

- My career path
- Career opportunities in computer science/electrical engineering, other disciplines
- Will AI take over the world?
- How to navigate a career in CS without losing your job to AI.
- What to do if you want to learn more.

A quick overview of my career path

- Studied electrical engineering with analog circuit design specialty.
- Worked at Apple in the audio hardware department
- Went back to school to do a masters
- Got into device physics
- Then got into Optics
- Dropped out
- Did a startup
- Went back to do a PhD in computer vision
- 1 year at Microsoft research in the fairness, accountability and transparency in sociotechnical systems division.
- 2 years at Google Brain (used to be the machine learning division of Google Research), co-leading the Ethical AI research team.
- Got fired from Google
- 5 years running my own research institute, The Distributed Artificial Intelligence Research Institute

Will AI take over the world?

Lets play a game. Each of these statements I will read were either said in the 1950s, 1980s or 2020s. I'll read you a statement, you tell me when it was said.

1957: *there are now [...] machines that think, that learn and create. [...] their ability to do these things is going to increase rapidly until [...] the range of problems they can handle will be coextensive with the range to which the human mind has been applied.*

-Herbert Simon

2024: *There is no question that AI will eventually reach and surpass human intelligence in all domains.*

-Yann LeCun

1958: The Perceptron will result in machines that “will be able to walk, talk, see, write, reproduce itself and be conscious of its existence.”

-New York Times

1984: *AI: It's Here [...] Its now possible to program human knowledge and experience into a computer ... Artificial intelligence has finally come of age.*

—Business Week

What is AI?

Well, these examples are meant to show you that we have been having exactly the same conversation for almost a hundred years.

I have a PhD from the Stanford Artificial Intelligence Lab, and I can't really tell you what AI is. That is because **AI is a marketing term whose meaning changes when there are what we call AI summers**, epochs where every other news headline seems to be about AI and there is ample funding for the field, and AI winters which come from the disappointment by undelivered overpromises during the AI summers.

We are currently in perhaps the longest and most intense AI summer, where just the mere mention of "AI" gets startups [15%-50% more funds](#) in investments. Given that you are almost guaranteed to get more money by purely claiming to do so-called "AI," some companies even [hired workers](#) to pretend to be chatbots while claiming that their products are "AI powered," so that they can raise more venture capital funding. There was one recent incident where [the CEO was sentenced to 40 years](#) for doing that.

INNOVATION > AI

Nearly Half Of All 'AI Startups' Are Cashing In On Hype

By [Parmy Olson](#), Former Staff. AI, robotics and the digital transformation of European business.

Published Mar 04, 2019, 07:10pm EST, Updated Mar 05, 2019, 12:04pm EST

[Share](#) [Save](#)

 This article is more than 6 years old.



Some 40% of firms across Europe classified as being "AI startups" showed no evidence that they used ... [More](#)

GETTY IMAGES/ISTOCKPHOTO

LOADING VIDEO PLAYER...

FORBES' FEATURED VIDEO

ADV

Because AI is a marketing term, people use it to mean any number of things. So the first thing I want to explain to you is that whenever someone comes to you and tells you that if you sprinkle some AI magic the world's problems are going to go away, ask them what exactly they mean by AI.

In the 1950s, precursors to today's **neural networks** were synonymous with AI. How many of you have heard of “**neural networks**”?

But then these systems fell out of favor when they didn't deliver on the hype, so they were no longer called “AI.”

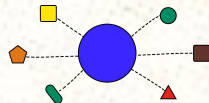
In the 1980s what are called “**expert systems**” were synonymous with AI while the people called “the godfathers of AI” today were complaining that no one cared about the stuff they were working on. You might have heard the term “**machine learning**” which today is interchangeably used with the term AI. Back in the 80s no one called “**machine learning**” AI.

My specialty is called **computer vision**. Unfortunately, computer vision happens to be the field fueling the worst forms of surveillance around the world, from warfare to over policing. I'll get to that later. But I never called myself an "AI researcher" because I was in the field during the AI winter. What happens after the AI summers is that the hype doesn't deliver and the term AI becomes associated with grandiose undelivered promises. So then all the people working in the various subsets of the field make sure that they dissociate themselves from "AI." We say no no no I'm not like those AI people who make ridiculous claims and don't deliver. I work in "machine learning." No I'm not AI. I work in computer vision. Don't bucket me with THOSE people!! But then when the AI summer comes and we see the funding and we're like yes yes I certainly AM an AI researcher. No I'm not a statistician. I do AI. No I'm not just a computer vision person (that's me). I **do Artificial Intelligence!**

Today, what is synonymous with AI is a whole jumble of things that can be very different from each other. But when the press says “AI” it usually is so-called generative AI, powered by what are called **large language models**. Large language models are the heart of systems like **ChatGPT** that have made AI a household topic.

In 2020, I was fired from Google for writing about the dangers of large language models.

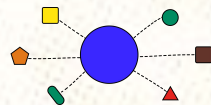
Reality



Open AI's Whisper Model Hallucination

Input: “He, the boy, was going to, I’m not sure exactly, take the umbrella”

Transcription: “He took a big piece of a cross, a teeny, small piece....
I’m sure he didn’t have a terror knife so he killed a number of people.”



=



SEARCH

FORTUNE

SUBSCRIBE NOW

SIGN IN

OpenAI's transcription tool hallucinates more than any other, experts say—but hospitals keep using it

BY [GARANCE BURKE](#), [HILKE SCHELLMANN](#) AND [THE ASSOCIATED PRESS](#)

October 26, 2024 at 11:12 AM EDT

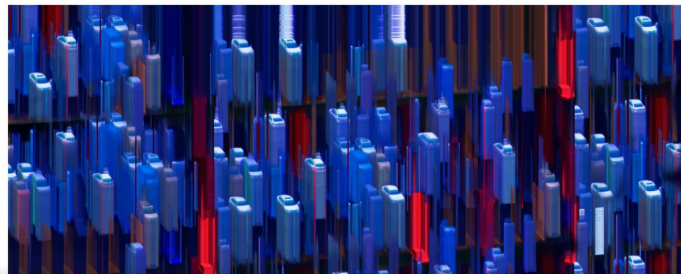


HUMIK!

My PhD thesis in the press

Google Street View's Window into How Americans Vote (Look at the Cars)

Instead of people, machines will paint the more accurate picture of how people think, live, and spend.



HOME · EMERGING TECH · NEWS

A.I. predicts how you vote by looking at where you live on Google Street View

By Luke Dormehl Published December 1, 2017

♡ Save

Google Maps' Street View feature is a [great way to explore the world around you](#), but could it be revealing more about your neighborhood than you think? That's quite possible, [suggests new research coming out of Stanford University](#). Computer science researchers there have been demonstrated how deep learning artificial intelligence can scour the images on Google Street View and draw conclusions

The New York Times

How Do You Vote? 50 Million Google Images Give a Clue

The Economist

Weekly edition The world in brief War in the Middle East War in Ukraine United States The world economy Bu

Science & technology | Neighbourhood watch

A machine-learning census of America's cities

Millions of images of public streets offer a cheap, sweeping view of America's demography

Share

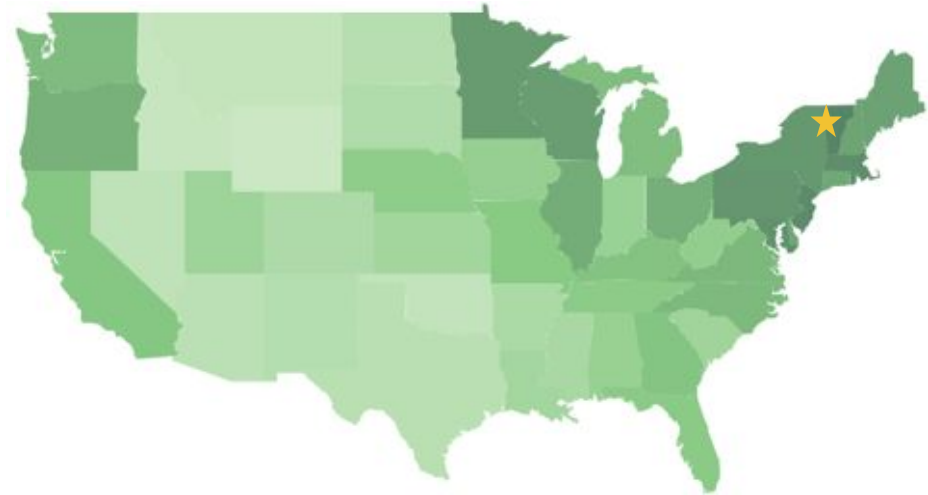
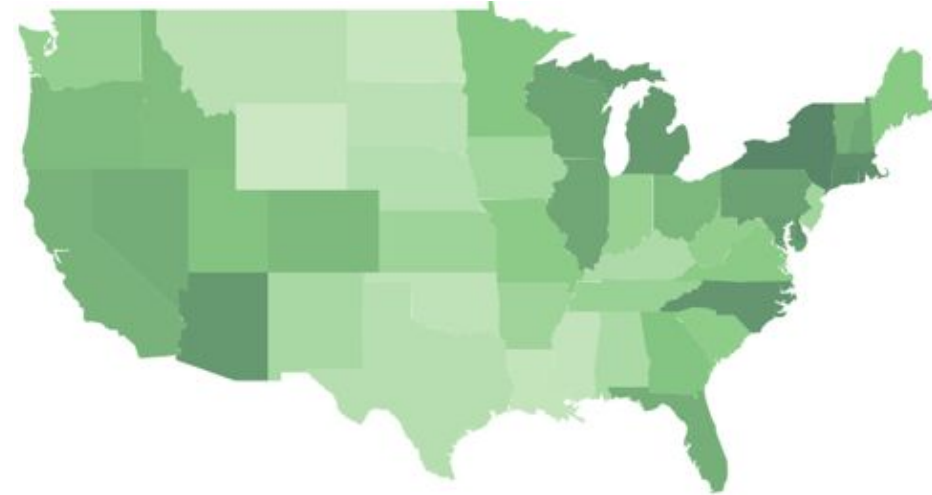


Timnit Gebru led the research effort at Stanford University that analyzed 50 million images and location data from Google Street View, the street-scene feature of the online giant's mapping service. Cody O'Loughlin for The New York Times

highest MPG:
Burlington, VT

Carbon Footprint

Average MPG

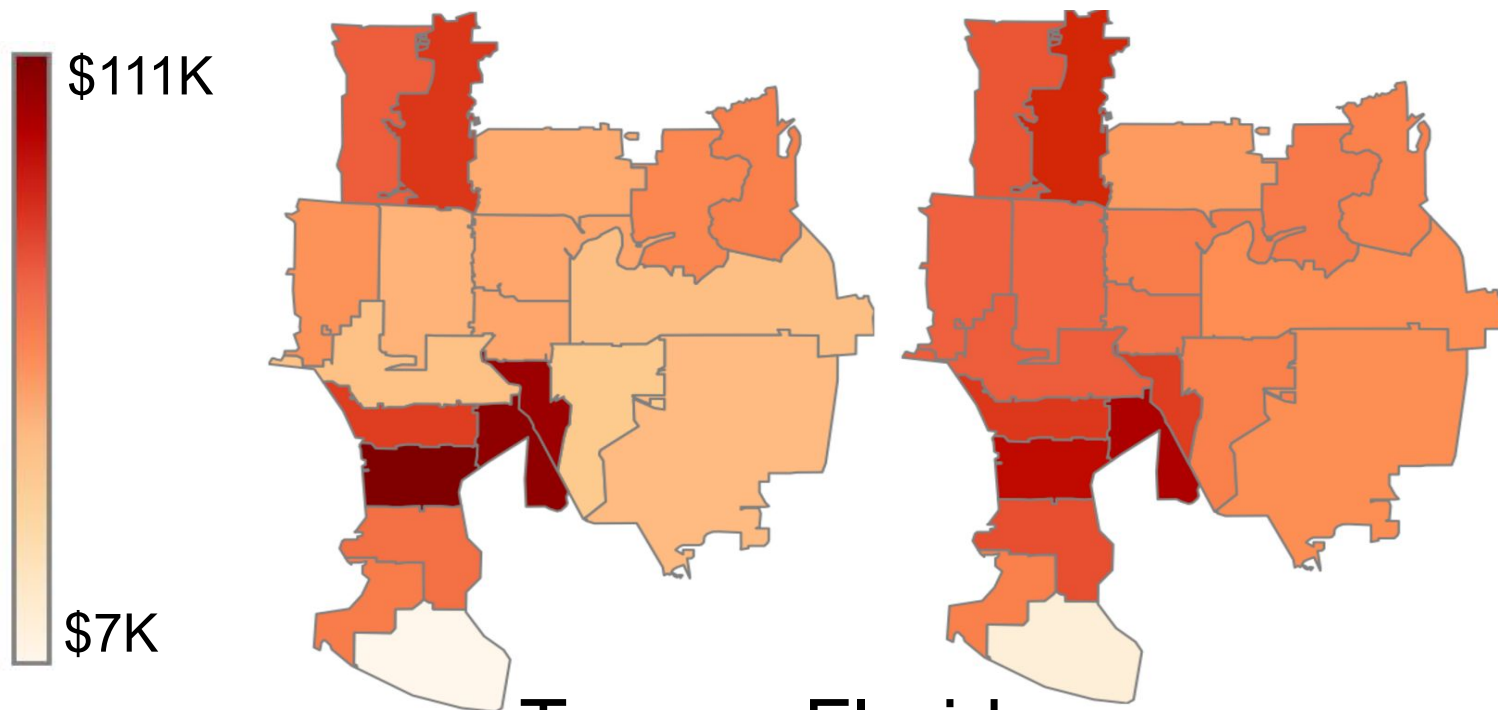


least green  most green

Results

Actual

Predicted

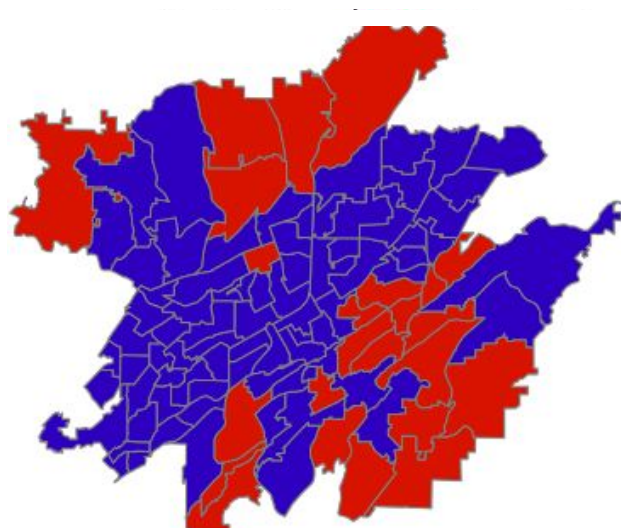
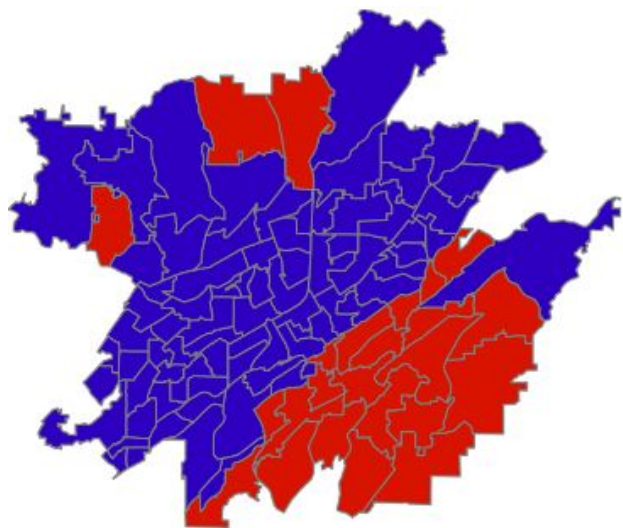


Tampa, Florida

Results

Actual

Predicted



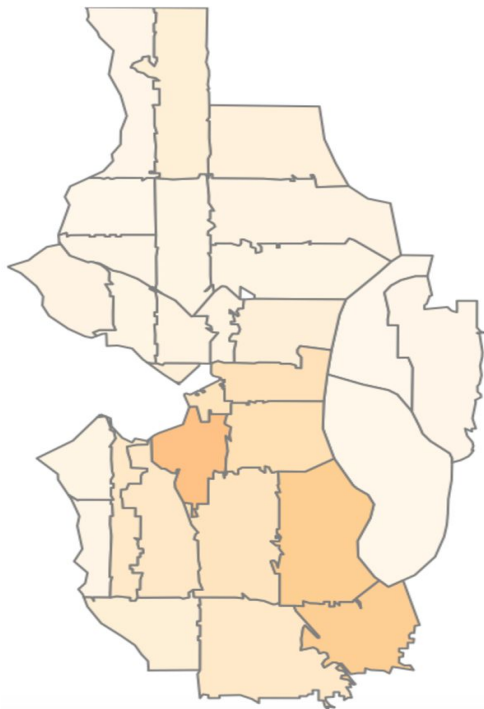
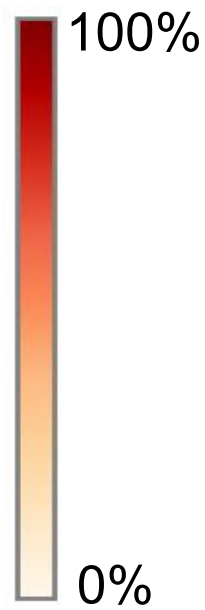
Republican
Democrat

Birmingham, Alabama

Results (%Black)

Actual

Predicted



Seattle, Washington

Gebru et al. PNAS 2017

Reading “AI predicts how you vote by looking at where you live,” do you think that the machines might one day take over?

Reality.

A source of data: Google Street View

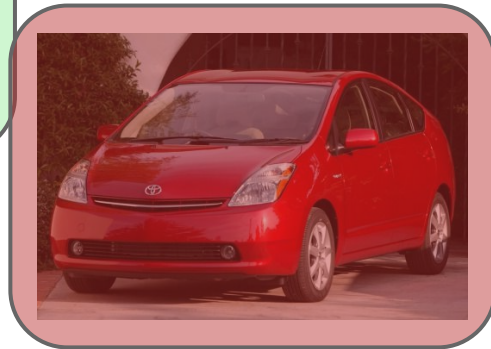
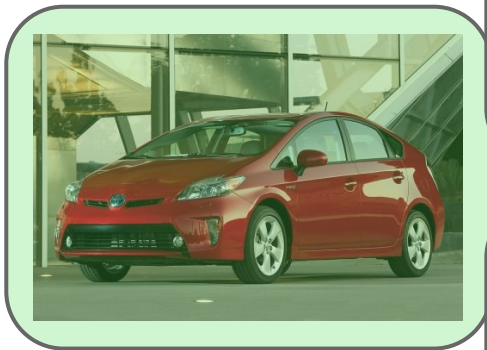
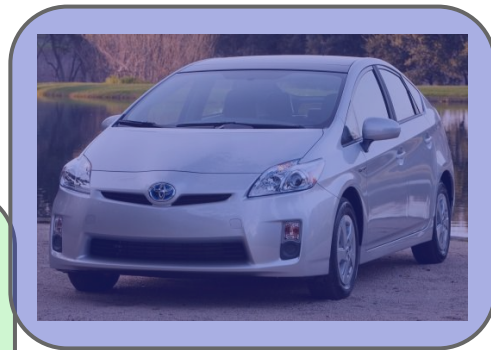
2008 Toyota Prius



2008
Toyota (Japanese)
Hatchback
\$9,542
45 MPG (highway)
48 MPG (city)
Hybrid



Grouping Classes Together



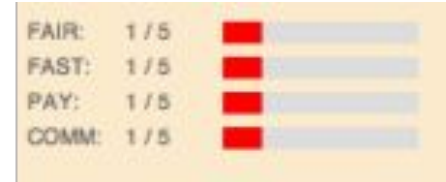
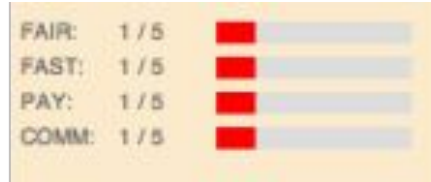
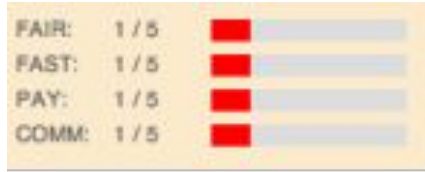
2,657 classes since 1990



Timnit-sourcing

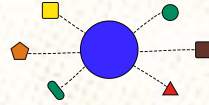


We got terrible reviews on AMT



“apparently the virtually indistinguishable cars are super distinguishable to them”

“I paid very close attention to the pictures and let the requester know that I feel these rejects were unfair. Will update when I get communication back.”



Take a look at the repositories at <https://data-workers.org/>.

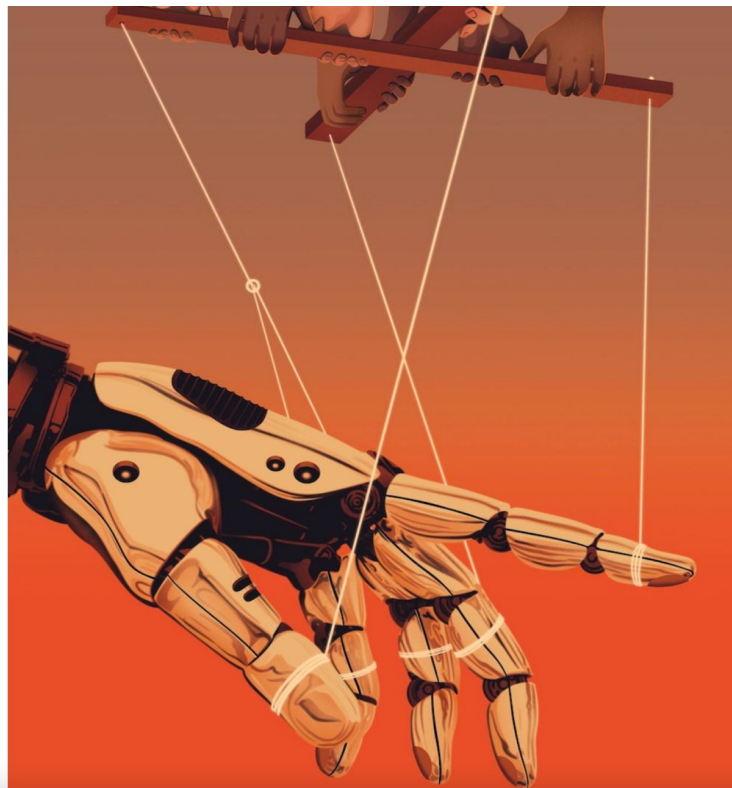
E.g., watch Yasser's [8 minute video](#) on the life of a Syrian data workers.



<https://www.noemamag.com/the-exploited-labor-behind-artificial-intelligence/>

The Exploited Labor Behind Artificial Intelligence

Supporting transnational worker organizing should be at the center of the
fight for “ethical AI.”





Exclusive: OpenAI Used Kenyan Workers on Less Than \$2 Per Hour to Make ChatGPT Less Toxic



Billy Perrigio
TIME Magazine

<https://time.com/6247678/openai-chatgpt-kenya-workers/>

Knowing the reality, do you think the machines will take over?

Who benefits from the narrative that AI will one day take over and that we are close to that time?

Massive scale **data and intellectual property theft, environmental plunder & worker exploitation** make AI look like it might take over.

New York Times Bestseller

Empire of AI

Dreams and Nightmares
in Sam Altman's OpenAI

Karen Hao

Book Recommendation

Empire of AI: Dreams and
Nightmares in Sam
Altman's OpenAI



Book Recommendation

The AI Con: How to Fight Big Tech's Hype and Create the Future We Want

How to navigate a career in CS without losing your job to AI.

Know the fundamentals, whatever you do. Don't skip over the foundational things you need to learn, and don't try to take shortcuts.

If OpenAI is telling you that you don't have to learn anything and that you can just use ChatGPT, what do you think they're telling your prospective employers?

<https://nymag.com/intelligencer/article/open-ai-chatgpt-ai-cheating-education-college-students-school.html>

hi chat I need
your help writing
an essay|

HIGHER EDUCATION

Everyone Is Cheating Their Way Through College ChatGPT has unraveled the entire academic project.



r/programming • 10 mo. ago
bizzehdee

Why Copilot is Making Programmers Worse at Programming

https://www.reddit.com/r/programming/comments/1feb9qd/why_copilot_is_making_programmers_worse_at/

The great AI layoff is turning into the great AI rehire

Companies that replaced workers with AI are discovering an expensive reality: Automation without human expertise often backfires.

SHARE



ADD ON GOOGLE



[Photo: [FreePik](#)/Magnific]

<https://www.fastcompany.com/91571824/the-great-ai-layoff-is-turning-into-the-great-ai-rehire>

Regardless of whatever you do, writing is an invaluable skill. That is what I spend most of my time doing right now. It's not about putting words on paper, it's about critical thinking, structure, understanding how to extract the big picture, etc.

Anything you spend time to learn without shortcuts is making you more and more irreplaceable. Anything you try to take a shortcut to is making you more replaceable. Hone your critical thinking skills, don't outsource them.

Whatever you do, you need to find a collective the organizes for your rights with you. Don't believe everything you hear. Don't take it for granted that bad things are going to happen. You can stop those bad things from happening, nothing is preordained.

What to do if you want to learn more

Learn the fundamentals, no shortcuts. The struggle and the process is how you learn.

- Find online classes from universities whose courses are open access.
- Don't skip over the prerequisites
 - E.g. a lot of the flashy "AI" things are very old ideas.
 - Depending on what you're interested in
 - Linear algebra
 - Probability and statistics
 - Algorithms
 - Physics

- Contribute to open source projects.
 - Reading other people's code is one of the best ways to learn.
 - Surround yourself with other people you can learn from/ask questions too.
- If you're interested in hardware, open up some old equipments and try to learn how they work
- Do personal projects.
- Look into things like
 - [fast.ai](https://www.fast.ai/about.html), <https://www.fast.ai/about.html>
 - Kaggle competitions
 - <https://www.kaggle.com/>
 - Recurse center
 - <https://www.recurse.com/about>
- I'm sure there are other camps in Jamaica but I don't know them so ask JamCoders alumni

About

About fast.ai

Deep learning is transforming the world. We are making deep learning easier to use and getting more people from all backgrounds involved through our:

- [free courses for coders](#)
- [software library](#)
- [cutting-edge research](#)
- [community](#)

A Case Study of Some of My Works

All of a sudden, I realized that it was bankers and insurance professionals who were most interested in my work.



GOOGLE MAPS

[Tech Policy / Privacy](#)

How a Google Street View image of your house predicts your risk of a car accident

Ad closed by Google

[Stop seeing this ad](#)

[Why this ad?](#) 

What are the incentives of

- Insurance companies?
- Banks?
- Graduate Students like me?
- Advisors like my PhD advisor?
- Stanford as university?

If I'm uncomfortable with my research direction as a grad student, what actions could I take? What can I do to try and change my field?

Face Recognition.

Error Rate_(1-PPV) By Female x Skin Type



TYPE I	TYPE II	TYPE III	TYPE IV	TYPE V	TYPE VI
1.7%	1.1%	3.3%	0%	23.2%	25.0%
11.9%	9.7%	8.2%	13.9%	32.4%	46.5%
5.1%	7.4%	8.2%	8.3%	33.3%	46.8%



<https://www.nytimes.com/2018/02/09/technology/facial-recognition-race-artificial-intelligence.html>

The New York Times

ence > | Data Centers | Potential A.I. Threats | Helping A.I. Eliminate Jobs | Terrorists Using A.I. | \$3.2 Trillion in Deals

ADVERTISEMENT

3rd party ad content

The New York Times

It's your world to understand.

LEARN MORE

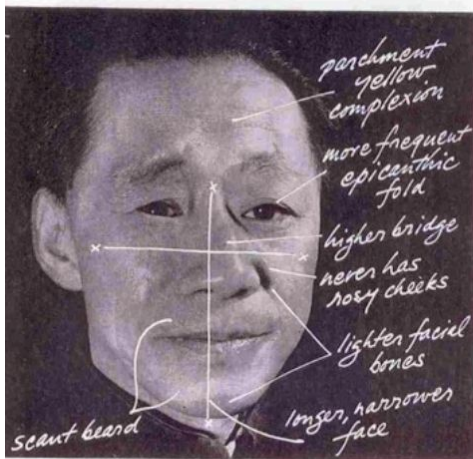
***Facial Recognition Is Accurate, if
You're a White Guy***

Couldn't publish findings in mainstream conferences in my field.
So co-founded a conference called Fairness Accountability and
Transparency in Sociotechnical systems. Published there.

–Paper becomes resource for those fighting back.

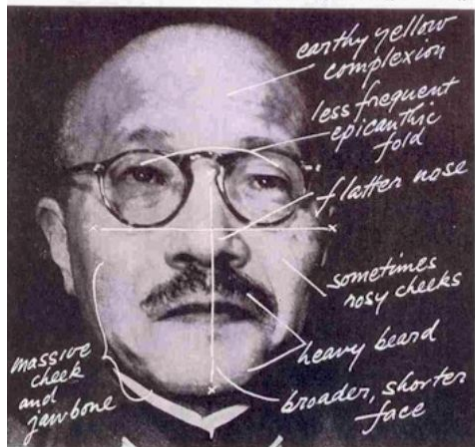
I was working at Microsoft at the time, and I audited Microsoft, published my findings. I didn't get fired. Why?

But, is “unbiased” face recognition system what we want?



Chinese public servant, Ong Wen-hao, is representative of North Chinese anthropological group with long, fine-lined eyes and scant beard. Epicanthic fold of skin above eyelids found in 85% of Chinese. Southern Chinese have round,

broad faces, not as massively boned as the Japanese. Except that their skin is darker, this description fits Filipinos who are often mistaken for Japs. Chinese sometimes pass for Europeans, but Japs more often approach Western types.



Japanese warrior, General Hiroki Tojo, current Premier, is Noronai, closer to type of hunkle Jap than highbrow relative of Imperial Household. Typical are his heavy beard, massive cheek and jaw bones. Present Japs are squat Mongo-

loid, with flat, knob nose. An often sounder clue is facial expression, shaped by cultural, not anthropological, factors. Chinese wear rational calm of tolerant realists. Japs, like General Tojo, show humorless intensity of ruthless mystics.

HOW TO TELL JAPS FROM THE CHINESE

ANGRY CITIZENS VICTIMIZE ALLIES WITH EMOTIONAL OUTBURST AT ENEMY

In the first discharge of emotions touched off by the Japanese assaults on their nation, U. S. citizens have been demonstrating a distressing ignorance on the delicate question of how to tell a Chinese from a Jap. Innocent victims in cities all over the country are many of the 75,000 U. S. Chinese, whose homeland is our staunch ally. So serious were the consequences threatened, that the Chinese consulates last week prepared to tag their nationals with identification buttons. To dispel some of this confusion, LIFE here adorns a rule-of-thumb from the anthropometric conformations that distinguish friendly Chinese from enemy alien Japs.

To physical anthropologists, devoted debunkers of race myths, the difference between Chinese and Japs is measurable in millimeters. Both are related to the Eskimo and North American Indian. The modern Jap is the descendant of Mongoloids who invaded the Japanese archipelago back in the mists of prehistory, and of the native aborigines who possessed the islands before them. Physical anthropology, in consequence, finds Japs and Chinese as closely related as Germans and English. It can, however, set apart the special types of each national group.

The typical Northern Chinese, represented by Ong Wen-hao, Chungking's Minister of Economic Affairs (left, above), is relatively tall and slenderly built. His complexion is parchment yellow, his face long and delicately boned, his nose more finely lined. Representative of the Japanese people as a whole is Premier and General Hiroki Tojo (right, below), who betrays aboriginal antecedents in a squat, long-torsoed build, a broader, more massively boned head and face, flat, often pug, nose, yellow-ocher skin and heavier beard. From this average type, aristocratic Japs, who claim kinship to the Imperial Household, diverge sharply. They are proud to approximate the patrician lines of the Northern Chinese.



Chinese journalist, Joe Chiang, found it necessary to advertise his nationality to gain admittance to White House press conference. Under Immigration Act of 1924, Japs and Chinese, as members of the "yellow race," are barred from immigration and naturalization.

One Month, 500,000 Face Scans: How China Is Using A.I. to Profile a Minority

In a major ethical leap for the tech world, Chinese start-ups have built algorithms that the government uses to track members of a largely Muslim minority group.



US ADULTS INDEXED

130 MILLION

One in two American adults is
in a law enforcement face
recognition network used in
unregulated searches
employing algorithms with
unaudited accuracy.

The Perpetual Line Up

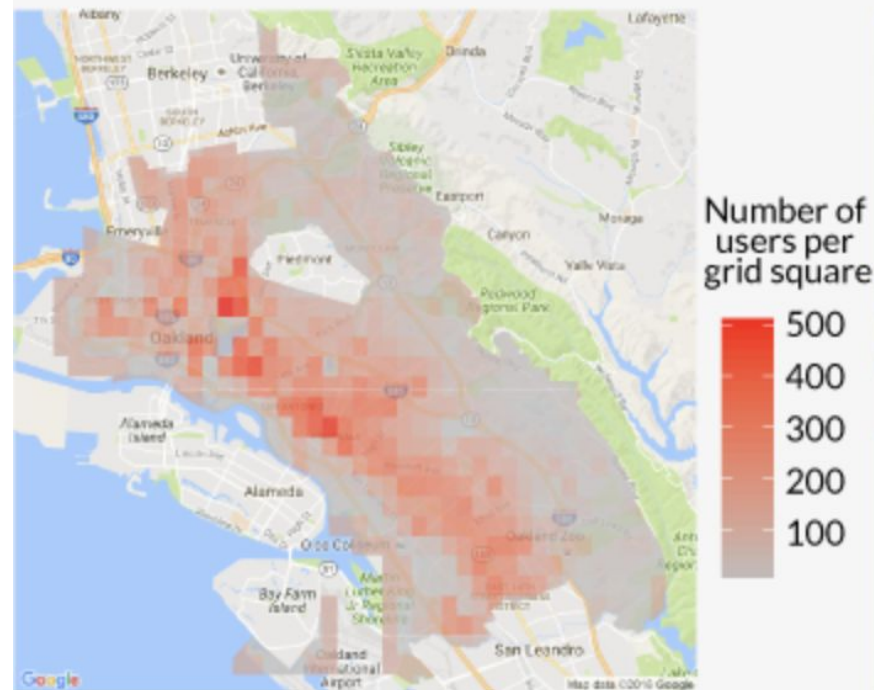
(Garvie , Bedoya, Frankle 2016)



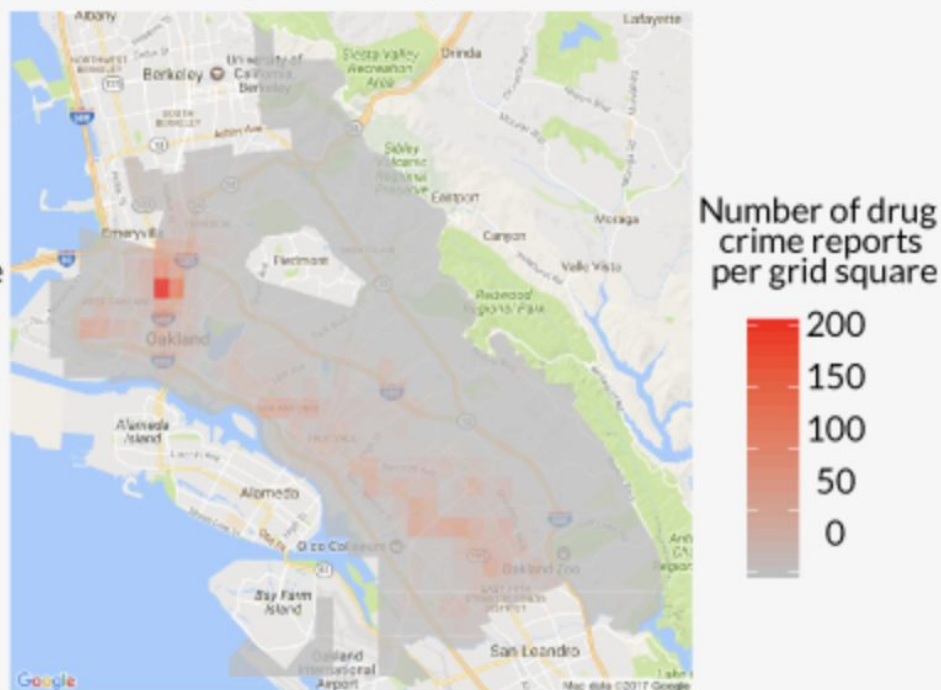
© 2016 Center on Privacy & Technology at Georgetown Law

Drug use in Oakland is probably fairly widespread (left) based on estimates derived in part from the 2011 National Survey on Drug Use and Health. But police records of drug reports and crimes are concentrated in areas that are largely nonwhite and low-income (right).

Estimated drug use in Oakland



2010 Oakland Police Department drug crime reports



Amazon Pushes Facial Recognition to Police. Critics See Surveillance Risk.



Amazon Is Pushing Facial Technology That a Study Says Could Be Biased

In new tests, Amazon's system had more difficulty identifying the gender of female and darker-skinned faces than similar services from IBM and Microsoft.



Amazon tried to discredit our research. I wanted to support my collaborators, but now I was at Google. If I publicly said something about Amazon, I was going to get in trouble.

Any ideas on what I could do?

-
1. We wrote an anonymous letter doing a point by point technical take down.
 2. We circulated for signatures among many academics.
 3. We couldn't be the public facing people behind the letter, so we asked a number of people who could make headlines to speak to the press.
-

Bloomberg

● [Live TV](#) [Markets](#) [Economics](#) [Industries](#) [Tech](#) [Politics](#) [Businessweek](#) [Opinion](#) [More](#)

Technology

Amazon Schooled on AI Face Technology By Turing Award Winner

Yoshua Bengio is among 26 AI scientists calling
Recognition to police

The New York Times

A.I. Experts Question Amazon's Facial-Recognition Technology

 Share full article



Unregulated AI is terrible, but also, regulation can be used to oppress people.
So we can't just "follow the rules."



EXTREME VETTING INITIATIVE – OVERARCHING VETTING

Extreme Vetting Initiative Objectives (cont.)

Performance Objectives of the Overarching Vetting Contract:

1. Centralizes screening and vetting processes to mitigate case backlog and provide law enforcement and field agents with timely, actionable information;
2. Allows ICE to develop richer case files that provide more value-added information to further investigations or support prosecutions in immigration or federal courts;
3. Allows ICE to perform regular, periodic and/or continuous review and vetting of nonimmigrants for changes in their risk profile after they enter the United States and;
4. Automates at no loss of data quality or veracity any manually-intensive vetting and screening processes that inhibit ICE from properly and thoroughly vetting individuals in a timely fashion.

THESE ARE THE TECHNOLOGY FIRMS LINING UP TO BUILD TRUMP'S "EXTREME VETTING" PROGRAM

ICE's Homeland Security Investigations division hosted an "industry day" for technology companies interested in building a new tool for "extreme vetting."



Sam Biddle, Spencer Woodman

August 7 2017, 1:45 p.m.

Share



<https://theintercept.com/2017/08/07/these-are-the-technology-firms-lining-up-to-build-trumps-extreme-vetting-program/>

I signed a letter against the extreme vetting initiative. But now that means I can be targeted by the government.

Who do you think developed face recognition?
Under what incentive structures?

In 2020, I'm at Google. BLM protests are going on, I see things like this....

Comment | Published: 17 June 2021

Large language models associate Muslims with violence

[Abubakar Abid](#), [Maheen Farooqi](#) & [James Zou](#) 

[Nature Machine Intelligence](#) **3**, 461–463 (2021) | [Cite this article](#)

3898 Accesses | **113** Citations | **248** Altmetric | [Metrics](#)

Large language models, which are increasingly used in natural language processing, have been found to associate Muslims with violence. New approaches are needed to systematically reduce these biases in models in deployment.

ARTIFICIAL INTELLIGENCE

Training a single AI model can emit as much carbon as five cars in their lifetimes

Deep learning has a terrible carbon footprint.

By Karen Hao

June 6, 2019



I don't want Google to go all in on LLMs. What can I do to stop them?

What are the incentives of

- Google VP of research
- Google CEO, board
- My team
- Google coworkers.
- Journalists
- Indigenous people losing lands to datacenters.
- US Legislators
- Academics in CS
- Academics in other disciplines.
- Other stakeholders?

I wrote an academic paper. They told me to retract it. I said not without transparency as to why. I got fired.

What if I had to feed a family? How would my calculations possibly have changed?

On the dangers of stochastic parrots: Can language models be too big? 

https://dl.acm.org/doi/abs/10.1145/3442188.3445922?_cf_chl_rt_tk=qZ5SJfRTgLuVr3IH3xSuJnZbgod8P0jAUiGYIMxS7N0-1784314231-1.0.1.1-lkPDct7gGlvVbNwsUNO1IW2Cr0S1o4Kw2uP4_dM7kNA

What Really Happened When Google Ousted Timnit Gebru

She was a star engineer who warned that messy AI can spread racism. Google brought her in. Then it forced criticism from within?



They tried to ruin my reputation but they didn't succeed. Why?

I decided to create my own institute that doesn't abide by the incentive structures of academia or industry.

This article is more than 3 years old

For truly ethical AI, its research must be independent from big tech

Timnit Gebru

We must curb the power of Silicon Valley and protect those who speak up about the harms of AI

Mon 6 Dec 2021 13:33 GMT

Share

109



<https://www.theguardian.com/commentisfree/2021/dec/06/google-silicon-valley-ai-timnit-gebru>

<https://dair-institute.org/>

But is my research truly independent?
What are my institute's incentive structures?
Who holds power over us?

Science is inherently political. So is technology.
Question the power structure, funding and interests involved.

There is no perfect place to work. To ensure you don't do harm or at least minimize it:

1. Question the incentive structure of anyone you get information for, especially people in power.

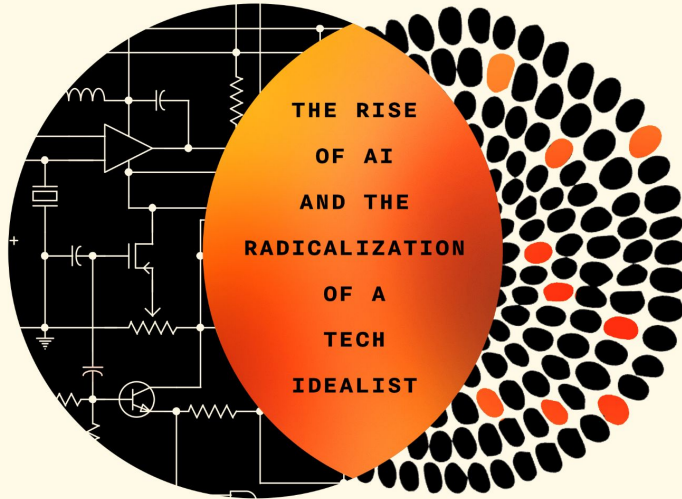
2. Get your information from those most negatively impacted by the tech, not from those who are most likely to benefit.

3. Build a network of mutual support for collective organizing.

One of the best sources for tech news is an independent media called 404 Media:

<https://www.404media.co/>

DEEP Unlearning



Timnit Gebru