



Intro to Ethics & Equity

Equity & Ethics in Software Engineering

CS/SWE 795

<http://go.gmu.edu/swe795>

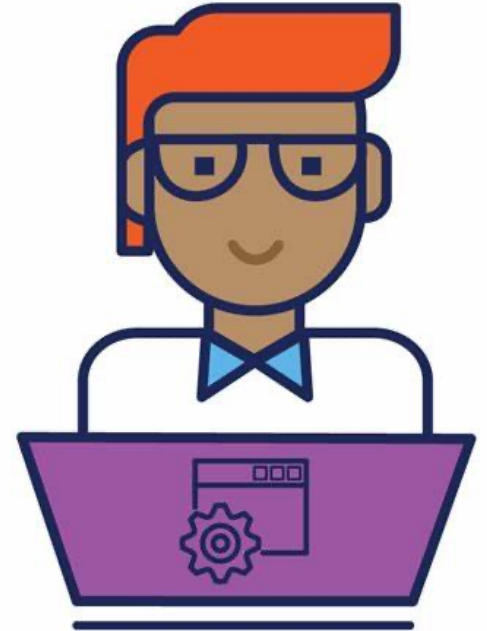
Dr. Brittany Johnson-Matthews
(Dr. B for short)

Software engineers have power.

Software is everywhere.

As builders of technology, we have power to influence a lot

- Healthcare
- Criminal justice
- Resource allocation
- The list literally goes on!



The decisions we make influences the software that gets shipped to the world.

With great power...

...comes great responsibility!



Aside from developing powerful software, we must consider:

- Impact on the environment it's being used in (e.g., system integration)
- Impact on the individuals using it (e.g., safety and security)

It's important that software engineers make “good” decisions.

"Good" decision making

"Good" decision making is:

- subjective, and
- guided by *ethics*, or principles/morals/values that guide us toward the best action

So, for us to make "good" decisions in software engineering, we need to think more explicitly about how we support *ethical decision-making*.



What is ethical decision-making?

Three common philosophical theories

- *Deontology*: apply strict set of universal moral laws or rules (e.g., do not harm or do not steal)
- *Consequentialism*: consequences of actions over rules or laws
- *Virtue Ethics*: stems from who we are as people (e.g., having good character)

There is no single definition of ethical decision-making...but we know the effects of its presence (or lack thereof).

The power in decisions

Common example is bias in healthcare tech

A recent study found:

- sick Black patients given similar risk scores to healthier White patients
- root cause was algorithm using health *cost* as proxy for risk

The decision to use cost led to *accurate predictions* but *inequitable outcomes*.

What if the algorithm developers had explicitly thought about the potential for bias?

Obermeyer, Z., Powers, B., Vogeli, C., & Mullainathan, S. (2019). Dissecting racial bias in an algorithm used to manage the health of populations. *Science*, 366(6464), 447-453.

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Millions of black people affected by racial bias in health-care algorithms

Study reveals rampant racism in decision-making software used by US hospitals – and highlights ways to correct it.

[Heidi Ledford](#)



Black people with complex medical needs were less likely than equally ill white people to be referred to programmes that provide more personalized care. Credit:

<https://www.nature.com/articles/d41586-019-03228-6>

The power in decisions

Given the findings, explored other options:

- Other costs (e.g., future avoidable costs)
- Number active chronic conditions

Conducted series of experiences to evaluate outcomea

Worked with company to improve the algorithm

The ethical decision to evaluate a variety of options led to a more equitable algorithm.

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Professors Turn to ChatGPT to Teach Students a Lesson

The powerful paper-writing chatbot presents an educational challenge: Ban it or build on it?

BY CAM POLLACK/THE WALL STREET JOURNAL; ISTOCK (1); CHATGPT (1)

By [Douglas Belkin](#) [Follow](#)

Jan. 25, 2023 10:00 am ET

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Last month a professor at Weber State University in Utah asked a new artificial-intelligence chatbot to write a tweet in his voice.

Within a few minutes the application, called ChatGPT, had spit out a dozen messages that captured Alex Lawrence's tone and personality. His first reaction: "Holy Cow!" His second: "This is the greatest cheating tool ever invented."

His response reflects a dilemma that the powerful AI tool creates for educators: Should they ban ChatGPT or build on it?

Whichever path they take, some teachers say they are scrambling to update curriculum, launch new learning guidelines and deploy tactics that stymie cheating and make sure

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CNN BUSINESS Markets Tech Media Success Perspectives Videos

How Microsoft could use ChatGPT to supercharge its products

Analysis by Samantha Murphy Kelly, CNN Business
Published 1:25 PM EST, Wed January 25, 2023

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ChatGPT can find and fix bugs in computer code

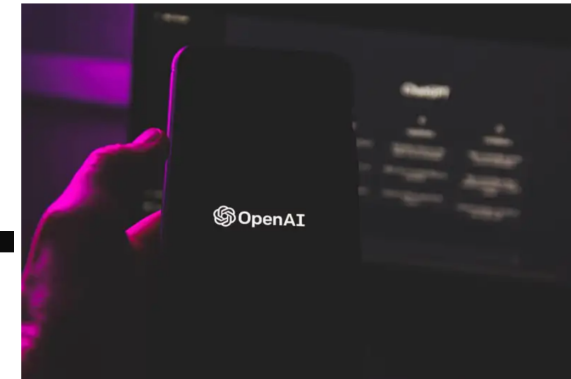
The AI chatbot ChatGPT is as good as standard machine learning approaches at fixing bugs in code, and does even better if you engage in dialogue with it

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TECHNOLOGY 25 January 2023

By [Chris Stokel-Walker](#)



ChatGPT is a chatbot developed by OpenAI
Rokas Tenys/Alamy Stock Photo

ChatGPT, the AI chatbot developed by tech company OpenAI, can find and fix bugs in computer code as well as standard machine learning approaches – and does even better when engaged in conversation.

[Dominik Sobania](#) at Johannes Gutenberg University in Mainz, Germany, and his colleagues sought to see how well ChatGPT compared with other AI-powered coding support tools. A number of tools exist

The Washington Post
Democracy Dies in Darkness

ChatGPT is now writing legislation. Is this the future?



OpenAI's ChatGPT tool has surged in popularity in recent months. (Gabby Jones/Bloomberg News)

It's not unheard of for legislators in the United States to turn to interest groups to help draft large chunks of legislation, even when they may be the target of proposed regulations.

But in what may be a first, a Massachusetts state senator has used a **surging new tool** to help write a bill aimed at restricting it: ChatGPT, the artificial intelligence chatbot.

On Friday, state Sen. **Barry Finegold** (D) introduced [legislation](#) to set

But all that glitters ain't gold

ChatGPT Is Dumber Than You Think

Treat it like a toy, not a tool.

By Ian Bogost



Tyler Comrie / The Atlantic; Getty

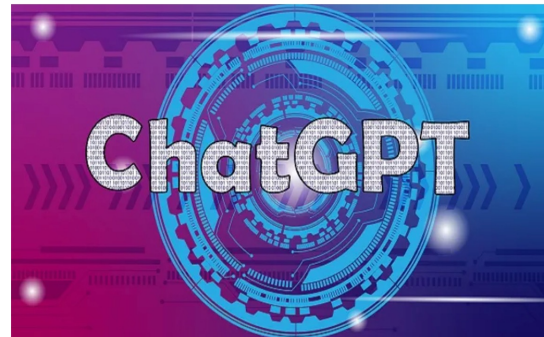
ChatGPT: An Author Without Ethics

If you're offended by AI-generated content, who should you blame? That's just one of many questions surrounding ChatGPT.



John Edwards
Technology Journalist & Author

January 12, 2023



Credit: Kashif Khan via Alamy Stock

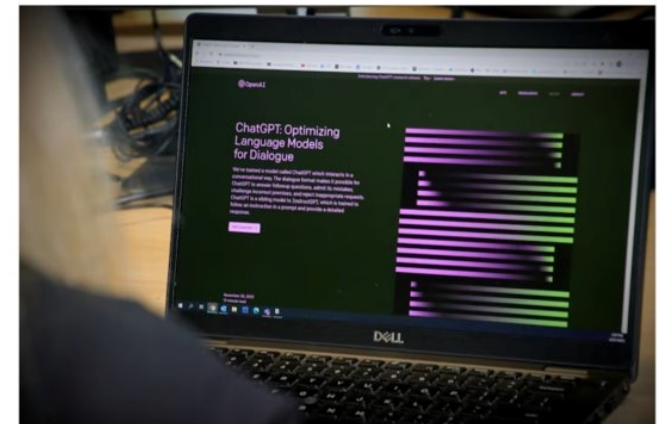


Controversial authors such as Orwell, Nabokov, Swift, and Rushdie, among many others, have shouldered substantial criticism over the years. Opposing prevailing opinion certainly isn't a game for weaklings. But who should take the blame when a computer ticks people off?

ChatGPT sparks cheating, ethical concerns as students try realistic essay writing technology

By Ashleigh Davis

Posted 3h ago, updated 34m ago



ChatGPT has the ability to write bespoke essays and exam responses. (ABC News: Gian De Polani)

Topics in this course

The History of Ethics in Computing

Ethics & Artificial Intelligence

Supporting Ethics in Practice: Tools & Frameworks

Diversity on Software Teams

Engaging Marginalized Communities

- Research methods and design approaches
- Persons with Disabilities
- Children and Aging Populations
- LGBTQ* (Lesbian, Gay, Bisexual, Transgender, Queer, and everything in between)
- Intersectionality & Positionality

The History of Ethics in Computing

Ethics has a long (and sorted) history in computing.

Major push in the 90's for code of ethics for software engineers.

Since then, we have seen the concept of ethical computing evolve.

We will learn about and discuss:

- The ACM's Code of Ethics
- Ethics in research and practice
- Ethics-aware software engineering

Ethics & Artificial Intelligence

More recently, ethics conversations have centered on AI technologies.

This includes concerns, such as fairness and safety.

We will discuss general contributions and contributions to:

- Healthcare
- Criminal justice
- Hiring

Supporting Ethics in Practice

If we're gonna talk about it, we gotta be about.

Numerous efforts have been made to support ethical decision-making in practice.

Support can come in the form of:

- tooling
- guidelines
- process support

We will learn about some of these existing efforts.

Diversity on Software Teams

To heighten the chance for ethics to support equity, research suggest diversity is key.

Diversity can come in many forms (e.g., personality, gender, culture)

Diverse software teams are:

- More productive
- More creative
- Less likely to miss considerations like bias

We will examine research that emphasizes the value of diversity on software teams.

Engaging Marginalized Communities

Research suggests that a necessary requirement for equity is engagement.

There are research and design methods that aim to support engaging with marginalized communities.

- Assets-based design
- Community-based participatory research

We will explore these methods and their application for:

- Race
- Persons with disabilities
- Children and aging populations
- LGBTQ*

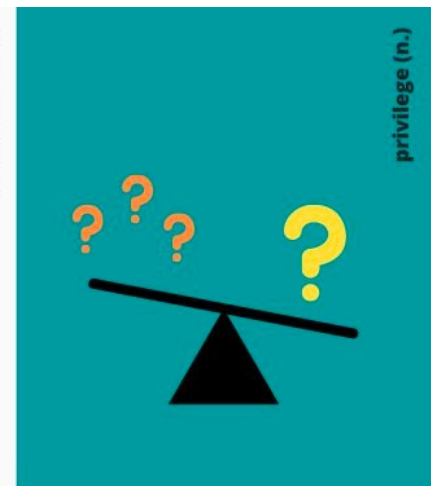
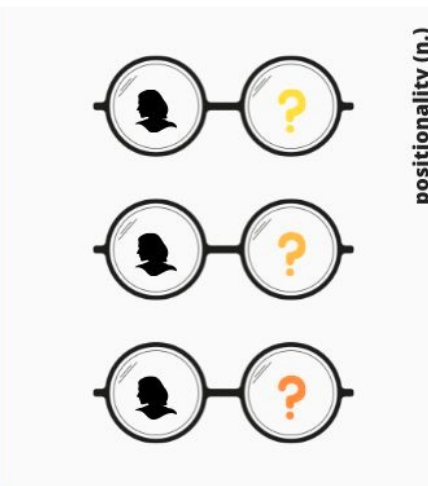
Stepping outside of CS

Most of what we cover will pertain to computing research and practice.

However, part of problem (and solution) lies in social science theory.

This course will introduce two concepts from the social sciences:

- *Intersectionality*
- *Positionality*



Intersectionality & Positionality

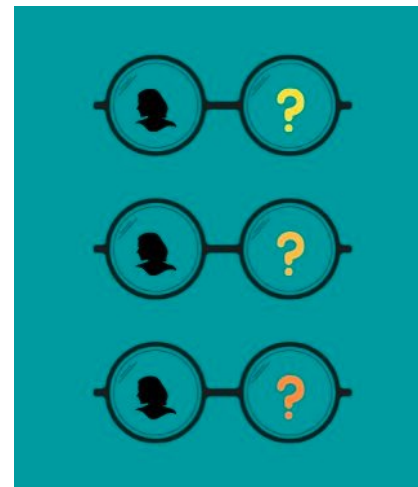
intersectionality (n.)

"The complex, cumulative way in which the effects of multiple forms of discrimination combine, overlap, or intersect especially in the experiences of marginalized individuals or groups" (Merriam Webster, 2021)



positionality (n.)

"The occupation or adoption of a particular position in relation to others, usually with reference to issues of culture, ethnicity, or gender." (Oxford, 2021)



Bringing it all together

Lack of ethical decision-making leads to undesirable software outcomes.

By centering on ethics,
we provide a foundation for working towards equitable software systems.

