IDEAS | YONATAN ZUNGER

Computer science faces an ethics crisis. The Cambridge Analytica scandal proves it.

NEW YORK TIMES

Facebook founder Mark Zuckerberg speaks at a conference in San Jose, Calif., in 2017. Cambridge Analytica scraped up Facebook data from more than 50 million people.

By Yonatan Zunger | MARCH 22, 2018

CAMBRIDGE ANALYTICA BUILT a weapon. They did so understanding what uses its buyers had for it, and it worked exactly as intended. To help clients manipulate voters, the company built psychological profiles from data that it surreptitiously harvested from the accounts of 50 million Facebook users. But what Cambridge Analytica did

was hardly unique or unusual in recent years: a week rarely goes by when some part of the Internet, working as intended, doesn't cause appreciable harm.

I didn't come up in computer science; I began my career as a physicist. That transition gave me a specific perspective on this situation. That the field of computer science, unlike other sciences, has not yet faced serious negative consequences for the work its practitioners do.

Chemistry had its first reckoning with dynamite; horror at its consequences led its inventor, Alfred Nobel, to give his fortune to the prize that bears his name. Only a few years later, its second reckoning began when chemist Clara Immerwahr committed suicide the night before her husband and fellow chemist, Fritz Haber, went to stage the first poison gas attack on the Eastern Front. Physics had its reckoning when nuclear bombs destroyed Hiroshima and Nagasaki, and so many physicists became political activists — some for arms control, some for weapons development. Human biology had eugenics. Medicine had Tuskegee and thalidomide. Civil engineering, a series of building, bridge, and dam collapses. (My thanks to many Twitter readers for these examples.)

These events profoundly changed their respective fields, and the way people come up in them. Before these crises, each field was dominated by visions of how it could make the world a better place. New dyes, new materials, new sources of energy, new modes of transport — everyone could see the beauty. Afterward, everyone became painfully aware of how their work could be turned against their dreams.

Each field dealt with its reckoning in its own way. Physics and chemistry rarely teach dedicated courses on ethics, but the discussion is woven into every aspect of daily life, from the first days of one's education. As a graduate student, one of the two professors I was closest to would share stories of the House Un-American Activities Committee and the anti-war movement; the other would talk obliquely about his classified work on nuclear weapons. Engineering, like medicine, developed codes of ethics and systems of licensure. Human biology, like psychology, developed strong institutional

review boards and processes.

None of these processes, of course, prevent all ethical lapses, and they neither require nor create agreement about which choices are right. Many physicists, for example, began avoiding working on problems with military applications in the years after the McCarthy hearings and the Vietnam War. But many others do such research, and the issue is frequently and hotly debated.

Computer science is a field of engineering. Its purpose is to build systems to be used by others. But even though it has had its share of events which could have prompted a deeper reckoning — from the Therac-25 accidents, in which misprogrammed radiation therapy machines killed three people, up to IBM's role in the Holocaust — and even though the things it builds are becoming as central to our lives as roads and bridges, computer science has not yet come to terms with the responsibility that comes with building things which so profoundly affect people's lives.

Software engineers continue to treat safety and ethics as specialities, rather than the foundations of all design; young engineers believe they just need to learn to code, change the world, disrupt something. Business leaders focus on getting a product out fast, confident that they will not be held to account if that product fails catastrophically. Simultaneously imagining their products as changing the world and

not being important enough to require safety precautions, they behave like kids in a shop full of loaded AK-47's.

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WHAT WOULD A higher standard of care look like? First of all, safety would be treated as a principal concern at all stages, even when "just trying to get something out the door," and engineers' education would equip them to do so. If safety came first, the Facebook Graph API used by Cambridge Analytica, which raised widespread alarm among engineers from the moment it first launched in 2010, would likely never have seen the light of day.

Tech companies focus intensely on preventing crashes. A rigorous effort to anticipate what could go wrong is already standard practice for specialists in system reliability, which deals with "what-ifs" around computer failures. A higher standard for safety would simply do the same for "what-ifs" around human consequences. This would not imply that all systems should be built to the same safety standards; nobody expects a tent to be built like a skyscraper. But the civil engineer's approach would require a substantial shift of priorities.

Such a shift would sometimes be resisted for business reasons, but working codes of ethics give engineers (and others) more power to say "no." If breaking ethics rules would mean the end of someone's career, an employer couldn't easily replace someone who refuses to cheat. If the systems for enforcement are well-built, a competitor couldn't easily work around those standards. Uniform codes of ethics give engineers more of a voice in protecting the public.

Underpinning all of these need to be systems for deciding on what computer science ethics should be, and how they should be enforced. These will need to be built by a consensus among the stakeholders in the field, from industry, to academia, to capital, and most importantly, among the engineers and the public, who are ultimately most affected. It must be done with particular attention to diversity of representation. In computer science, more than any other field, system failures tend to affect people in

different social contexts (race, gender, class, geography, disability) differently. Familiarity with the details of real life in these different contexts is required to prevent disaster.

There are many methods by which different fields enforce their ethics, from the institutional review boards that screen life-sciences experiments on humans and animals, to the mid-career certification of professional engineers who then oversee projects used by the unsuspecting public, to the across-the-board licensure of doctors and lawyers. Each of these approaches has advantages, and computer science would need to combine ideas and innovate on them to build something suited to its specific needs. What would not be acceptable is the consequence of inaction. The public would lose trust in technology, and computer scientists would face a host of practical, commercial, and regulatory consequences.

Computers have made having friends on the other side of the world as normal as having them next door, have put the sum of human knowledge in our pockets, and have made nearly every object we encounter more reliable and less expensive. Yet their failure, whether by accident or by unthinking design, can have catastrophic consequences for individuals and society alike.

What stands between these is attention to the core questions of engineering: to what uses might a system be put? How might it fail? And how will it behave when it does? Computer science must step up to the bar set by its sister fields, before its own bridge collapse — or worse, its own Hiroshima.

Yonatan Zunger, now at the startup Humu, is a former distinguished engineer in security and privacy at Google. Follow him on Twitter @yonatanzunger.

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Cici from nh 03/23/18 12:39 PM

Hello Dr. Zunger, I am unable to recall the last time that I read an article such as yours. I appreciate the manner of the way that you address the

topic of ethical issues, and integrity of the individuals who are in the profession(s) where the character of the individuals are imperative to the creation of their collaborative effort in service to the global community.

Thank you for your perspectives about which, you articulate so well, and hopefully educate the readers too.

I found your column to be of great interest especially regarding some of the professions that technology scientists have come from, initially. Knowledge about the history of the current era, is extremely helpful to me, as it has significance that I have not thought about before (I am rather embarrassed by this admission), but I wanted to make a point about the significance of knowing the history surrounding any phenomenon of such magnitude as this topic.

I wish that I time to ask a couple more questions before I have to leave; maybe the thread will still be here when I return?

Thank you for your interesting experiences and your own personal regard for your professional endeavors for yourself and your colleagues.

Todayisagift 03/25/18 07:26 AM

I agree with “cici from nh”’s eloquent thoughts and hope that you will continue to write about this.

DEddy3 03/24/18 07:17 AM

Some thoughts:

1/ - for the past 60+ years information technology has been able to randomly put a stick in the ground & find unlimited & increasing amounts of oil, water & gold. Those virgin lands days are long over.

2/ - AFAIK The Business School does NOT teach systems as a required first year course. Programming as an elective is nice but does not count. When someone is on the Masters of the Universe track & they are not exposed to systems, clearly systems are not relevant... and so systems are often quite poorly managed.

There's an old Army saying... "If the Army thought you needed a wife, they'd issue you one." If The Business School thought systems were important, they'd teach it to you. Since they don't systems are clearly NOT important. WRONG conclusion.

Consider this... systems & data are NOT on the corporate balance sheet. Spending on systems is flushed through the income statement along with paper clips, toilet paper & your salary. A number to be cut when times are tough or senior management needs to pay for their bonuses.

In one of his books, Peter Drucker said: "To treat accounting/finance & systems as two separate, unrelated disciplines is dumb."

ButterBean007 03/25/18 07:14 AM

There's been a LOT of work in this area going on for quite some time. Many people and organizations are approaching this from different angles.

Just recently, a bill has been proposed to understand the impact of big data, AI and machine learning on security and privacy, the Algorithmic

Justice League has made the news by hightlighting bias in big data, and EPIC has been fighting the good fight to protect data privacy since the 90's. Many people are seeing the need for better standards, codes of conduct and oversight in this area and are putting in the work.

1. Congresswoman Elise Stefanik (R-NY-21), Member of the House Armed Services Committee and Chair of the Subcommittee on Emerging Threats and Capabilities, introduced the National Security Commission on Artificial Intelligence Act of 2018.
2. The Algorithmic Justice League, founded by a dynamic coder/scholar/activist whose mission includes promoting Accountability During the Design, Development, and Deployment of Coded Systems . She also has a excellent TED talk.
3. EPIC was established in 1994 to focus public attention on emerging privacy and civil liberties issues and to protect privacy, freedom of expression, and democratic values in the information age. Epic.org

In tech as in any company, the emphasis is on profitability, not the impact of their business practices on society. The real scandal is bad data being used to create ineffective algorithms that are increasingly being used to make decision in the public sector like health benefit eligibility and sentencing guidelines.

https://www.theverge.com/platform/amp/2018/3/21/17144260/healthcare-medicaid-algorithm-arkansas-cerebral-palsy?__twitter_impression=true

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Cammi0 03/25/18 07:33 AM

Very interesting article. Very well written and thought out.
Headline says "Computer science faces an ethics crisis" If what the

programmers and corporations are doing makes money and profit then there is no crisis. Even if a product does fail spectacularly, no one holds the corps liable anymore all they ask if you made a profit on said item and if you did the customer should of known said item would fail anyways since everything today is made to fail quickly so you'll have to buy it again.

There's an old Navy saying "Never question the answers of a bunch of stupid people" Basically you're not paid to think just do as your told and if it's stupid again you're not paid to think of it being stupid.

The whole second part of this article is what should be the standard already but isn't and hasn't been for a long time and probably won't be as long as profit and shareholder pleas come first and the rest comes after in varying degrees of importance.

twoj 03/25/18 03:28 PM

Ethics for Hackers. Will it ever come to pass?

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galwaycity 03/25/18 05:30 PM

A national survey last year listed Zuckerberg as one of the top 10 possibilities for the 2020 Democratic nomination. Some people will opt for any billionaire businessman. I hope Trump has lanced that boil.

ST505 03/25/18 06:01 PM

I, too, thought this was a terrific article. In 1967, as a high school sophomore, I watched over his shoulder as my classmate Freddie hacked

the first version of "time-sharing" at Dartmouth College from out-of-state, using a teletype machine (before VDT's existed). We were summoned to Hanover in our math teacher's car to explain how Freddie did this remotely (which he did explain, much to Dr. Kemeny's surprise). Security was almost immediately "improved," albeit very imperfect, by today's "standards." Hopefully, 50 years later, we'll finally get somewhere in dealing with such issues, at least as well as happens in other sciences!