

# What's Gonna Happen Today

- Intro to Optimization Systems and their harms
- Intro to Protective Optimization Technologies (POTs)
- Small Group Discussions (if you get here early introduce yourself to your 3 nearest neighbors)
- Make some POTs! (Protective Optimization Technologies)
  
- @ us: @hiddenmarkov @bekah\_overdorf
- Photos of us and the slides are ok to share
- Please interrupt us if something is unclear!

Open our pad: [pad.internetfreedomfestival.org/p/1028](https://pad.internetfreedomfestival.org/p/1028)



# A GUIDE TO REVOLUTIONARY COUNTER=OPTIMIZATION

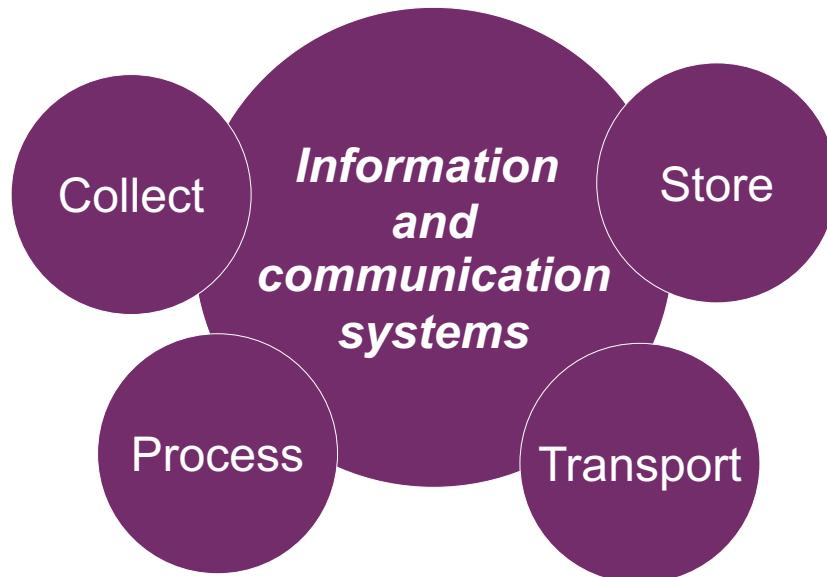
BEKAH  
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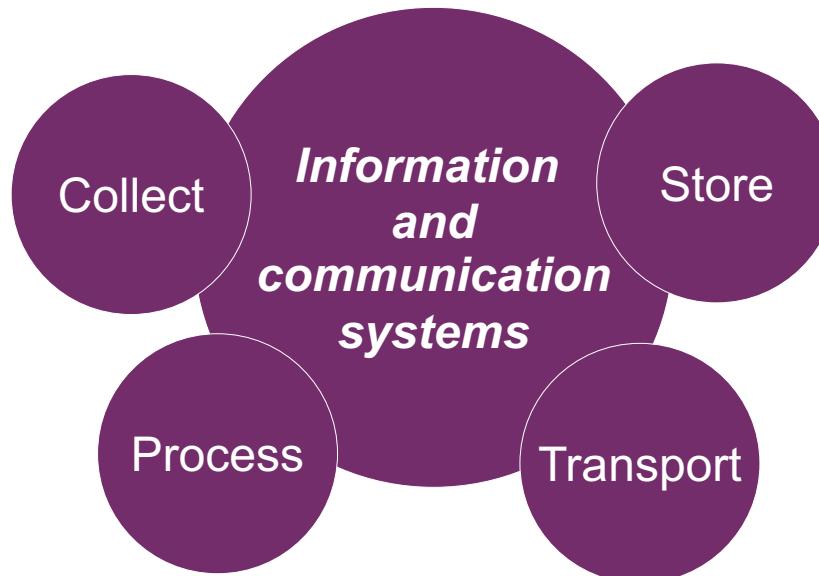
# What to Expect

- . Explore optimization systems and their harms
- . Explore methods to counter these harms
- . A lot of talking to people around you!

# Information Systems

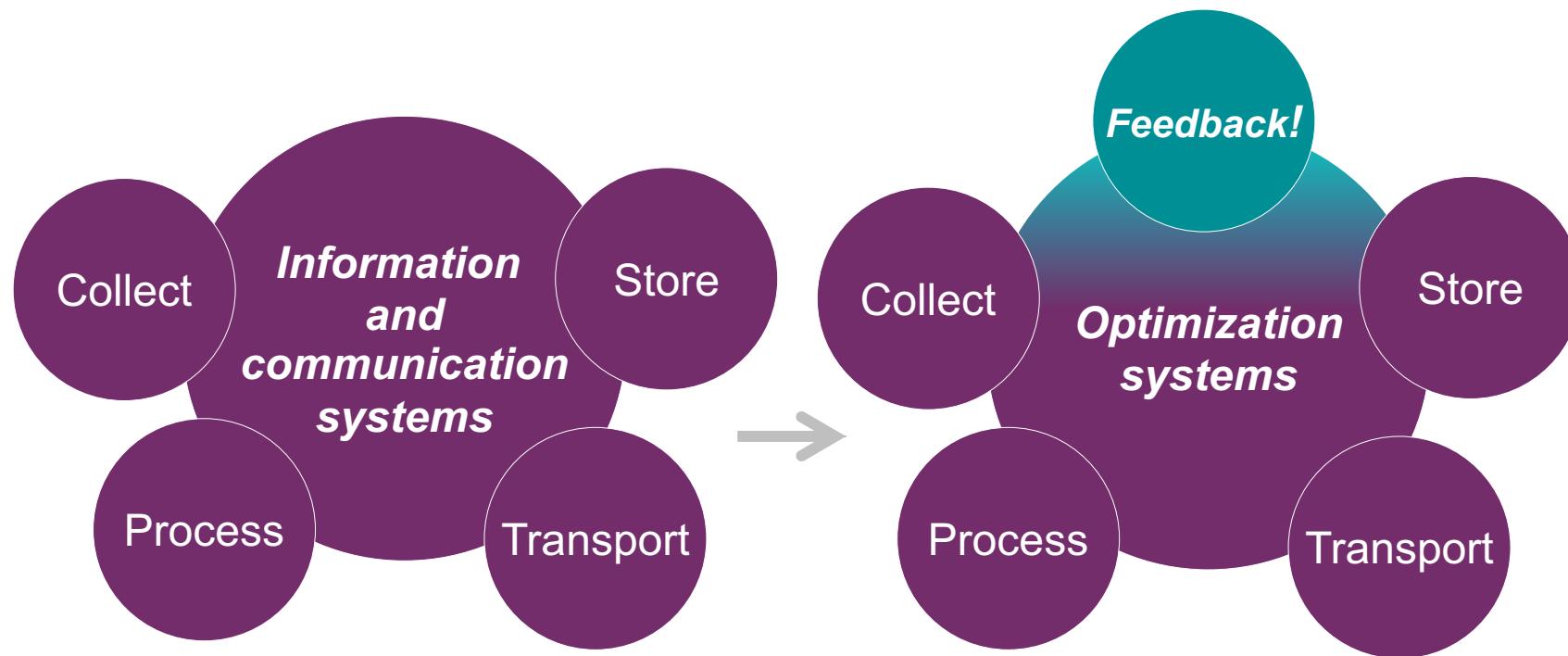


# Information Systems



- Issues
  - Surveillance
  - Censorship

# From Information Systems to Optimization Systems



# From Information Systems to Optimization Systems



# Optimization Systems

Use optimization algorithms to extract maximum value ( $U$ ) from the manipulation of people's activities and their environment.

$$\max_{x \in \mathbb{R}} U(x)$$

# Optimization Systems

Site time

Prices



Police  
Resources



airbnb



Prison  
Resources  
(recidivism)



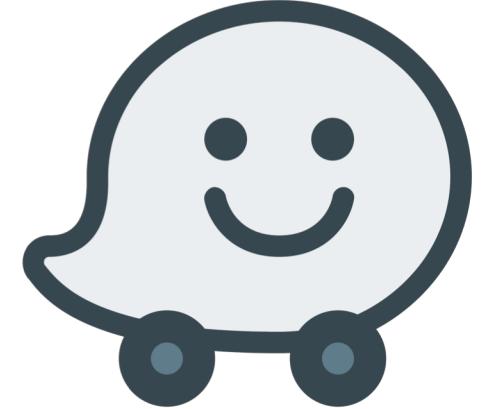
Routes



# Harms

- Antisocial and negative environmental outcomes
- Adverse side effects
- Only benefit a few
- Externalize exploration costs
- Externalize cost of errors
  - Produce errors due to distributional shift
  - Fulfill objective but not its intended goals
  - Distribute errors unfairly

# Waze



Optimizes **ROUTES** for its users  
around traffic

**What is optimized?**

Fastest Routes

**Who benefits?**

Users

# Externalities (harms) of Optimization Systems

**Externalities** are the negative effects, intended or accidental, that are caused by these systems.

E.g., Waze. Who loses?

Non-Users/residents whose neighborhoods are flooded with users.

# Break Out! (10 minutes)

Turn to the people near you

Come up with some examples of optimization systems.

- What are these systems optimizing for?
- Who benefits?
- Who loses?
- What externalities may these systems have?

Example Optimization System: Waze

Who benefits: Users      Optimizing for: Quickest routes for users

Who loses: Non-users      Externality: Surface roads are congested

# Break Out! (5 minutes)

Now that you've come up with systems and their externalities...

What do we do about these externalities?

Tell us about your problems  
and solutions

Solutions from  
within the system

Solutions from  
outside the system

# Solutions from within the system

# Solutions from outside the system

“We’re creating algorithms that cause harms, so we need to fix the algorithms”



Protective Optimization  
Technologies

# POTS: Solutions from the Outside

## New Jersey Town Restricts Streets From Commuters To Stop Waze Traffic Nightmare

May 8, 2018 · 4:01 PM ET

SAMANTHA RAPHELSON



## Miami Police Fight Back Against Waze App

Published Jan 29, 2015 at 11:10 PM | Updated at 10:58 PM EST on Feb 17, 2015

Local

Traffic-weary homeowners and Waze are at war, again. Guess who's winning?



0:12 / 3:02



Share



# Protective Optimization Technologies

POTs are solutions to the harms of optimization systems that come from *outside* the system

GOAL: design tools to deal with Optimization on behalf of the users



# Design Steps for Protective Optimization Technologies

1. Name the externality
2. Identify who or which environments are harmed
3. Dissect the roots of its cause: what is the technical problem?
4. Identify the Goal of the POT and the benefactors of the POTs
5. Create the Solution
6. Evaluate impact on benefactors and other actors

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- 
1. Surface roads are congested
  2. Non-users
  3. That the routing algorithm sends users through the town
  4. Reroute traffic off of surface roads
  5. Find the minimum number of roads to block s.t. the town is not congested
  6. See if there's still traffic!

# Break Out! (15 minutes)

Make some POTs! Are there any solutions that you can come up with that don't rely on the service provider?

Some help: Think about how the inputs to the system – on what data does the system make a decision? How can we edit that data? Can we?

Is your POT “acceptable” “ethical” “feasible”? Does it have its own Externalities?

Tell us about your POTS!

# The Rest of the POTS Team



Carmela Troncoso



Ero Balsa



Seda Gürses

# Thank you

Blog Post: <https://bit.ly/2VhUgDq>

Code: [github.com/spring-epfl/pots](https://github.com/spring-epfl/pots)

Tell us your problems!

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Papers:

[arxiv.org/abs/1806.02711](https://arxiv.org/abs/1806.02711)

[arxiv.org/abs/1811.11293](https://arxiv.org/abs/1811.11293)

