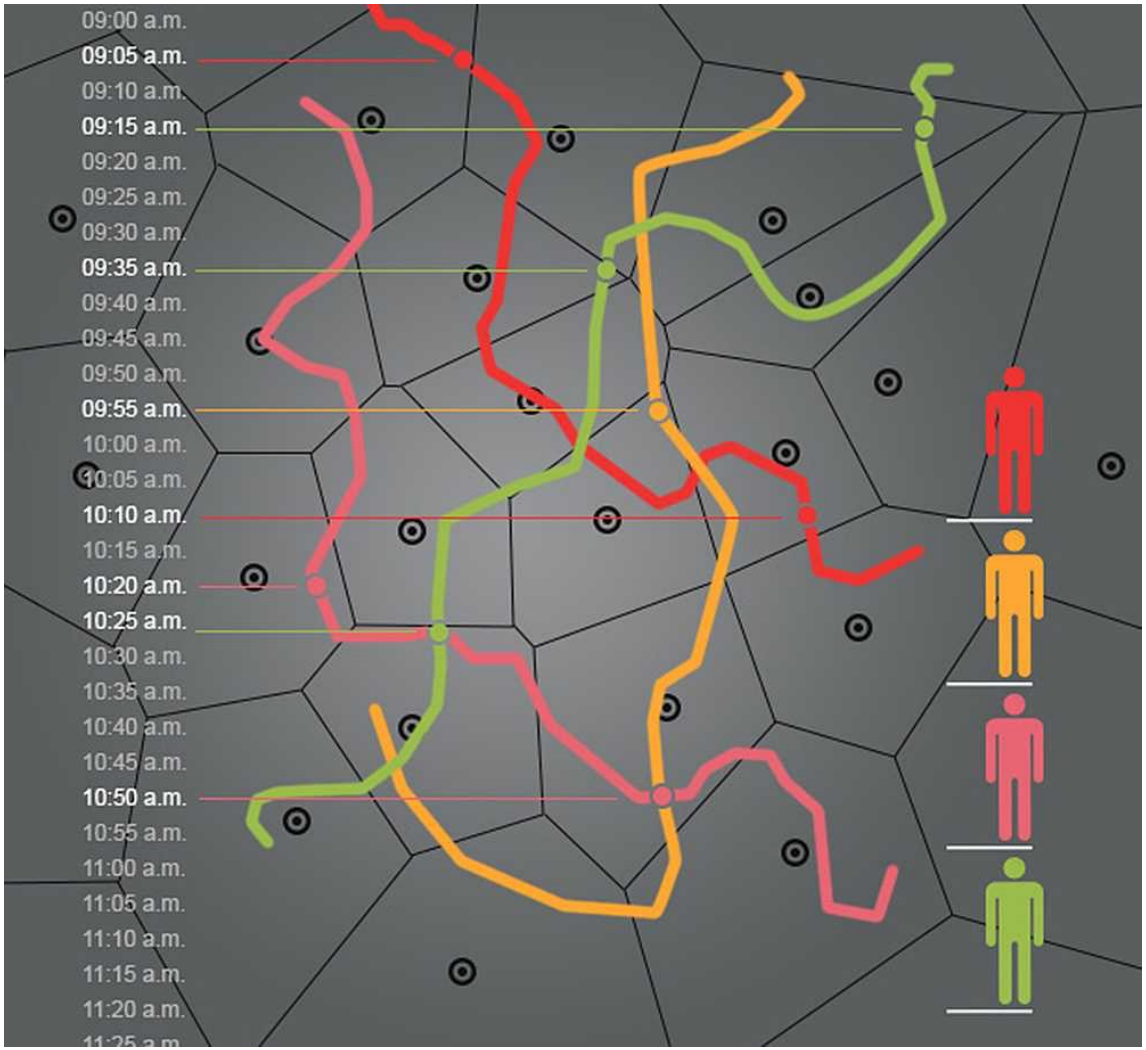
Netflix **canceled plans** for **additional rounds** of its prize challenge.

Phone Data Re-identification

Analysis of **"anonymized" phone data** over 15 months.

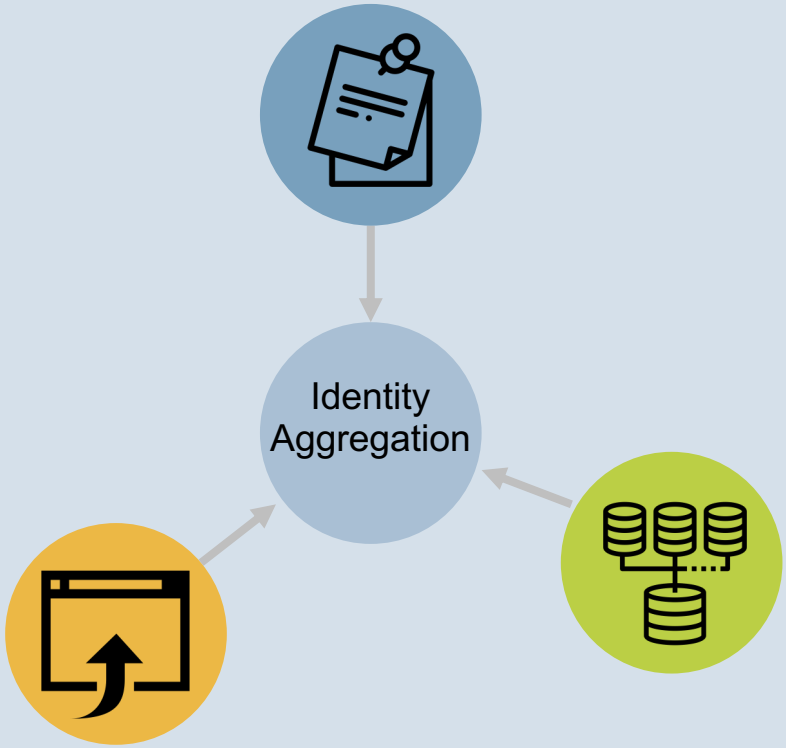
Use of **only 4 points of reference** with slight differences in time and space.

Unique identification of **95%** out of 1.5 m users.



Picture: https://news.mit.edu/2013/how-hard-it-de-anonymize-cellphone-data

How Re-identification Works



Identifying **data in retained fields**, e.g., patient name mentioned in physician notes, a text field or graph structure match, even without labels

Combination of multiple **partial identification**, e.g., AOL search, Massachusetts health information

Using **external data sets**, e.g., Netflix

Four Types of Leakage

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1. Reveal **identity**
2. Reveal **value of hidden attributes**
3. Reveal **link between two entities,** e.g., by phone call metadata
4. Reveal **group membership**, e.g., your religious denomination from your cellphone location

Anonymity Is Impossible

Anonymity is virtually **impossible**, with enough other data:

Diversity of entity sets can be eliminated through **joining external data.**

Random perturbation works only if we can **guarantee a one-time perturbation**.

Aggregation works only if there is **no known structure** among entities aggregated.

Faces can be recognized in image data. Increasingly even **under challenging conditions**, such as partial occlusion.

Severe Lack of Anonymity
Example: China's Facial Recognition

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Picture (L): https://image.cnbcfm.com/api/v1/image/105910971-1557804260825gettyimages-1124858078.jpeg?v=1582387062

Picture (R): https://www.cnet.com/news/in-china-facial-recognition-public-shaming-and-control-go-hand-in-hand/

Limit Publication of Datasets As Solution?

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If **anonymity is not possible**, the simplest way to **prevent misuse is not to publish** a dataset.

For example, **government** agencies should **not make potentially sensitive data public.**

Yet, access to **data is crucial for many desirable purposes**, including medical research and public watchdogs.

License Data to Trusted Parties

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Need **simple licensing regime** for access to potentially sensitive data, including de-identified data.

Enforce through **contracts** in the **business world** or…

…through **professional standards** in the **research world**.

Summary

Identity is very hard to manage online.

Anonymity is possible only in limited narrow situations.

De-identification is important to deter the merely curious but will not stop the truly determined.