CS 3001-C: Computing, Society, and Professionalism

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Week 16: Finals Review
April 25, 2022

Ethical Theories

Ethical Theories

- Formal study started with Socrates
- Ethical theories are frameworks for moral decision making
- We need ethical theories to examine moral problems behind an issue, reach conclusions, and defend those conclusions in front of a skeptical, yet open-minded audience
- Used to provide logical, persuasive justifications behind your reasoning in the case of an argument

Software Engineering Code of Ethics: 8 Key Principles:

- Product
- Public
- Judgment
- Client and Employer
- Management
- Profession
- Colleagues
- Self

Case Studies

Therac 25: What Happened

- Between June 1985 and January 1987, 6 known accidents involving massive overdoses, causing death & serious injury

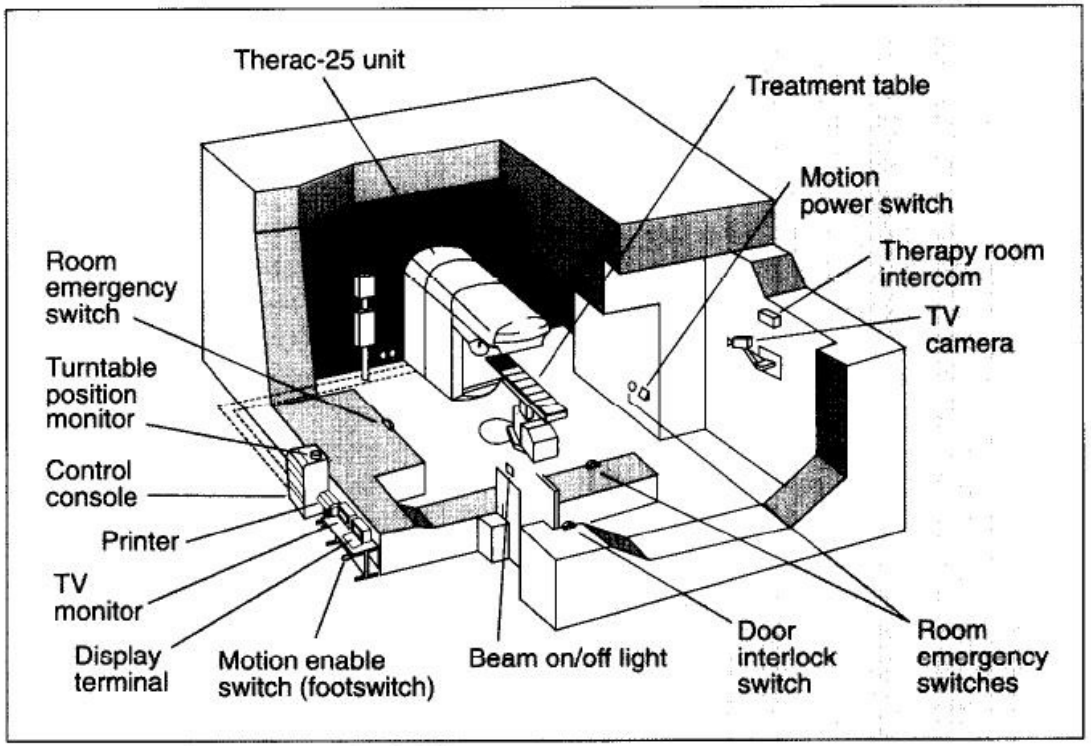
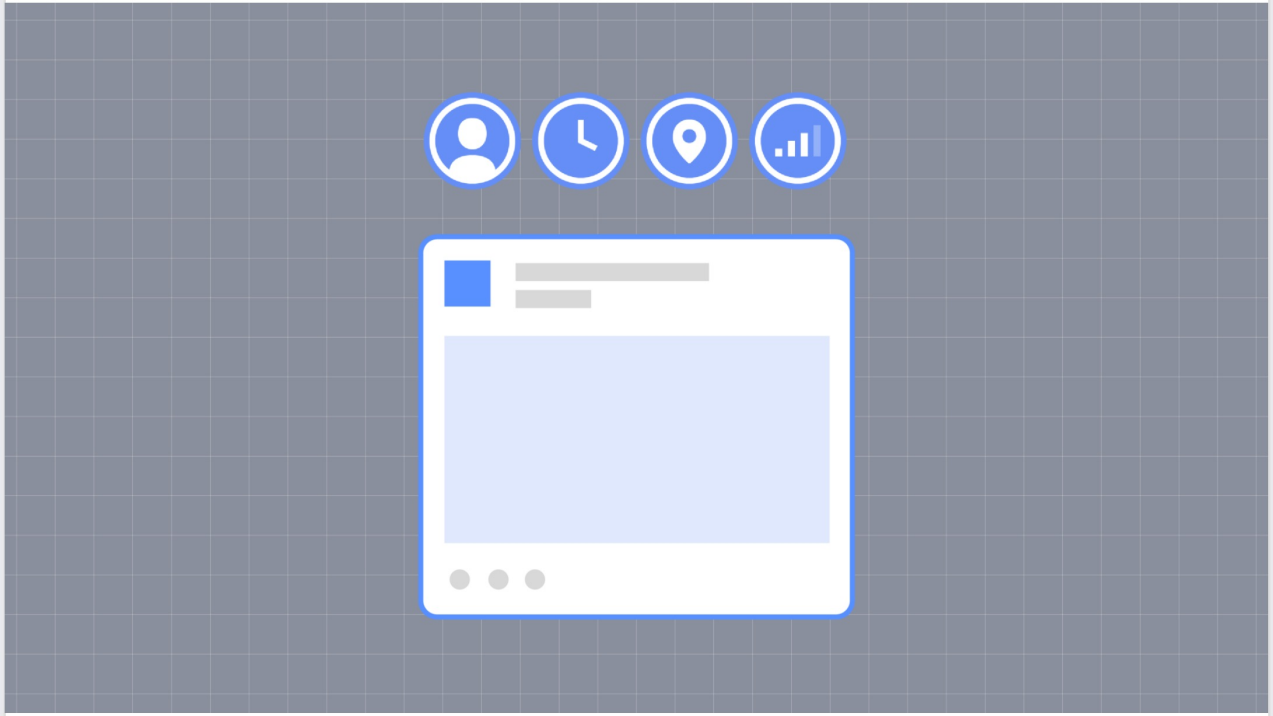


Figure 1. Typical Therac-25 facility.

Facebook Suicide AI

September 10, 2018

How Facebook AI Helps Suicide Prevention



Human Agency: Censorship, Privacy and Security

Is Censorship Ethical?

Kant's vs. Mill's Views on Censorship

- Radically different ethical theories, but had similar views on censorship

First Amendment

- It constrains what the US government can do
  - Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances
- The primary purpose is political – allow an open discussion of public issues; allow minority perspectives to be represented
  - But extends to other domains
- Not an absolute right
  - The private right must be balance against the public good

First Amendment

- Private groups can censor all they want and in some cases may seem to violate the first amendment
  - E.g., Facebook's Terms of Service disallow the sharing of explicit or violent content
  - In general written with "offensive"/controversial speech in mind
- Covers spoken & written words, pictures, art, and other forms of expression of ideas (like wearing an arm band)

First Amendment

- Existing restrictions on speech – balancing private right and public good
  - Advocating illegal acts can be acceptable (e.g., civil disobedience)
  - Libel (making false and damaging statements) is illegal
  - Making specific threats is illegal
  - Inciting violence can be illegal
  - Perjury
  - Obscenity
  - False advertising

Censorship and Internet

- Unlike traditional one to many broadcast media, the Internet supports many to many communications
- The Internet is dynamic – new devices are being connected each year
- The Internet is huge – human censors not practical
- The Internet is global – national governments have limited authority to restrict activities happening outside their borders
- It is hard to distinguish between different types of people e.g., children and adults on the Internet

Information Technology Erodes Privacy

- Information collection, exchange, combination, and distribution easier than ever means less privacy
- Scott McNealy (Sun Microsystems): “You have zero privacy anyway. Get over it.”
- This class: we will consider how we leave an “electronic trail” of information behind us and what others can do with this info

Solove's Taxonomy of Privacy

- **Information collection:** Activities that gather personal information
- **Information processing:** Activities that store, manipulate, and use personal information that has been collected
- **Information dissemination:** Activities that spread personal information
- **Invasion:** Activities that intrude upon a person's daily life, interrupt someone's solitude, or interfere with decision-making

Census Records

- Census required to ensure every state has fair representation
- Number of questions steadily rising
- Sometimes Census Bureau has broken confidentiality requirement
  - World War I: draft resistors
  - World War II: Japanese-Americans

Accuracy of NCIC Records

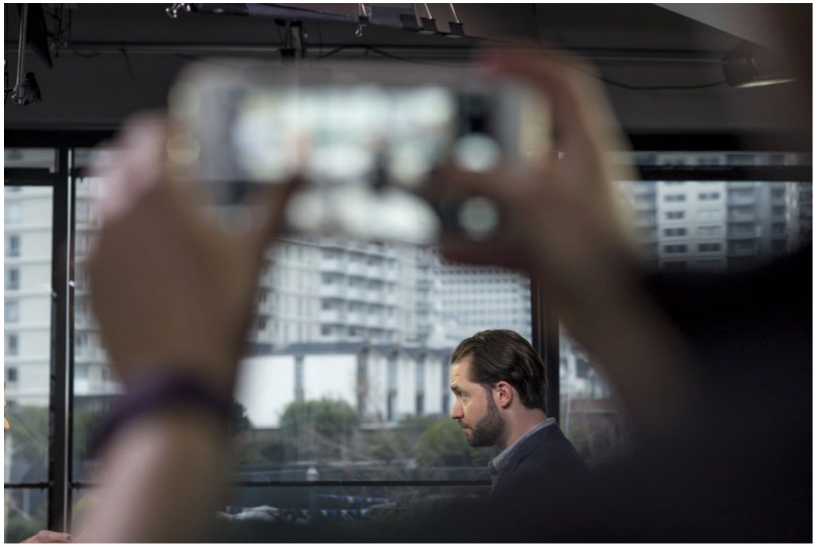
- March 2003: Justice Dept. announces FBI not responsible for accuracy of NCIC information
- Exempts NCIC from some provisions of Privacy Act of 1974
- Should government take responsibility for data correctness?

Online Hate/Abusive Speech

BUSINESS DAY

Reddit Limits Noxious Content by Giving Trolls Fewer Places to Gather

The Shift
By KEVIN ROOSE SEPT. 25, 2017



Alexis Ohanian, a founder of the website, which banned several forums in 2015 as part of a broad crackdown on poisonous behavior. David Paul Morris/Bloomberg

There are — and always have been, and probably always will be — trolls, scoundrels and reprobates on the internet.

It is a problem that has vexed multibillion-dollar corporations and the smartest computer programmers in the world. Facebook, Twitter and YouTube have all declared war on abuse and harassment, spent years training sophisticated algorithms and hired vast armies of moderators to root out hateful content.

And yet, the trolls persist.

But what if a better way of combating online toxicity were right under our

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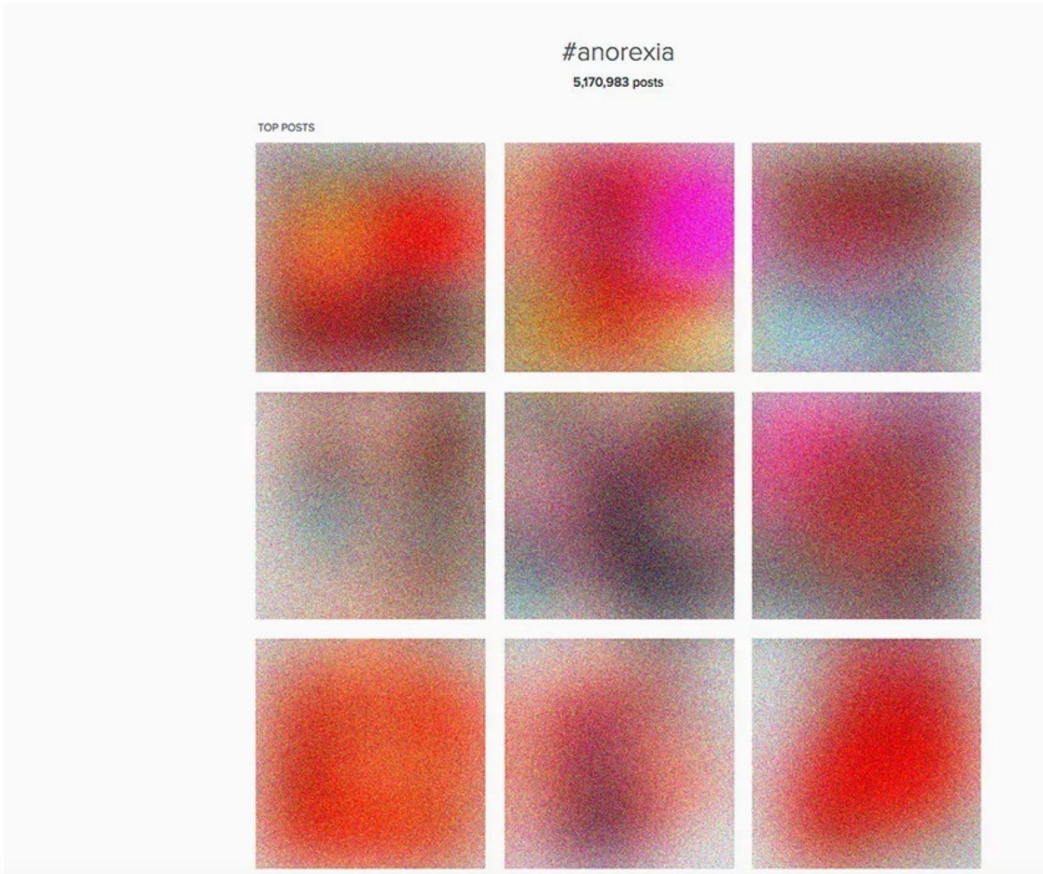
Over the last four years, the social media platforms have done a lot to curb content that promotes self-injury. But they'll never fully succeed. Is it worth trying?

Posted on April 14, 2016, at 2:01 p.m.

Stephanie M. Lee
BuzzFeed News Reporter



The Virus, the pandemic, and how we can respond **ethically**

Early detection, contact tracing

- Leaders are looking for guidance on when to close schools or order residents to shelter in place, and whether the measures they've already taken are working.
- Early research on coronavirus suggests that isolating people soon after they become symptomatic plays the "largest role in determining whether an outbreak [is] controllable."

Role of technology – Existing examples

- One potentially powerful tool for public health officials is contact tracing—identifying the people that an infected person has been around.
  - This reveals potential outbreak hot spots, offers some idea of where the virus may spread next, and importantly, warns officials who to contact next and potentially isolate if they become symptomatic.
  - Faster than manual tracing
- Earlier this month, the CDC issued a temporary rule requiring airlines to share data on passengers traveling from overseas on request, including addresses, phone numbers, and email.

Role of technology – Novel approaches

- Officials have a powerful potential surveillance tool unavailable in past epidemics: **smartphones**
- Government officials are anxious to tap the information from phones to help monitor and blunt the pandemic
- White House officials are asking tech companies for more insight into our social networks and travel patterns

Privacy threats

- These possibilities raised red flags to privacy advocates
  - European and US laws
  - There's already legal debate over whether such actions would overstep the Fourth Amendment's restrictions on the government's ability to search private property.
- What are the specific privacy threats?

A balance - Transparency

- The government should be really clear in articulating what specific public health goals it's seeking to accomplish
- * Be clear about how the government is limiting the collection of personal data to what's necessary to achieve those very specific goals
- Making sure that there are appropriate privacy safeguards put in place before data starts to change hands

A balance - Data collection based on science, not bias

- Ensure that any automated data systems used to contain COVID-19 do not erroneously identify members of specific demographic groups as particularly susceptible to infection
  - Avoid bias based on nationality, ethnicity, religion, and race—focus on facts about a particular individual's actual likelihood of contracting the virus, such as their travel history or contact with potentially infected people.

A balance – Parsimonious use of data

- Any data collection must be scientifically justified and proportionate to the need.
- Even anonymized, aggregate data can inform health efforts.
- Consider a scenario where city officials close bars and restaurants for a weekend, hoping to reduce the number of new coronavirus infections.
  - But instead, infections increase.
  - Some may be the result of exposures days earlier, but tracking where people went over the weekend could reveal new transmission hot spots.

A balance – Due process

- If the government seeks to limit a person's rights based on this "big data" surveillance (for example, to quarantine them based on the system's conclusions about their relationships or travel), then the person must have the opportunity to timely and fairly challenge these conclusions and limits.

A balance - Expiration

- There is a hazard that the data surveillance infrastructure we build to contain COVID-19 may long outlive the crisis it was intended to address.
- The government and its corporate cooperators must roll back any invasive programs created in the name of public health after crisis has been contained.

"Public policy must reflect a balance between collective good and civil liberties in order to protect the health and safety of our society from communicable disease outbreaks" the Electronic Frontier Foundation

Government Surveillance

Patriot Act Successes

- Charges against 361 individuals
  - Guilty pleas or convictions for 191 people
  - Shoe-bomber Richard Reid
  - John Walker Lindh
- More than 500 people removed from United States
- Terrorist cells broken up in Buffalo, Seattle, Tampa, and Portland (“the Portland Seven”)

Patriot Act Failure

- March 11, 2004 bombings in Madrid Spain
- FBI makes Brandon Mayfield a suspect
  - Claims partial fingerprint match
  - Conducts electronic surveillance
  - Enters home without revealing search warrant
  - Copies documents and computer hard drives
- Spanish authorities match fingerprint with an Algerian
  - Judge orders Mayfield released
  - FBI apologizes
- Civil rights groups: Mayfield was targeted for his religious beliefs

Surveillance Camera Images of Boston Marathon Bombing Suspects

Intellectual Property

What is Intellectual Property?

- Intellectual property: any unique product of the human intellect that has commercial value
  - Books, songs, movies
  - Paintings, drawings
  - Inventions, chemical formulas, computer programs
- Intellectual property ≠ physical manifestation
- Does right to own property extend to intellectual property?

Information Technology Changing Intellectual Property Landscape

- Value of intellectual properties much greater than value of media
  - Creating first copy is costly
  - Duplicates cost almost nothing
- Illegal copying pervasive
  - Internet allows copies to spread quickly and widely
- In light of advances in information technology, how should we treat intellectual property?

* Locke's Notion of Property Rights

Legitimacy of Intellectual Property Protection for Software

- IP protections of software allows entities to profit; people have to work harder to succeed; more innovation
- Software licenses typically prevent you from making copies of software to sell or give away
- Software licenses are legal agreements
- Violations (e.g., copying a proprietary software) are not argued morally, but handled in legal terms
- Discuss whether society *should* give intellectual property protection to software

Rights-based Analysis

- "Just deserts" argument
  - Programming is hard work that only a few can do
  - Programmers should be rewarded for their labor
  - They ought to be able to own their programs
- Criticism of "just deserts" argument
  - Why does labor imply ownership?
  - Can imagine a just society in which all labor went to common good
  - Intellectual property not like physical property

Utilitarian Analysis

- Argument against copying
  - Copying software reduces software purchases…
  - Leading to less income for software makers…
  - Leading to lower production of new software…
  - Leading to fewer benefits to society
- Each of these claims can be debated
  - Not all who get free copies can afford to buy software
  - Open-source movement demonstrates many people are willing to donate their software-writing skills
  - Hardware industry wants to stimulate software industry
  - Difficult to quantify how much society would be harmed if certain software packages not released

Ethics of Algorithms and AI

Various Issues

- Trust
- Transparency
- Bias
- Manipulation and Control
- Automation

Two case studies

Automatic Crime Prediction using Events Extracted from Twitter Posts

Xiaofeng Wang, Matthew S. Gerber, and Donald E. Brown

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Once Upon a Crime: Towards Crime Prediction from Demographics and Mobile Data

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POLICING THE FUTURE

In the aftermath of Ferguson, St. Louis cops embrace crime-predicting software

By Maurice Chammah, with additional reporting by Mark Hansen

Photography by Whitney Curtis

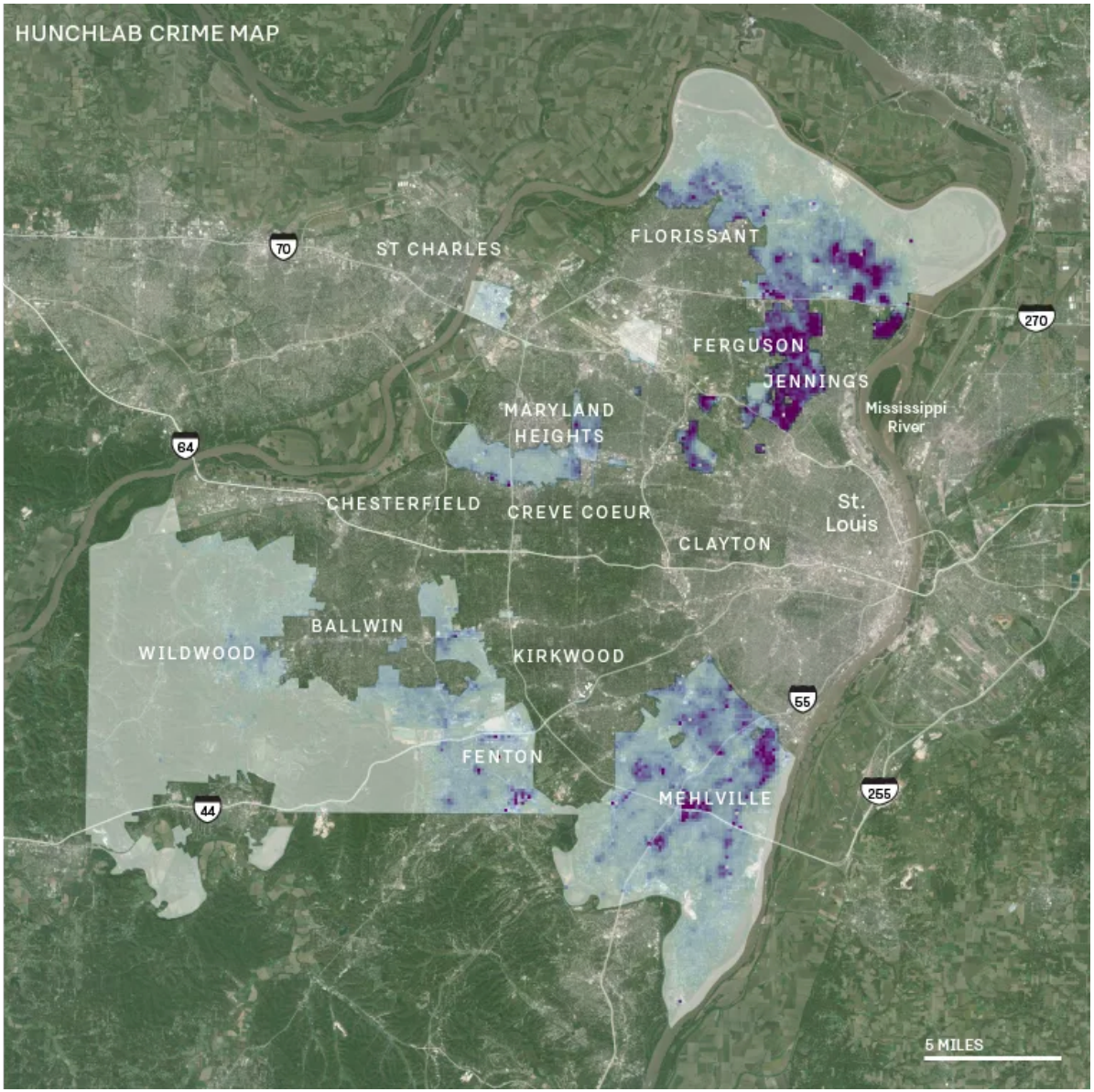
Just over a year after Michael Brown's death became a focal point for a national debate about policing and race, Ferguson and nearby St. Louis suburbs have returned to what looks, from the outside, like a kind of normalcy. Near the Canfield Green apartments, where Brown was shot by police officer Darren Wilson, a sign reading "Hands Up Don't Shoot" and a mountain of teddy bears have been cleared away. The McDonald's on West Florissant Avenue, where protesters nursed rubber bullet wounds and escaped tear gas, is now just another McDonald's.

Half a mile down the road in the city of Jennings, between the China King restaurant and a Cricket cell phone outlet, sits an empty room that the St. Louis County Police Department keeps as a substation. During the protests, it was a war room, where law enforcement leaders planned their responses to the chaos outside.

**


ST. LOUIS COUNTY
ST CHARLES
FLORISSANT
FERGUSON
JENNINGS
CHESTERFIELD
Mississippi River
St. Louis
BALLWIN
KIRKWOOD
FENTON
MEHLVILLE
5 MILES


ST. LOUIS COUNTY POLICE DEPARTMENT JURISIDICTION
ST CHARLES
FLORISSANT
FERGUSON
JENNINGS
CHESTERFIELD
Mississippi River
St. Louis
BALLWIN
KIRKWOOD
FENTON
MEHLVILLE
5 MILES


HUNCHLAB CRIME MAP
70
ST CHARLES
FLORISSANT
270
FERGUSON
JENNINGS
Mississippi River
MARYLAND HEIGHTS
64
CHESTERFIELD
CREVE COEUR
CLAYTON
St. Louis
BALLWIN
WILDWOOD
KIRKWOOD
55
FENTON
MEHLVILLE
255
44
5 MILES

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Technology

Colleges are turning students' phones into surveillance machines, tracking the locations of hundreds of thousands

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HEALTH AND SCIENCE

Google's DeepMind A.I. beats doctors in breast cancer screening trial

PUBLISHED THU, JAN 2 2020•8:13 AM EST

David Reid
@DAVYREID73

KEY POINTS

- Anonymous scans of 29,000 women were used in the trial.
- The biggest improvements over human scanning was found in the U.S. portion of the study.
- Google-owned DeepMind has already used AI to read eye scans and spot neck cancer.

AI

How people are using AI to detect and fight the coronavirus

KHARI JOHNSON @KHARIJOHNSON MARCH 3, 2020 12:49 PM

UVD disinfectant robot spreads ultraviolet rays in hospitals to kill bacteria and viruses

But is job amplification with AI going to be easy? What problems might it raise?

Rise of Robot Radiologists

Deep-learning algorithms are peering into MRIs and x-rays with unmatched vision, but who is to blame when they make a mistake?

By Sara Reardon

tificial intelligence—for natural-language processing. But she had been looking for a new line of research and decided to team up with radiologists to develop machine-learning algorithms that use computers' superior visual analysis to spot subtle patterns in mammograms that the human eye might miss.

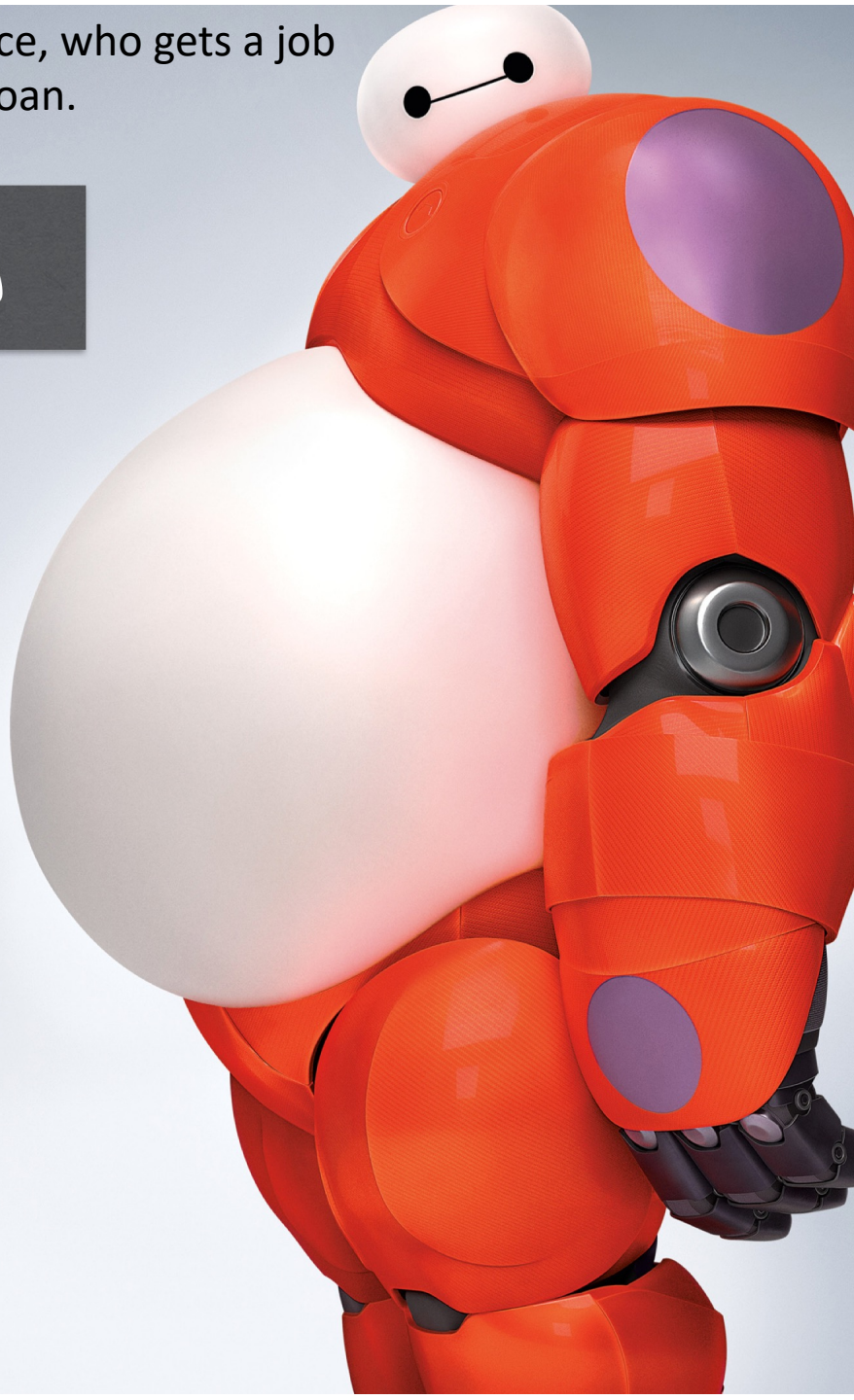
Over the next four years the team taught a computer program to analyze mammograms from about 32,000 women of different ages and races and told it which women had been diagnosed with cancer within five years of the scan. They then tested the computer's matching abilities in 3,800 more patients. Their resulting algorithm, published last May in *Radiology*, was significantly more accurate at predicting cancer—or the absence of cancer—than practices generally used in clinics. When Barzilay's team ran the program on her own mammograms from 2012—ones her doctor had cleared—the algorithm correctly predicted she was at a higher risk of developing breast cancer within five years than 98 percent of patients.

AI algorithms not only spot details too subtle for the human eye to see. They can also develop entirely new ways

"AI won't replace radiologists, but radiologists who use AI will replace radiologists who don't," Curtis Langlotz, radiologist at Stanford

Proprietary algorithms are used to decide, for instance, who gets a job interview, who gets granted parole, and who gets a loan.

Human(bias) and Algorithms



Two areas of concern: data and algorithms

Data inputs:

- Poorly selected (e.g., observe only car trips, not bicycle trips)
- Incomplete, incorrect, or outdated
- Selected with bias (e.g., smartphone users)
- Perpetuating and promoting historical biases (e.g., hiring people that "fit the culture")

Algorithmic processing:

- Poorly designed matching systems
- Personalization and recommendation services that narrow instead of expand user options
- Decision making systems that assume correlation implies causation
- Algorithms that do not compensate for datasets that disproportionately represent populations
- Output models that are hard to understand or explain hinder detection and mitigation of bias

Executive Office of the US President (May 2016): "Big Data: A Report on Algorithmic Systems,Opportunity,and Civil Rights"

Some case studies of algorithmic bias

REPORTS | PSYCHOLOGY

Semantics derived automatically from language corpora contain human-like biases

Aylin Caliskan[1,*], Joanna J. Bryson[1,2,*], Arvind Narayanan[1,*]

+ See all authors and affiliations

Science 14 Apr 2017:
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DOI: 10.1126/science.aal4230

Machines learn what people know implicitly

AlphaGo has demonstrated that a machine can learn how to do things that people spend many years of concentrated study learning, and it can rapidly learn how to do them better than any human can. Caliskan *et al.* now show that machines can learn word associations from written texts and that these associations mirror those learned by humans, as measured by the Implicit Association Test (IAT) (see the Perspective by Greenwald). Why does this matter? Because the IAT has predictive value in uncovering the association between concepts, such as pleasantness and flowers or unpleasantness and insects. It can also tease out attitudes and beliefs—for example, associations between female names and family or male names and career. Such biases may not be expressed explicitly, yet they can prove influential in behavior.

Science, this issue p. 183; see also p. 133

Science
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Unequal Representation and Gender Stereotypes in Image Search Results for Occupations

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ABSTRACT
Information environments have the power to affect people's perceptions and behaviors. In this paper, we present the results of studies in which we characterize the gender bias present in image search results for a variety of occupations. We experimentally evaluate the effects of bias in image search results on the images people choose to represent those careers and on people's perceptions of the prevalence of men and women in each occupation. We find evidence for both stereotype exaggeration and systematic underrepresentation of women in search results. We also find that people rate search results higher when they are consistent with stereotypes for a career, and shifting the representation of gender in image search results can shift people's perceptions about real-world distributions. We also discuss tensions between desires for high-quality results and broader

tional choices, opportunities, and compensation [20,26]. Stereotypes of many careers as gender-segregated serve to reinforce gender sorting into different careers and unequal compensation for men and women in the same career. Cultivation theory, traditionally studied in the context of television, contends that both the prevalence and characteristics of media portrayals can develop, reinforce, or challenge viewers' stereotypes [29].

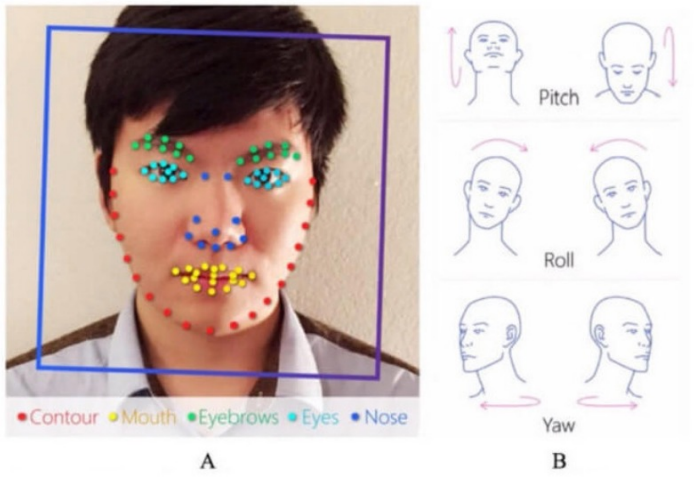
Inequality in the representation of women and minorities, and the role of online information sources in portraying and perpetuating it, have not gone unnoticed in the technology community. This past spring, Getty Images and LeanIn.org announced an initiative to increase the diversity of working women portrayed in the stock images and to improve how they are depicted [27]. A recent study identified discrimination in online advertising delivery when searching for

SCIENCE

The Study Claiming AI Can Tell If You're Gay or Straight Is Now Under Ethical Review

By Lisa Ryan @lisarya

SEPTEMBER 12, 2017
6:21 PM



An image from the study. Photo: Journal of Personality and Social Psychology/Stanford University

A recent Stanford University study published in the *Journal of Personality and Social Psychology* claimed artificial intelligence can figure out if a person is gay or straight by analyzing pictures of their faces. However, the Outline reports the study was met with "immediate backlash" from the AI community, academics, and LGBTQ advocates alike — and the paper is now under ethical review.

Technology used in self-driving cars has a racial bias that makes autonomous vehicles more likely to drive into black people, a new study claims.

Connectivity

First Evidence That Social Bots Play a Major Role in Spreading Fake News

Automated accounts are being programmed to spread fake news, according to the first systematic study of the way online misinformation spreads

by Emerging Technology from the arXiv August 7, 2017

Fake news and the way it spreads on social media is emerging as one of the great threats to modern society. In recent times, fake news has been used to manipulate stock markets, make people choose dangerous health-care options, and manipulate elections, including last year's presidential election in the U.S.

Clearly, there is an urgent need for a way to limit the diffusion of fake news. And that raises an important question: how does fake news

The Cambridge Analytica-Facebook Scandal

- The data analytics firm used personal information harvested from more than 50 million Facebook profiles without permission to build a system that could target US voters with personalized political advertisements based on their psychological profile
- Facebook received a number of warnings about its data security policies in recent years and had known about the Cambridge Analytica data breach since 2015, but only suspended the firm and the Cambridge university researcher who harvested user data from Facebook earlier this month