

# CENS

## Common Sense

Dana Cuff, Architecture and Urban Planning

Mark Hansen, Statistics and Design|Media Arts

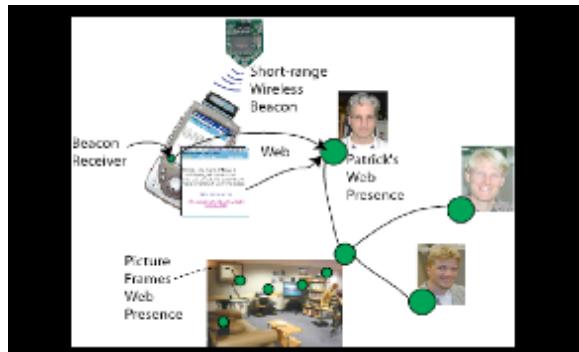
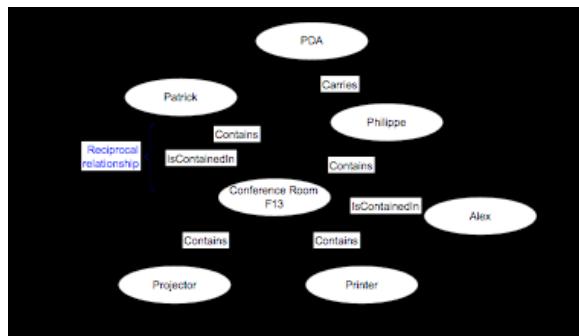
Jerry Kang, Law

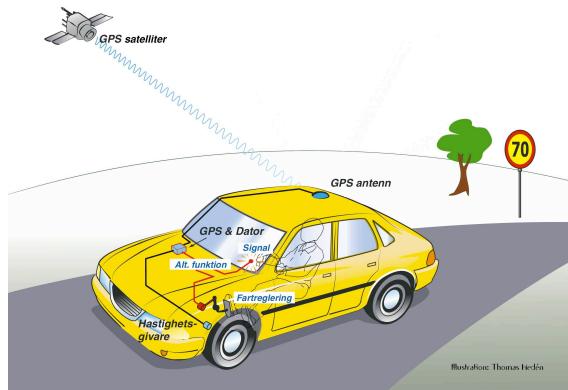
UCLA

Center for Embedded Networked Sensing



- CURRENT experiments with geoweb focus on
    - “lifestyle”
    - individuals
    - information





- current experiments with geoweb focus on
  - “lifestyle”
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## Common Sensing

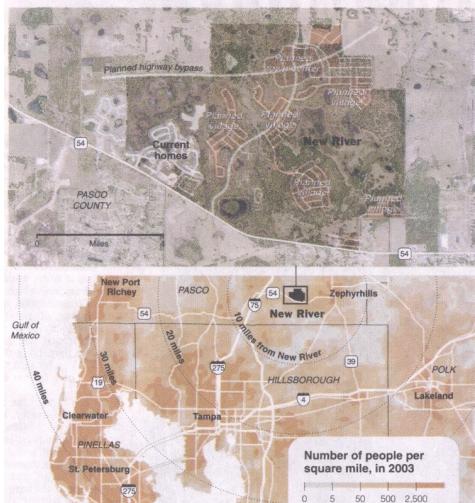
- NEXT generation experiments with geo-sensing should focus on
  - public sphere
  - groups of individuals
  - response



## Living Large, by Design, in the Suburban Middle of Nowhere

### On the Edge of the Exurbs

Over the next decade, New River is expected to grow to 4,800 housing units, and include a 200-acre town center with offices and commercial space. Today it has about 400 homes.



### Demographics of buyers of KB homes in New River

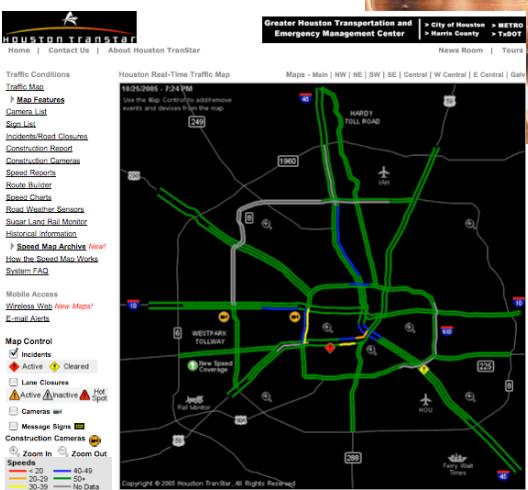
INCOME	27%	35%	14	14	11
	\$40,000 to \$60,000	\$80,000	\$100,000	\$120,000	
AGE	18%	46	23	13	
	Under 30	30 to 40	40 to 50	50+	
RACE	38%	24	16	5	16
	Hispanic	White	Black	Nat. Amer.	Other
EDUCATION	10%	41	44	5	
	High school or less	Some college	College graduate	Advanced degree	
FAMILY TYPE	64%	10	21	1	5
	Married or living together	Single or divorced	Married or living together	Single/div.	

Sources: KB Home; ORNL LandScan 2003/UT-Battelle L.L.C. The New York Times, satellite image from DigitalGlobe via Google Earth

## Sprawl Scenario: Residential Location Decisions

“symmetry of knowledge”  
vs “symmetry of ignorance”

- Neighborhood-based sensing
- Comparative data from other neighborhoods (GIS)
- General information



## P2P vs Top-Down

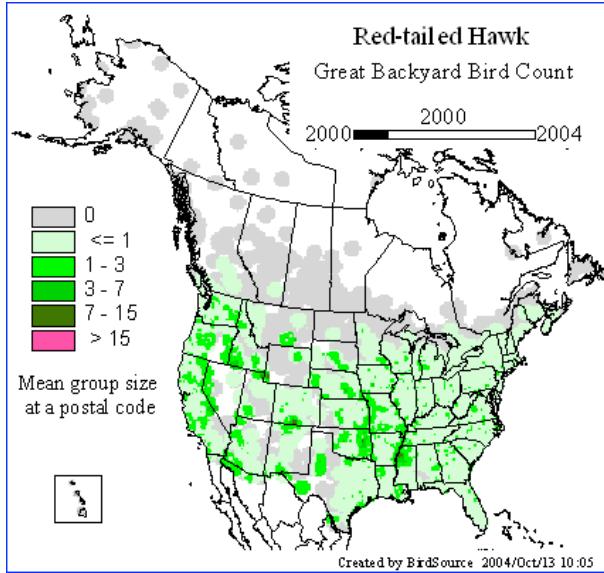
- Top-down traffic data is never current enough to be reliable for individual drivers, though it may serve traffic management purposes
- P2P data from thousands of cell phones with GPS could be sent to individuals by mobile service providers

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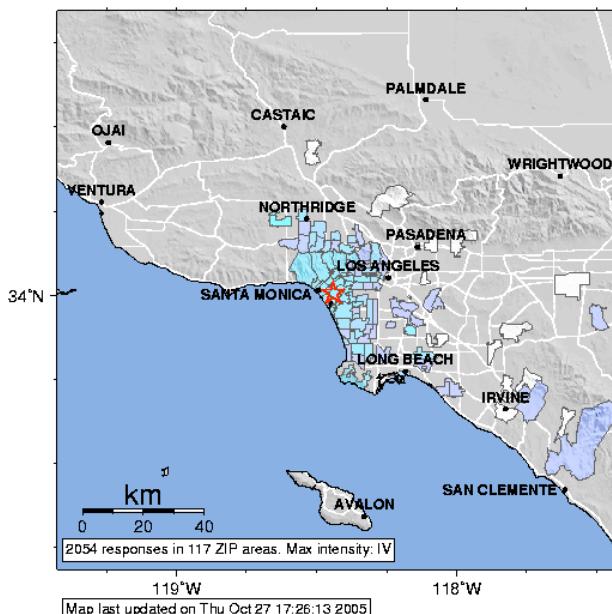
## Common Sense

### Participatory Sensing

Center for Embedded Networked Sensing



USGS Community Internet Intensity Map (2 miles NNE of Marina del Rey, CA)  
ID:10149481 20:42:16 PDT OCT 22 2005 Mag=3.1 Latitude=-34.01 Longitude=-W118.44



INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy

## Participatory Sensing

Top-down efforts to mobilize networks of *embedded citizen-sensors*

- Local expertise to help address global scientific questions
- Human identification and evaluation of phenomena
- Centralized data repositories allow citizen-sensors to share information and identify their contributions

The connection to the physical world adds a dimension beyond the use of the web as communication channel; physical phenomena become anchors for activity and collaboration

## CIRCUITS; A Journey to a Thousand Maps Begins With an Open Code

By DAMON DARLIN (NYT) 1347 words

Published: October 20, 2005

A Google map is no longer just a Google map.

You can still search Google Maps to figure out how to get from here to there, but why would you, when you can use it to pinpoint kosher restaurants in Cincinnati, traffic cameras in Dublin, or hot spring spas anywhere in the United States? How about finding coffee shops in Seattle that provide free wireless Internet access? Or would you prefer to locate the McMansion your boss just bought and find out exactly how much he paid for it?

An army of programmers, most of them doing it just for fun, has grabbed the software code that generates the distinctive maps with their drop-shadowed virtual pushpins, and combined it with other data like the locations of potholes, taco trucks and U.F.O. sightings, and even the sites of murders and muggings.



**Drifting:**  
The larger red circle indicates where you are in the city and in relation to other **threads** (as indicated by the coloured lines) other users have authored. This function allows users to search for threads and pockets of interest.

**Authoring:**  
Selecting 'author' allows the user to create a story, write a message, and digitally 'attach' a sound or song – any of the things making up a 'pocket' within a specific location or by a specific landmark.

**A Pocket:**  
This screen shot shows a pocket containing text, an image and a sound file. The UT team created this pocket as an example of what the public authoring system is capable of and what pockets might contain.

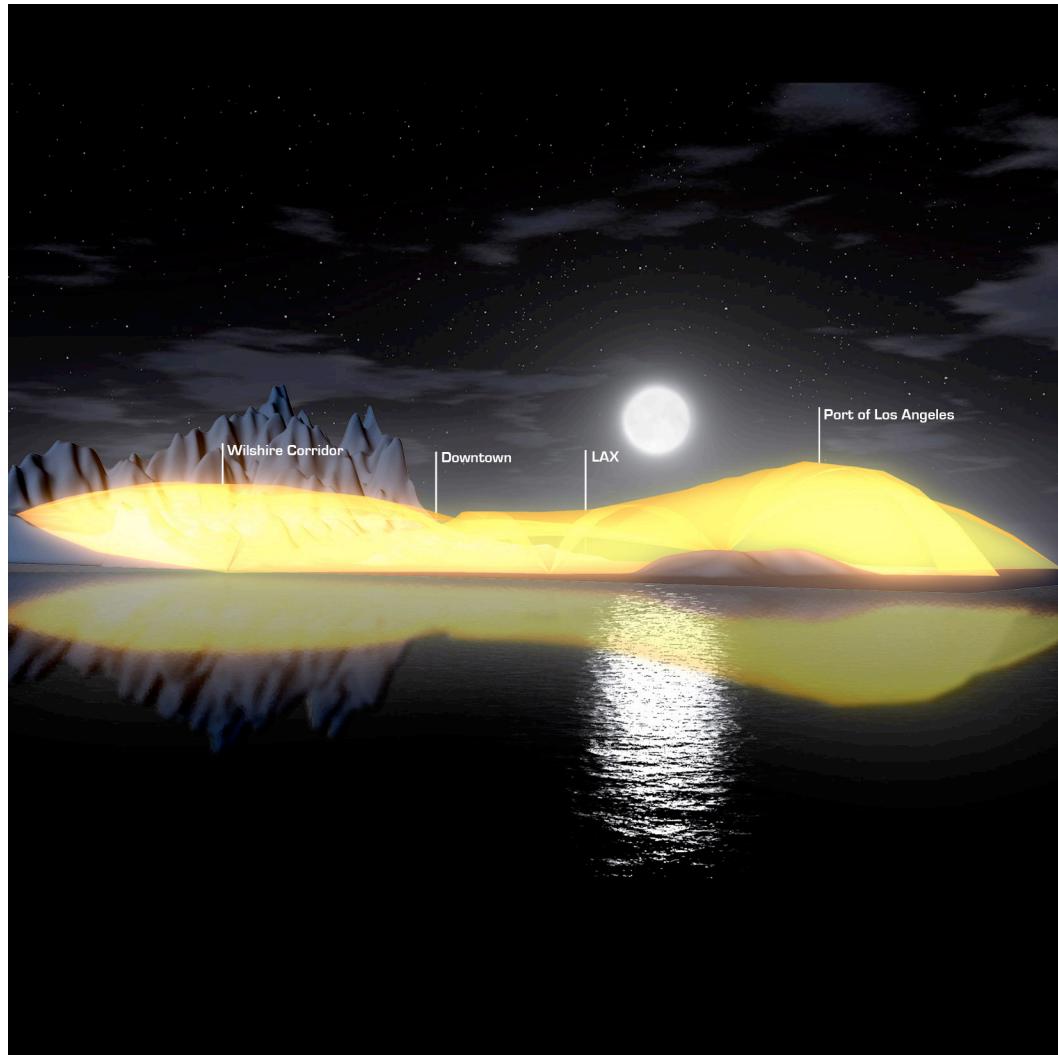


## Participatory Sensing

### Bottom-up mobilizations

- We can think of blogs and vlogs as a kind of "local" reporting from citizen-sensors
- From the sights of global conflicts and natural disasters, we have read reports by bloggers and other first-hand amateur journalists
- Google Maps mash-ups and other geography-based projects engage communities in sharing information; participation requires only a mobile phone or PDA
- Sensing has even started to emerge in the media arts

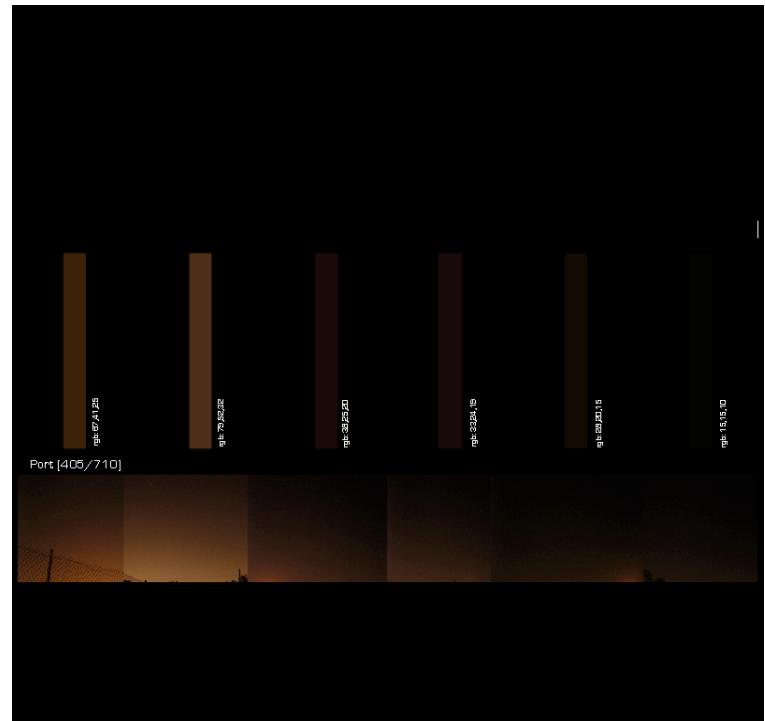
These projects tend to rely on low-cost, low-complexity sensors and readily available networking



## Shades of Black

Nuri Miller and Liron Elkan  
(DESMA 259, Spring 2005)

- Two architects attempting to expose levels of “light pollution” in Los Angeles
- Mapping light levels produced a kind of city skyline



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## Common Sense

### Data Commons

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April 04, 2005

## Google To Host Home-Video Uploads

Yet-unnamed service that will allow users to upload video to Google's site to debut later this week, according to company founders.

By Paul Kapustka

[Advanced IP Pipeline](#)

SAN FRANCISCO -- Move over blogging -- here comes Internet-based home video, to a Google server near you.

While there's no formal announcement yet, Google co-founder Larry Page said Monday that the well-known search engine concern would soon let the general public upload self-produced videos to Google's servers, partly in an effort to learn more about how to more efficiently search and display information about video-based data.

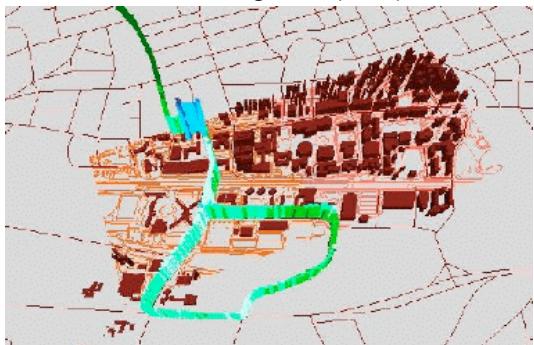
"It's an experiment we want to run," said Page of the video-uploading service, which he said the company will formally announce "in the next few days." Page made the non-announcement announcement during Monday's opening panel discussion at the National Cable & Telecommunications Show here, upstaging his luminary fellow panelists John Chambers of Cisco, Brian Roberts of Comcast, Jon Miller of AOL and Jeffrey Katzenberg of Dreamworks.



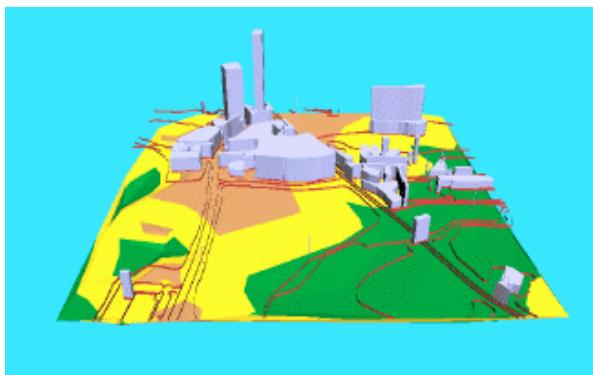
## Infrastructure for sharing

- How do we connect a sensor network to the internet? What lessons can we take from blogs and vlogs?
- What technologies will facilitate sharing of information?
- What structures will encourage participation?
- Hosting services, pub/sub models for distribution, search for data discovery
- What does our interface look like? Mapping tool or news reader or data analysis GUI?

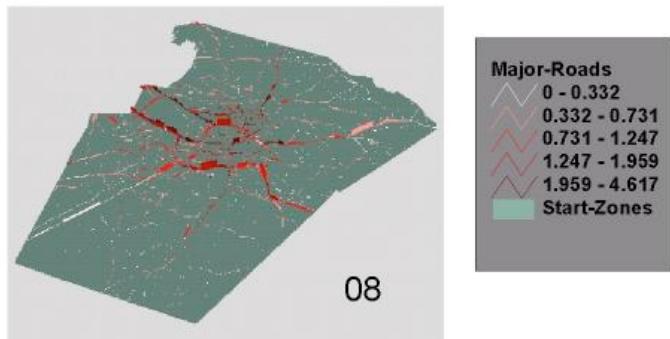
Air Pollution tracking data (EPA)



Microenvironmental geovisualization (EPA)

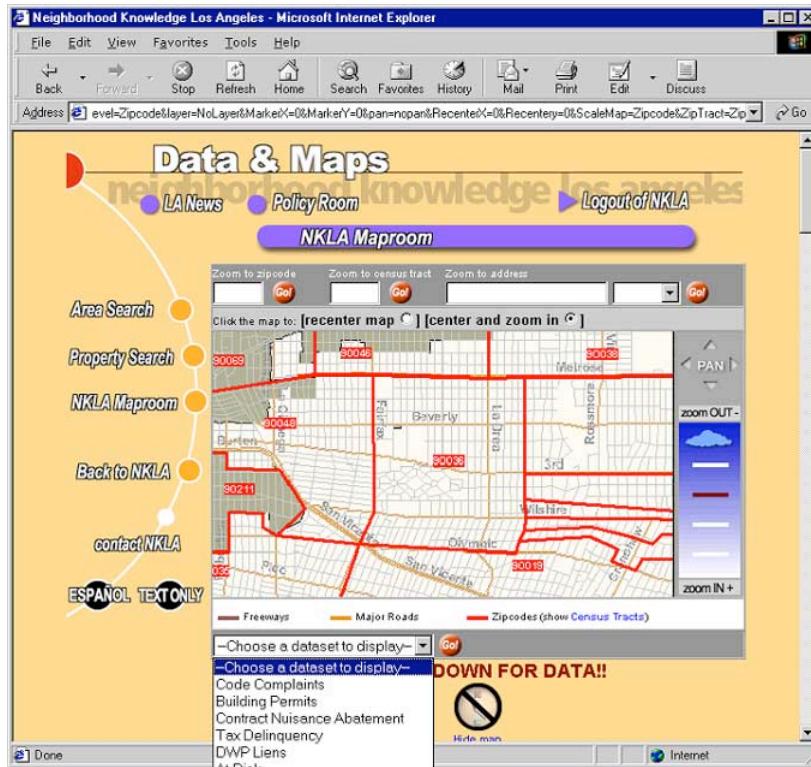
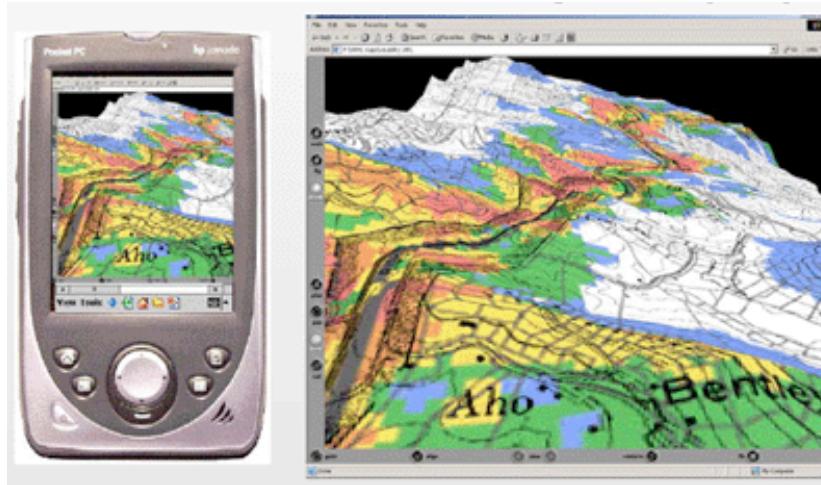


CO Emissions for Wake County - Major Roads



## Sprawl Scenario: Residential Location Decisions

- Neighborhood-based sensing
  - commute times into city
  - commute costs
  - water quality
  - air quality
  - crime reports

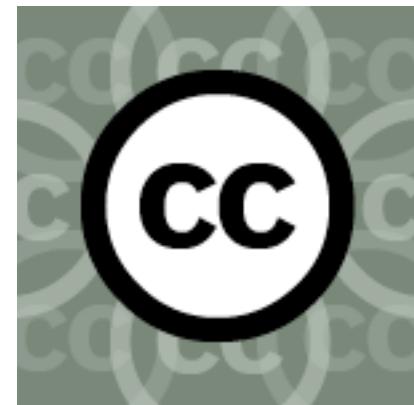


## Sprawl Scenario: Residential Location Decisions

- Comparative data from other neighborhoods (GIS)
  - housing costs
  - past year's appreciation
  - proximate public amenities
  - schools info (eg test scores, student/teacher ratio)

## Law's shaping of incentives to participate (IP, privacy, contract, tort)

- monetary?
- attribution?
- quid pro quo?
  - formal (constrained access)
  - informal (social norms)
- immunity from liability?



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## Common Sense

### Overlapping Stories

Center for Embedded Networked Sensing



*"The clever data analyst need only expose himself to what his data is willing (or even anxious) to tell him"* John Tukey

## Distributed sense-making

- If blogs spawned citizen-editors and journalists, what might we expect from easy access to data collection technologies, to publishing and collaboration?
- How can we contribute both through education as well as research, enabling more participatory users to make sense of extremely varied data types recorded under possibly unreliable circumstances
- Uncovering chance relations (“data mining” restored to its original usage?), reasoning in the face of uncertainties, recognizing poor quality data and data sources, drawing conclusions from sparse or unrepresentative samples

## Liability stories

- inaccurate
  - defamation: false statement of fact
- accurate
  - invasion of privacy
- who's vulnerable
  - individual liability (anonymity)
  - intermediary liability (47 U.S.C. § 230 immunity)



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## Common Sense

## Public Response

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Living Large, by Design, in the Suburban Middle of Nowhere



Suburban infill project, Janek Bielski

## Value of Interdisciplinary project

- CURRENT primary applications of public sensing are
  - surveillance
  - gps tracking
  - mobile telephony
  - RFID (highway tolls; inventory mgmt)
  
- NEXT applications of public sensing should be
  - responsive environments
  - location-specific distribution of public and educational information
  - P2P capability
  - public health and safety information
  - mechanisms to promote public Participation
  - technologies that embed social responsibility