Privacy In UbiComp

# What is Privacy?

"It is possible to have high levels of security but no privacy (think surveillance state), or even some sort of privacy without security (e.g., a private table conversation in a busy restaurant)." [9]





Is it techno-centric?

Is it human-centric?

"Privacy (or the lack thereof) for most at least is easy to identify when experienced but difficult to define" [7]

# Brief Overview of Security

Security is not synonymous with privacy [9].  But it is an important part!

## Aspects of Security

- **Data leaks**
  - Encryption
  - firewalls

- **Unauthorized Access**
  - Insufficient identification measures
  - Fraudulent access

PrivateBus: An example of WiFi Security [6]

- "97.8% users can be uniquely re-identified by 4 random domain (connection) records"
- "96.2% users can be uniquely re-identified by 5 random locations on buses"
- "98.1% users can be uniquely re-identified by only 2 random records if both their connection records and locations are leaked to attackers"
- Inserting 1.5% synthetic records protected 95% of users

Other ideas: see [16] and [19]

# Discussion Question

"One could still suggest putting this topic in front of people interested in databases or information retrieval in particular, rather than systems or usability evaluation in general. Is privacy not about the storage and processing of data, which in turn is really the job of database and information retrieval specialists? The answer is: Yes and no." [9]
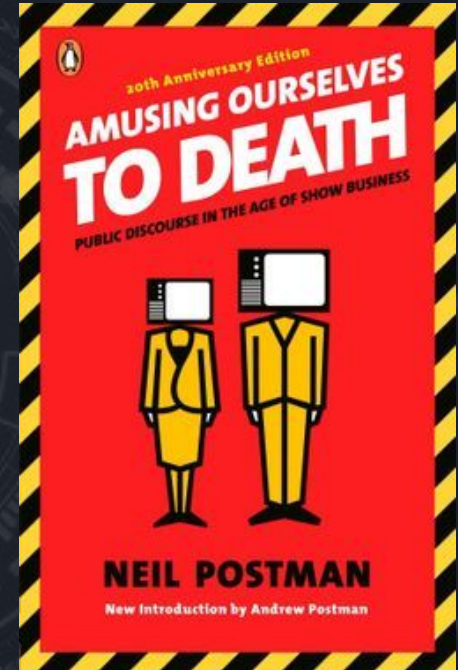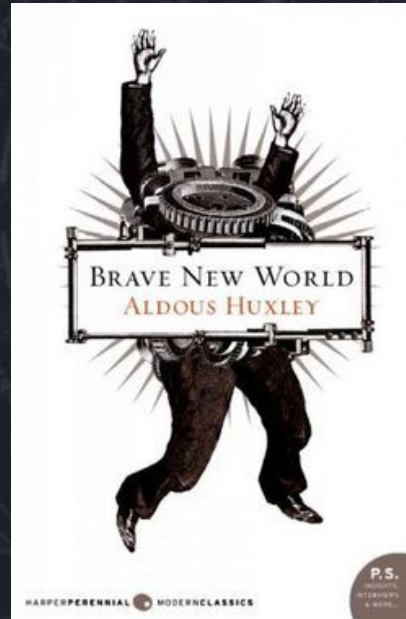
**Why "Yes"?**

**Why "No"?**

# Why Do We Care About Privacy?

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# Social & Psychological Roots

"The ways to invade privacy run as deep as the ways one can injure a person's emotion and dignity – as well as, perhaps far more pressingly, to encroach on and chill the structural contributions that individual rights make to the welfare of the community" [8]

What counts as private? [1]
- Accountability vs. personal freedom

Protection of personal interests or fear of embarrassment [13]
- For more reading, see also [17]

**Discussion**
Your Thoughts?
Why do we care about privacy?

# Whose privacy is at stake?

"Big data and ubiquitous computing enable privacy threats for persons whose data are only indirectly involved and even for persons about whom no data have been collected and processed." [10]

"What exactly does it mean anyway, for a system to be "privacy-safe"? Whose privacy does it protect, when, and to what extent?" [9]

# Why privacy keeps dying:
## The trouble with talk about the end of privacy

Another perspective on Warren and Brandeis's 1890 definition of privacy

- "modern privacy talk has always been endist because the right to privacy was born out of the conditions for its violation, not its realization" [8]

"Privacy has been pronounced defunct for decades" [8]

Another "apocalyptic pattern" [8] or a timeless critique?

- 'Orwell got it wrong. Big Brother may not necessarily be bad for us' (Riddiford, 2001) [8]
  - Scott McNealy: "You have zero privacy anyway. Get over it" [8]
  - Zuckerberg: The social norm has evolved. "People 'have really gotten comfortable not only sharing more information and different kinds, but more openly and with more people'" [8]
- "The ways to invade privacy run as deep as the ways one can injure a person's emotion and dignity – as well as, perhaps far more pressingly, to encroach on and chill the structural contributions that individual rights make to the welfare of the community" [8]

# Who is in Charge?

Another way of differentiating the various conceptions of privacy can be found by distinguishing the various effects privacy has on people's lives, grouping them around the three functional concepts of zonal, relational, and decisional privacy. Zonal privacy protects certain spaces, such as one's home, workplace, or car. Relational privacy protects the relationships in an individual's life, such as intimate family relations between husband and wife, or between mother and child. Decisional privacy is what Beate Rössler, professor for philosophy at the University of Amsterdam, calls "securing the interpretational powers over one's life," the freedom to decide for oneself "who do I want to live with; which job to take; but also: what clothes do I want to wear" [7].[1]

*"Decisional privacy is what Beate Rössler, professor for philosophy at the University of Amsterdam, calls "securing the interpretational powers over one's life," the freedom to decide for oneself" [9]*

We may understand the choices we are making in terms of zonal and relational privacy, but decisional privacy is more complex (e.g. quote above)

We may not be aware of whether our decisional privacy is being invaded
- "assumption that ... persons are fully informed and capable of deciding according to advanced privacy considerations" [10]

Coopamootoo & Grob:  reason for privacy paradox is conflicting emotional states
**Do you agree?**

# What information is *actually* being shared?

Relationship status [18]
- What does this article teach us?

Fine-hearing Google Home: why silence will not protect your privacy [2]
- Privacy-leaking attacks
- "traffic analysis allows to detect the presence of a person in a house equipped with a Google Home device, even if the same person does not interact with the smart device"[2]

# Discussion Questions

Is it possible for UbiComp applications make our lives *more* private/secure instead of *less*?
If so, how?

Are there any examples of implementations of Langheinrich's ideas for UbiComp security?

# Discussion

"there is no formal definition of privacy information, as each company has its own policy; is there any effort being put into the direction of trying to figure out different levels of private information?" (Myles)

How much should different factors in privacy factor into our decision to use a service?
*(e.g. do we just need to think about data being used for more than we think it is by those we give access to? Or do we also need to be concerned with the infrastructure and what would happen if there were to be a security breach?)*

What constitutes surveillance versus a service? (Lika)

What are the limits of data consent and what constitutes an invasion of privacy?

What can be done to minimize the "privacy paradox"? (Maruf)
*Is it a design solution? A regulatory solution? Both? Something else?*

# Discussion Question

**Westin's Privacy Orientations**

### Pragmatist

*"generally distrustful of organizations that ask for their personal information" and "worried about the accuracy of computerized information and additional uses made of it." [9]*

### Fundamentalist

*"weigh the benefits to them of various consumer opportunities and services, protections of public safety or enforcement of personal morality against the degree of intrusiveness of personal information sought and the increase in government power involved" [9]*

### Unconcerned

*"generally trustful of organizations collecting their personal information, comfortable with existing organizational procedures and uses, and ready to forego privacy claims to secure consumer-service benefits or public-order values" [9]*

**Personal experiences?**

**Which category do you see yourself in?**

**Which category do you see most people as being in?**

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# Image Sources

background: https://www.pinterest.ca/pin/697846904739172917/

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