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 influence 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 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?

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 outcomes

Worked with company to improve the algorithm

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

More recently...

ChatGPT can find and fix bugs in computer code

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

This article has been viewed 361 times in the last 24 hours.

ChatGPT is now writing legislation. Is this the future?

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 new writing tool to help write a bill aimed at restricting its use: ChatGPT, the artificial intelligence chatbot.
But all that glitters ain’t gold
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
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.