

Ethics

Michael Coblenz

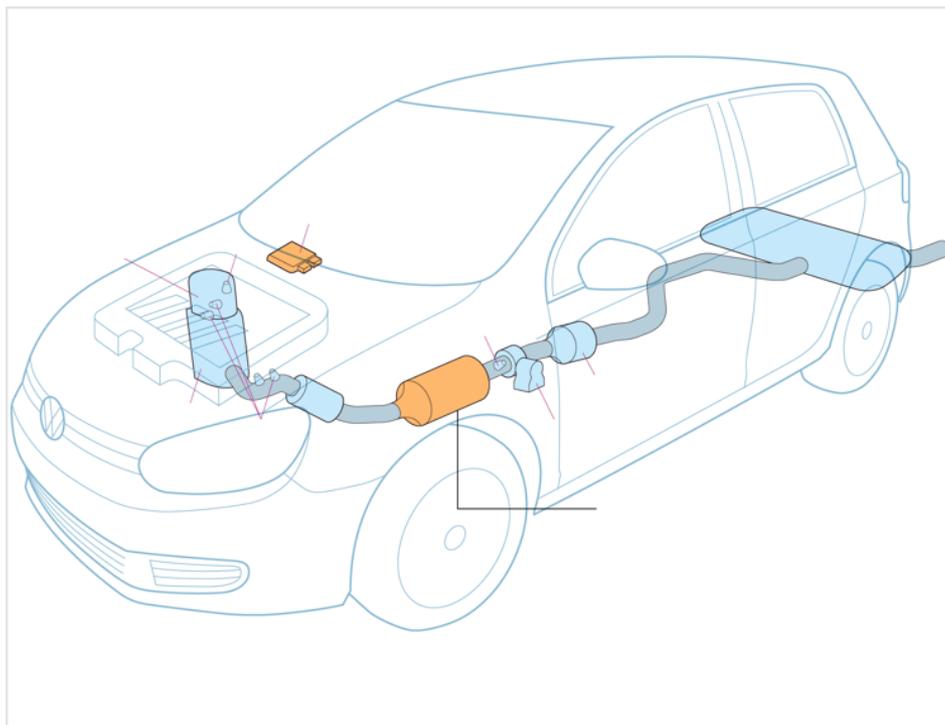
(slide credit: Michael Hilton at Carnegie Mellon)

What is Human Flourishing?

According to Harvard's Human Flourishing Program:
Human flourishing is composed of five central domains:
happiness and life satisfaction, mental and physical health, meaning and purpose, character and virtue, and close social relationships.

Volkswagen Scandal

- VW was caught cheating on emissions for diesel engines.
- \$4.3 billion of penalties; multiple indictments



<https://www.nytimes.com/interactive/2015/business/international/vw-diesel-emissions-scandal-explained.html?mtrref=www.google.com&assetType=REGIWALL>

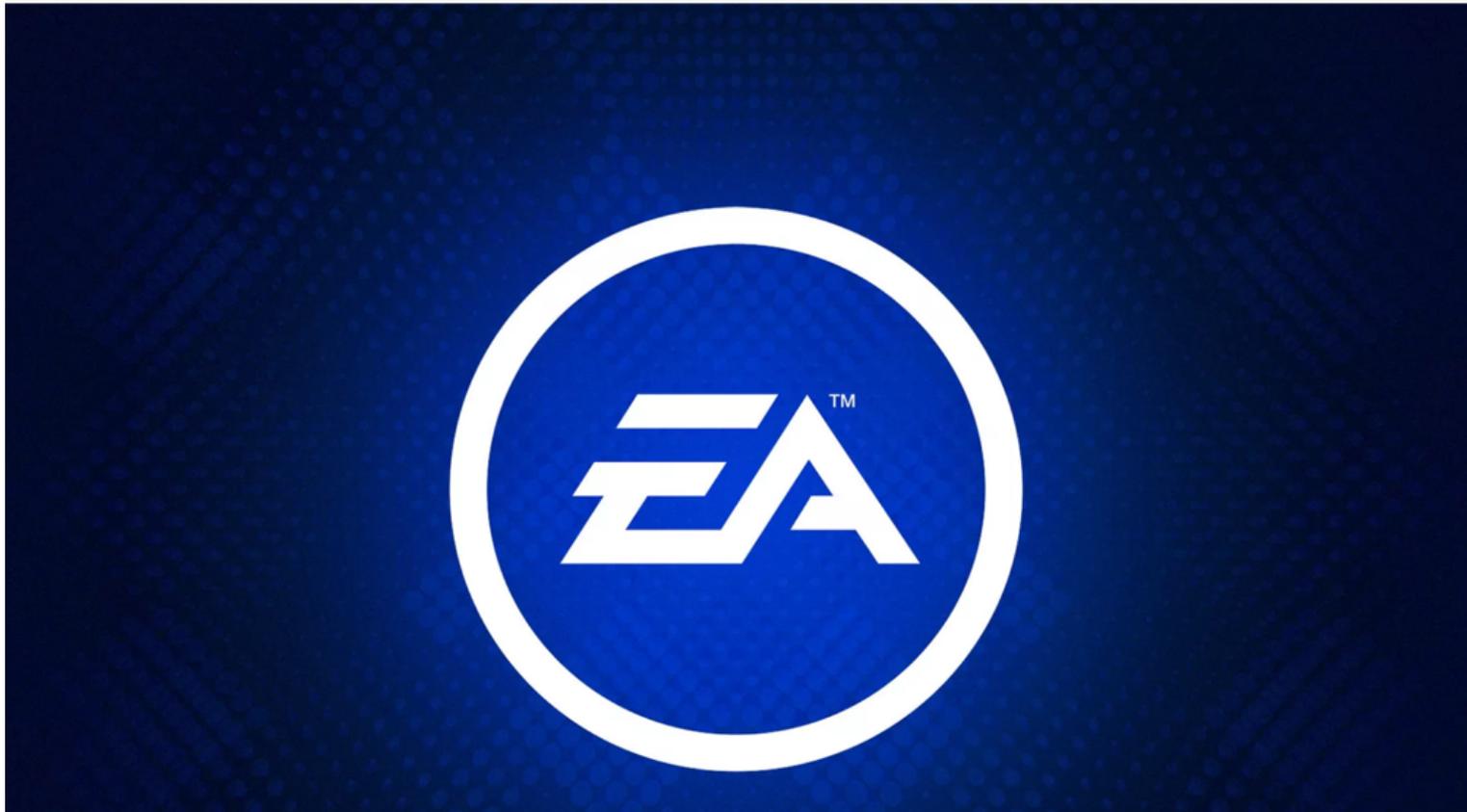
Activity:
(Un)Ethical situations

EA calls its loot boxes 'surprise mechanics,' says they're used ethically

'People like surprises,' executive tells UK Parliament

By [Ana Diaz](#) | [@AnaLikesPikachu](#) | Jun 21, 2019, 9:10am EDT

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Domino's Would Rather Go to the Supreme Court Than Make Its Website Accessible to the Blind

Rather than developing technology to support users with disabilities, the pizza chain is taking its fight to the top

by [Brenna Houck](#) | [@EaterDetroit](#) | Jul 25, 2019, 6:00pm EDT

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Some airlines may be using algorithms to split up families during flights

Your random airplane seat assignment might not be random at all.

By Aditi Shrikant | aditi@vox.com | Nov 27, 2018, 6:10pm EST

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Passengers boarding a Boeing aircraft of the low cost airline carrier Ryanair in Thessaloniki Macedonia Airport, Greece. | Nicolas Economou/NurPhoto/Getty Images



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- Enterprise
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Lime halts scooter service in Switzerland after possible software glitch throws users off mid-ride



Ingrid Lunden @ingridlunden / 9:51 am EST • January 12, 2019

Comment



Uber self-driving car involved in fatal crash couldn't detect jaywalkers

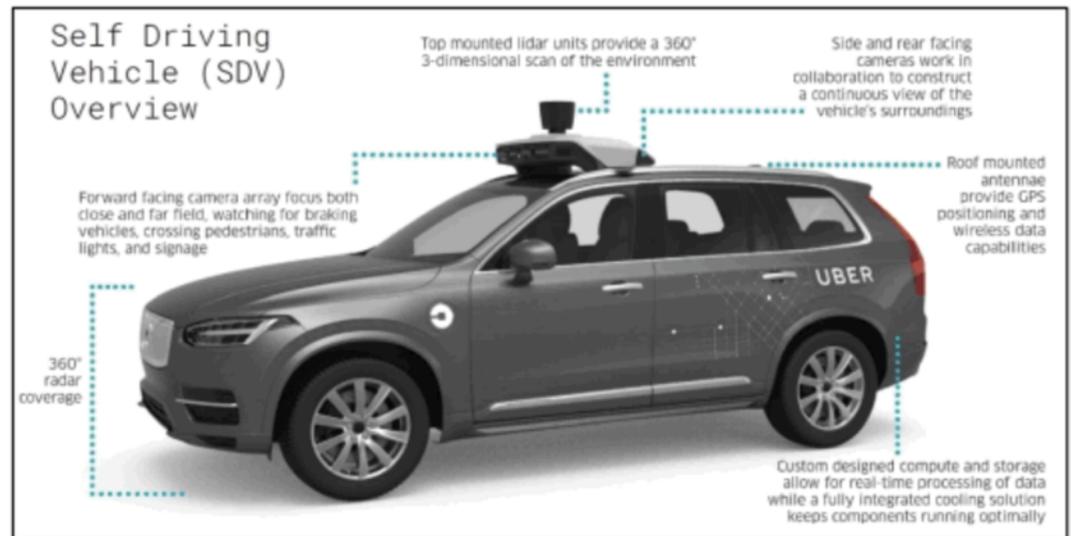
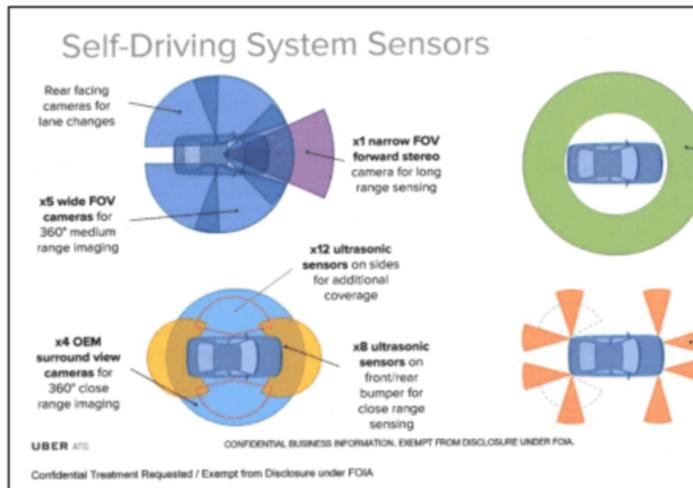
The system had several serious software flaws, the NTSB said.



Steve Dent, @stevetdent
11.06.19 in [Transportation](#)

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UBER_NTSB_0002435

Currently, the AI portrait generator has been trained mostly on portraits of people of European ethnicity. We're planning to expand our dataset and fix this in the future. At the time of conceptualizing this AI, authors were not certain it would turn out to work at all. This is close to state of the art in AI at the moment.

Sorry for the bias in the meanwhile. Have fun!

Twitter cropping photos

 **Tony "Abolish (Pol)ICE" Arcieri** 
@bascule

Trying a horrible experiment...

Which will the Twitter algorithm pick: Mitch McConnell or Barack Obama?



6:05 PM · Sep 19, 2020 · Twitter Web App

64.7K Retweets **16.3K** Quote Tweets **198.6K** Likes



Open Source Maintainers

- Package "event-stream" had 2 million downloads on NPM
- User "right9 stream"
- Maintainer
- right9ctrl ac user's bitco



dominictarr commented 7 days ago

Owner ...



dominictarr commented 7 days ago

Owner ...



limonte commented 7 days ago • edited ▾

...



dominictarr commented 6 days ago

Owner ...



XhmikosR commented 6 days ago

...



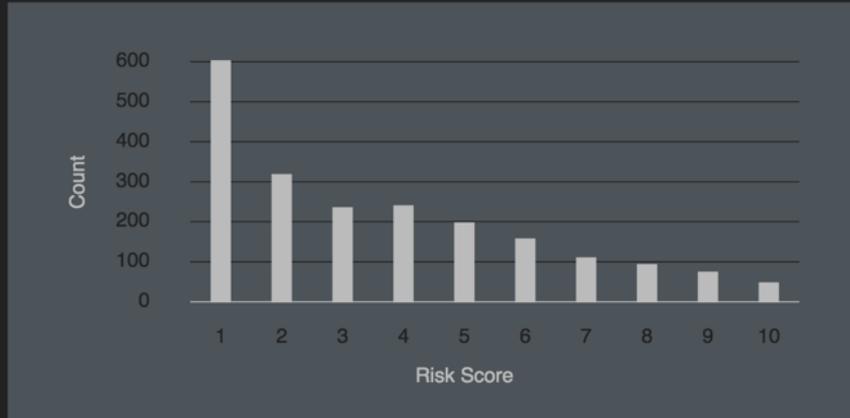
jaydenseric commented 6 days ago

...

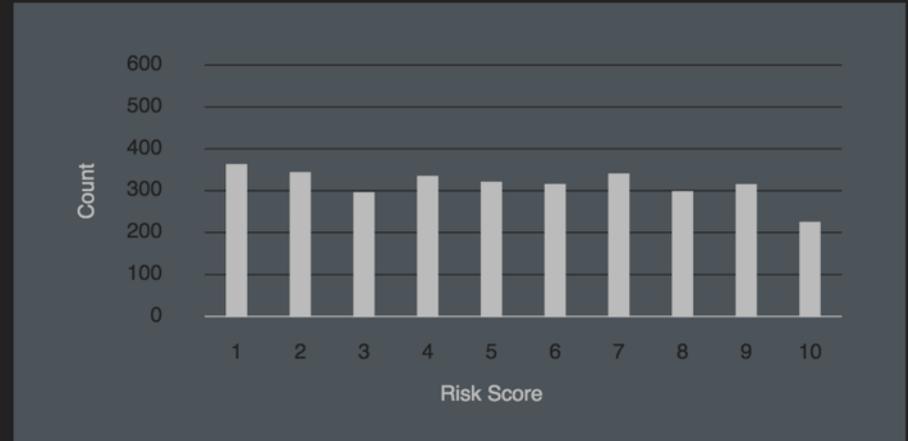
There is a huge difference between not maintaining a repo/package, vs giving it away to a hacker (which actually takes more effort than doing nothing), then denying all responsibility to fix it when it affects millions of innocent people.

👍 884 👎 162 😊 7 😞 16 ❤️ 18

White Defendants' Risk Scores



Black Defendants' Risk Scores



These charts show that scores for white defendants were skewed toward lower-risk categories. Scores for black defendants were not. (Source: ProPublica analysis of data from Broward County, Fla.)

Prediction Fails Differently for Black Defendants

	WHITE	AFRICAN AMERICAN
Labeled Higher Risk, But Didn't Re-Offend	23.5%	44.9%
Labeled Lower Risk, Yet Did Re-Offend	47.7%	28.0%

Algorithmic Bias

Algorithms affect:

Where we go to school

Access to money

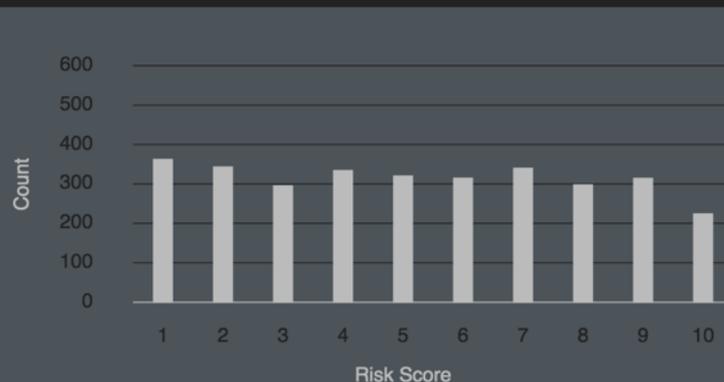
Access to health care

Receiving parole

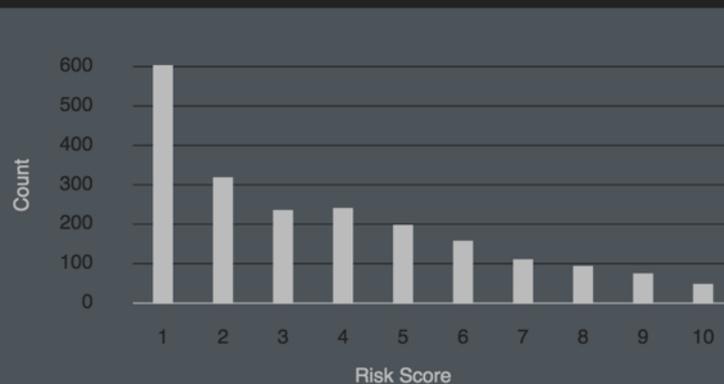
Possibility of Bail

Risk Scores

Black Defendants' Risk Scores



White Defendants' Risk Scores



These charts show that scores for white defendants were skewed toward lower-risk categories. Scores for black defendants were not. (Source: ProPublica analysis of data from Broward County, Fla.)

Therac-25

Bug (race-condition) in software lead to at least 6 deaths

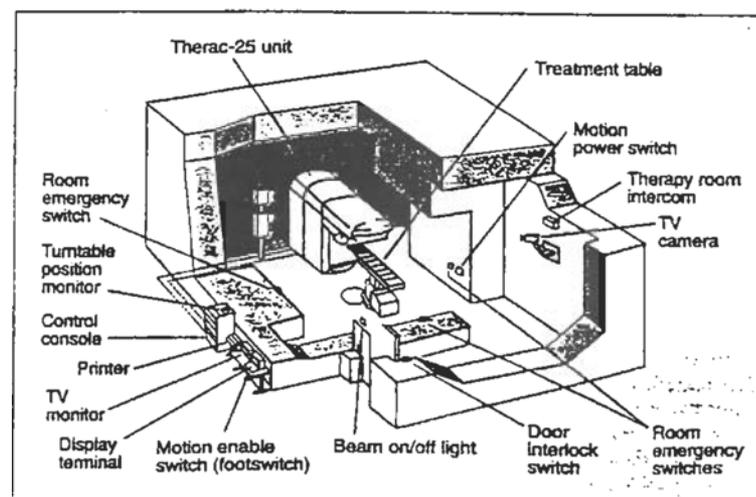
Traced to:

Lack of reporting bugs

Lack of proper due diligence

Engineers were overconfident, removed hardware locks

Race condition of 8 seconds could lead to problems



```
PATIENT NAME: John
TREATMENT MODE: FIX
BEAM TYPE: E ENERGY (KeV): 10

UNIT RATE/MINUTE ACTUAL PRESCRIBED
MONITOR UNITS 200.000000 200.000000
TIME (MIN) 0.270000 0.270000

GANTRY ROTATION (DEG) 0.000000 0.000000 VERIFIED
COLLIMATOR ROTATION (DEG) 359.200000 359.200000 VERIFIED
COLLIMATOR X (CM) 14.200000 14.200000 VERIFIED
COLLIMATOR Y (CM) 27.200000 27.200000 VERIFIED
WEDGE NUMBER 1.000000 1.000000 VERIFIED
ACCESSORY NUMBER 0.000000 0.000000 VERIFIED

DATE: 2012-04-16 SYSTEM: BEAM READY OP. MODE: TREAT AUTO
TIME: 11:48:58 TREAT: TREAT PAUSE REASON: OPERATOR 3-DAY 173777
OPR ID: 033-1f3sp CORCOND: █
```

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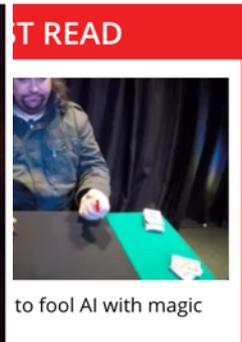
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We Need To Work Harder To Make Software Engineering More Ethical

n
it ethics



Jessica Baron Contributor
Consumer Tech
I write about the ethics of science and technology.



patch the software, but you can't patch a person if you, you know, damage someone's reputation." Sam Hodgson for The New York Times

Code of Ethics



As an ACM member I will

Contribute to society and human well-being.

Avoid harm to others.

Be honest and trustworthy.

Be fair and take action not to discriminate.

Honor property rights including copyrights and patent.

Give proper credit for intellectual property.

Respect the privacy of others.

Honor confidentiality.

Code of Ethics

Does ACM's Code of Ethics Change Ethical Decision Making in Software Development?

Andrew McNamara
North Carolina State University
Raleigh, North Carolina, USA
ajmcnama@ncsu.edu

Justin Smith
North Carolina State University
Raleigh, North Carolina, USA
jssmit11@ncsu.edu

Emerson Murphy-Hill
North Carolina State University
Raleigh, North Carolina, USA
emerson@csc.ncsu.edu

ABSTRACT

Ethical decisions in software development can substantially impact end-users, organizations, and our environment, as is evidenced by recent ethics scandals in the news. Organizations, like the ACM, publish codes of ethics to guide software-related ethical decisions. In fact, the ACM has recently demonstrated renewed interest in its code of ethics and made updates for the first time since 1992. To better understand how the ACM code of ethics changes software-

The first example is the Uber versus Waymo dispute [26], in which a software engineer at Waymo took self-driving car code to his home. Shortly thereafter, the engineer left Waymo to work for a competing company with a self-driving car business, Uber. When Waymo realized that their own code had been taken by their former employee, Waymo sued Uber. Even though the code was not apparently used for Uber's competitive advantage, the two companies settled the lawsuit for \$245 million dollars.

"We found that explicitly instructing participants to consider the ACM code of ethics in their decision making had no observed effect when compared with a control group."

Challenge:

How do we apply ethics to a field (Software Engineering) that changes so often?

Remember the Dominos case? The ADA law was written before the first website (1990)

To handle this uncertainty about the future, let's focus on three questions we can ask to remind ourselves to focus on promoting human flourishing.

Three questions to promote human flourishing

1. Does my software respect the **humanity** of the **users**?
2. Does my software **amplify positive** behavior, or **negative** behavior for users and society at large?
3. Will my software's **quality** impact the **humanity** of others?

1. Does my software
respect the **humanity**
of the **users**?

Humane Design Guide

<http://humanetech.com>

Humane Design Guide (Alpha Version)

Use this worksheet to identify opportunities for Humane Technology.

Product or feature:

Value proposition:

Measure of success:

What are Human Sensitivities?

Human Sensitivities are instincts that are often vulnerable to new technologies.

Human Sensitivity	We are inhibited when	What inhibits	We are supported when	Opportunity to improve
Emotional What we feel in our body and in our physical health.	We are stressed, low on sleep, afraid or emotionally exhausted.	<ul style="list-style-type: none"> Artificial scarcity Urgency signalling Constant monitoring Optimizing for screentime 	Design engenders calm, balance, safety, pauses and supports circadian rhythms.	
Attention How and where we focus our attention.	Attention is physiologically drawn, overwhelmed or fragmented.	<ul style="list-style-type: none"> Constant context switching Many undifferentiated choices Fearful information No stopping cues (e.g. infinite scroll) Unnecessary movement 	Enabled to bring more focus and mindfulness.	
Sensemaking How we integrate what we sense with what we know.	Information is fear-based, out of context, confusing, or manipulative.	<ul style="list-style-type: none"> Facts out of context Over-personalized filters Equating virality with credibility Deceptive authority (ads vs. content) 	Enabled to consider, learn, express and feel grounded.	
Decisionmaking How we align our actions with our intentions.	Intentions and agency are not solicited nor supported.	<ul style="list-style-type: none"> Avatars to convey authority Stalking ads and messages Push content models Serving preference over intent 	Enabled to gain agency, purpose, and mobilization of intent.	
Social Reasoning How we understand and navigate our personal relationships.	Status, relationships or self-image are manipulated.	<ul style="list-style-type: none"> Quantified social status Viral sharing Implied obligation Enabling impersonation 	Enabled to connect more safely and authentically with others.	
Group Dynamics How we navigate larger groups, status, and shared understanding.	Excluded, divided or mobilized through fear.	<ul style="list-style-type: none"> Suppressing views and nuance Enabling ad hominem or hate speech Enabling viral outrage Lack of agreed-upon norms 	Enabled to develop a sense of belonging and cooperation.	

Humane Design Guide

<http://humanetech.com>

Provides a template for considering a piece of software, and asking questions to help us arrive at a “humane design”

Consider 6 human sensitivities: Emotional, Attention, Sense making, Decision making, Social Reasoning, and Group Dynamics

Human Sensitivity	We are inhibited when	What inhibits	We are supported when	Opportunity to improve
Attention How and where we focus our attention.	Attention is physiologically drawn, overwhelmed or fragmented.	<ul style="list-style-type: none">• Constant context switching• Many undifferentiated choices• Fearful information• No stopping cues (e.g. infinite scroll)• Unnecessary movement	Enabled to bring more focus and mindfulness.	

Identify Opportunities to improve

After analysis step, develop plan of action:

1. In what ways does your product/feature currently engage Human Sensitivities?
2. How might your product/feature support or elevate human sensitivities?
3. Action Statement

Abby Jones¹



You can edit anything in blue print

- 28 years old
- Employed as an Accountant
- Lives in Cardiff, Wales

Abby has always liked music. When she is on her way to work in the morning, she listens to music that spans a wide variety of styles. But when she arrives at work, she turns it off, and begins her day by scanning all her emails first to get an overall picture before answering any of them. (This extra pass takes time but seems worth it.) Some nights she exercises or stretches, and sometimes she likes to play computer puzzle games like Sudoku

Background and skills

Abby works as an accountant. She is comfortable with the technologies she uses regularly, but she just moved to this employer 1 week ago, and [their software systems are new to her](#).

Abby says she's a "numbers person," but she has never taken any computer programming or IT systems classes. She [likes Math](#) and knows how to think with numbers. She writes and edits spreadsheet formulas in her work.

In her free time, she also [enjoys working with numbers and logic](#). She especially likes working out puzzles and puzzle games, either on paper or on the computer

Motivations and Attitudes

- **Motivations:** Abby uses technologies [to accomplish her tasks](#). She learns new technologies if and when she needs to, but prefers to use methods she is [already familiar and comfortable with, to keep her focus](#) on the tasks she cares about.
- **Computer Self-Efficacy:** Abby has [low confidence about doing unfamiliar computing tasks](#). If problems arise with her technology, she often [blames herself for these problems](#). This affects whether and how she will persevere with a task if technology problems have arisen.
- **Attitude toward Risk:** Abby's life is a little complicated and she [rarely has spare time](#). So she is [risk averse about using unfamiliar technologies that might need her to spend extra time](#) on them, even if the new features might be relevant. She instead performs tasks using familiar features, because they're more predictable about what she will get from them and how much time they will take.

How Abby Works with Information and Learns:

- **Information Processing Style:** Abby tends towards a *comprehensive information processing style* when she needs to more information. So, instead of acting upon the first option that seems promising, she [gathers information comprehensively to try to form a complete understanding of the problem before trying to solve it](#). Thus, her style is "burst-y"; first she reads a lot, then she acts on it in a batch of activity.
- **Learning: by Process vs. by Tinkering:** When learning new technology, Abby leans toward [process-oriented learning](#), e.g., tutorials, step-by-step processes, wizards, online how-to videos, etc. She [doesn't particularly like learning by tinkering with software](#) (i.e., just trying out new features or commands to see what they do), but when she does tinker, it has positive effects on her understanding of the software.

¹Abby represents users with motivations/attitudes and information/learning styles similar to hers. For data on females and males similar to and different from Abby, see <http://eusesconsortium.org/gender/gender.php>

GenderMag

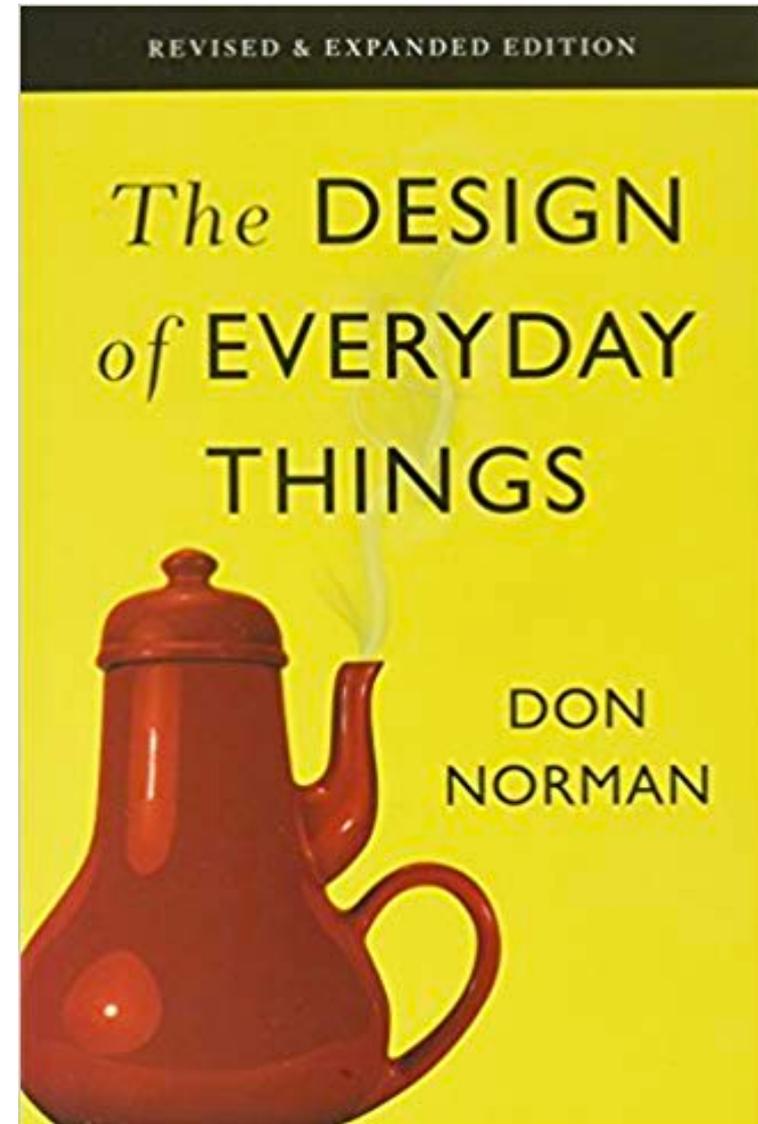
<https://gendermag.org>

<ul style="list-style-type: none"> 1. Pick a persona. eg: Abby  2. Pick a use case/scenario in your tool, eg: <ul style="list-style-type: none"> – in Book Store Navigator app... – “Find science fiction books” 	<ul style="list-style-type: none"> 3a-b. Pick a Subgoal for that scenario. eg:  <p>Subgoal #1: “See bookstore map”.</p> <p>Q: Will Abby have formed this sub-goal...?</p> <ul style="list-style-type: none"> • Yes/no/<i>maybe</i>. Why? <i>Consider Abby's Motivations...</i> 
<ul style="list-style-type: none"> 3c-d. Pick an Action for that subgoal.  See map! <p>Action #1: “Tap ‘Browse Off’”:</p> <p>– Q1. Will Abby know what to do?</p> <ul style="list-style-type: none"> • Yes/no/<i>maybe</i>. Why? <i>Consider Abby's, ... Tinkering</i>  <p>→ First answer Q1. After answering it, then perform the action.</p>	<p>– 3e. Q2. If she performs the action, producing  See map!</p>  <p>will Abby see progress toward the subgoal?</p> <ul style="list-style-type: none"> • Yes/no/<i>maybe</i>. Why? <i>Consider Abby's Self-Efficacy & ...</i>

User Centered Design

User-centered design tries to optimize the product around how **users can, want, or need to use the product**, rather than forcing the users to change their behavior to **accommodate the product**.

-Wikipedia



Agile

User C

Agile c



Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over following a plan

Customer collaboration over contract negotiation

That is, while there is value in the items on the right, we value the items on the left more.

Kent Beck	James Grenning	Robert C. Martin
Mike Beedle	Jim Highsmith	Steve Mellor
Arie van Bennekum	Andrew Hunt	Ken Schwaber
Alistair Cockburn	Ron Jeffries	Jeff Sutherland
Ward Cunningham	Jon Kern	Dave Thomas
Martin Fowler	Brian Marick	

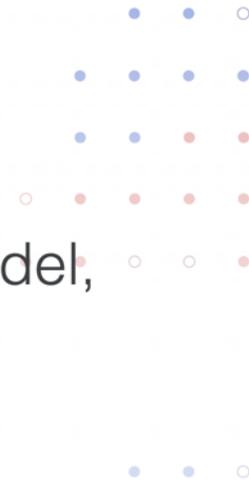
**2. Does my
software amplify
positive or
negative behavior
for users and
society at large?**

What if...

<https://pair-code.github.io/what-if-tool/>

What If...

you could inspect a machine learning model,
with minimal coding required?



What if...

<https://pair-code.github.io/what-if-tool/>

What-If Tool demo - binary classifier for predicting salary of over \$50k - UCI census income dataset

Partial dependence plots Compute distance Show nearest different classification: L1 L2 ⓘ

PERFORMANCE + FAIRNESS **DATAPOINT EDITOR** FEATURES

Binning | X-Axis Co... Binning | Y-Axis C... Color By
age 10 marital-stat 1 Inference

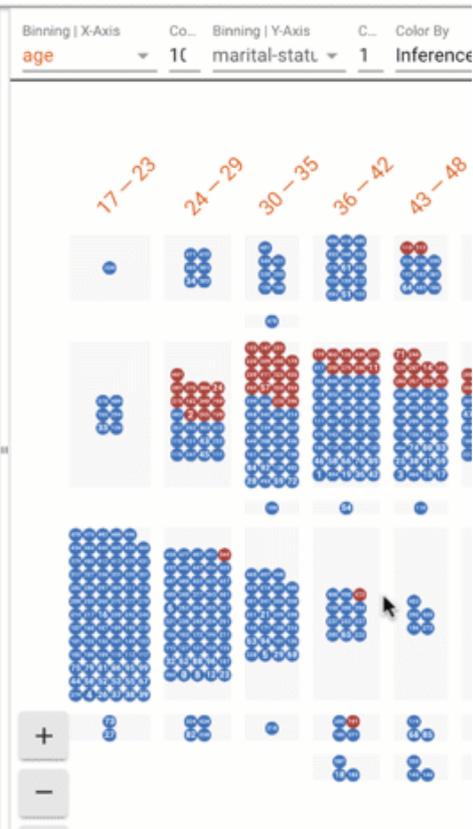
Select a datapoint to begin exploring features and values. →

Clicking on a datapoint in the visualization will load all the features and values associated with that example. Here are some of the things you can do:

- **Edit features and values** and rerun inference to see how your model performs.
- **Compute Distance:** Select an example to be an anchor and create a new L1 or L2 distance feature for all loaded examples.
- **Closest Counterfactuals:** For classification models, find the closest example with a different classification using L1 or L2 distance.
- **Partial Dependence Plots:** For a selected example, explore plots for every feature that show the change in inference results across different valid values for that feature.

Use the Performance + Fairness tab to investigate model performance across your dataset.

Use the Features tab to view statistics about your dataset.



The screenshot displays the 'What-If Tool' interface. At the top, there's a title bar for a binary classifier. Below it are control buttons for 'Partial dependence plots', 'Compute distance', and 'Show nearest different classification' with options for L1 and L2. The main interface is divided into three tabs: 'PERFORMANCE + FAIRNESS', 'DATAPOINT EDITOR' (which is active), and 'FEATURES'. The 'DATAPOINT EDITOR' tab shows a grid of data points for different age groups: 17-23, 24-29, 30-35, 36-42, and 43-48. Each age group has a corresponding plot of data points. A mouse cursor is hovering over a red data point in the 36-42 age group plot. The 'FEATURES' tab on the right shows a grid of plots for different features, with a 'Color By' dropdown set to 'Inference'. The plots show the distribution of data points for each feature, with a color scale from blue to red representing the inference result.

Local Interpretable Model-Agnostic Explanations (LIME)

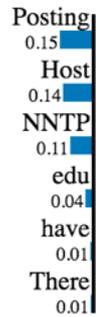
<https://github.com/marcotcr/lime>

Prediction probabilities



atheism

christian



Text with highlighted words

From: johnchad@triton.unm.edu (jchadwic)
Subject: Another request for Darwin Fish
Organization: University of New Mexico, Albuquerque
Lines: 11
NNTP-Posting-Host: triton.unm.edu

Hello Gang,

There have been some notes recently asking where to obtain the DARWIN fish. This is the same question I have and I have not seen an answer on the net. If anyone has a contact please post on the net or email me.

Explain “why” to customers

Why you're seeing this ad ✕

Only you can see this

[Simplifi Money](#) wants to reach people like you, who may have:

- Set their age between 25 and 50 >
- A primary location in the United States >

What else influences your ads

Your ads may be based on other advertiser choices, your profile and activities—like websites you visit and ads you interact with—as well as other information not listed here. [Learn more about how ads work](#)

What you can do

- Hide all ads from this advertiser** Hide
You won't see Simplifi Money's ads
- Make changes to your ad preferences** >
Adjust settings to personalize your ads

Learn about your privacy at Meta

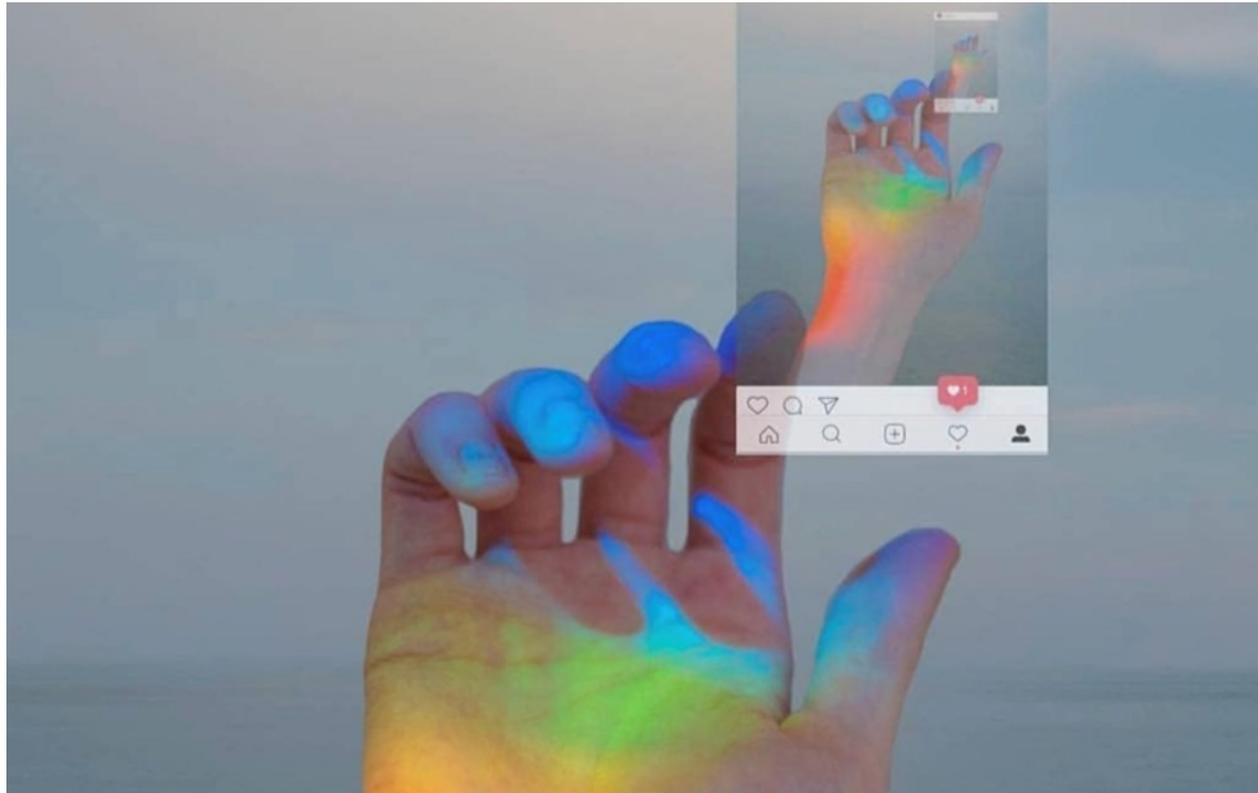
We want to help you understand how Meta uses your information to show you ads.

How businesses use our ads system

Businesses try to reach people based on their interests, characteristics, or using information about who visits the business's website...

You have options to manage the ads you see on Facebook

To give you more control of the ads you see, we have a number of tools to manage your ad experience



@dovneon

What Instagram removing likes may mean for influencers and our self-esteem

SCIENCE & TECH - FEATURE

The decision could have a positive impact on the way people use the platform, but harm those trying to use it professionally

Anil Dash on how to prevent abuse

http://anildash.com/2011/07/20/if_your_websites_full_of_assholes_its_your_fault-2/

You should have real humans dedicated to monitoring and responding to your community.

You should have community policies about what is and isn't acceptable behavior.

Your site should have accountable identities.

You should have the technology to easily identify and stop bad behaviors.

You should make a budget that supports having a good community, or you should find another line of work.

Deon <https://github.com/drivendataorg/deon>



Read more about [deon](#) on the project homepage

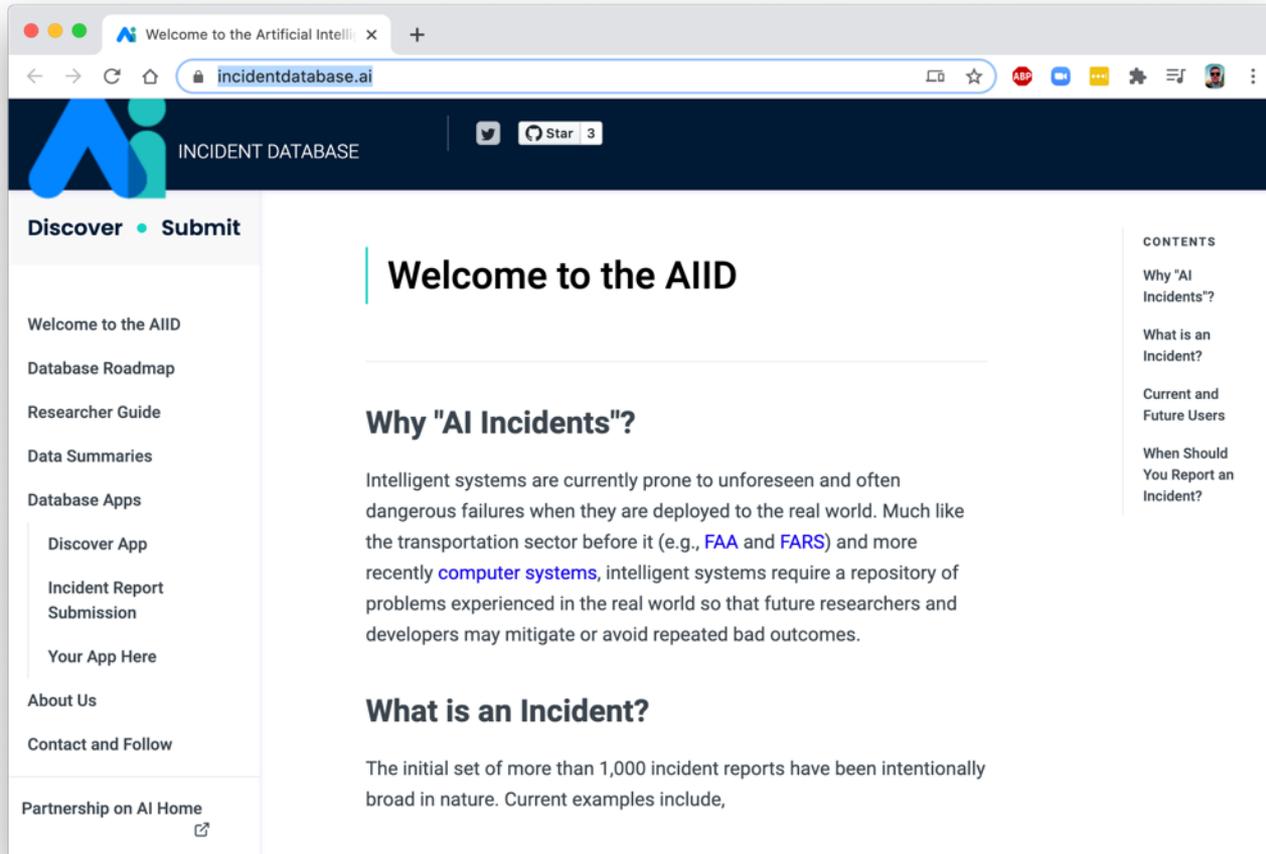
An ethics checklist for data scientists

`deon` is a command line tool that allows you to easily add an ethics checklist to your data science projects. We support creating a new, standalone checklist file or appending a checklist to an existing analysis in [many common formats](#).

δέον • (déon) [n.] (*Ancient Greek*) [wikitionary](#)

Duty; that which is binding, needful, right, proper.

AI Incident Database



**3. Will my
software's
quality impact
the humanity
of others?**

Quality has long been considered

Quality attributes [\[edit \]](#)

Notable quality attributes include:

- [accessibility](#)
- [accountability](#)
- [accuracy](#)
- [adaptability](#)
- [administrability](#)
- [affordability](#)
- [agility](#) [Toll] (see Common Subsets below)
- [auditability](#)
- [autonomy](#) [Eri]
- [availability](#)
- [compatibility](#)
- [composability](#) [Eri]
- [configurability](#)
- [correctness](#)
- [credibility](#)
- [customizability](#)
- [debugability](#)
- [degradability](#)
- [determinability](#)
- [demonstrability](#)
- [dependability](#)
- [deployability](#)
- [discoverability](#) [Eri]
- [distributability](#)
- [durability](#)
- [effectiveness](#)
- [efficiency](#)
- [evolvability](#)
- [extensibility](#)
- [failure transparency](#)
- [fault-tolerance](#)
- [fidelity](#)
- [flexibility](#)
- [inspectability](#)
- [installability](#)
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- [interoperability](#) [Eri]
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- [localizability](#)
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- [modularity](#)
- [observability](#)
- [operability](#)
- [orthogonality](#)
- [portability](#)
- [precision](#)
- [predictability](#)
- [process capabilities](#)
- [producibility](#)
- [provability](#)
- [recoverability](#)
- [relevance](#)
- [reliability](#)
- [repeatability](#)
- [reproducibility](#)
- [resilience](#)
- [responsiveness](#)
- [reusability](#) [Eri]
- [robustness](#)
- [safety](#)
- [scalability](#)
- [seamlessness](#)
- [self-sustainability](#)
- [serviceability](#) (a.k.a. supportability)
- [securability](#)
- [simplicity](#)
- [stability](#)
- [standards compliance](#)
- [survivability](#)
- [sustainability](#)
- [tailorability](#)
- [testability](#)
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- [vulnerability](#)
- [usability](#)

Engineering ethics.

Ethics applies and is formalized in many professional fields: medical, legal, business, and engineering.

The first codes of engineering ethics were formally adopted by American engineering societies in 1912-1914. In 1946 the National Society of Professional Engineers (NSPE) adopted their first formal Canons of Ethics.

“hold paramount safety, h

- Citigroup Center, Designed by Structural engineer William LeMessurier
- Followed calculations required by building codes
- Civil Engineering student Diane Hartley realized there was a problem
- Tests showed that winds needed to bring it down would happen every 55 years
- Welded steel plates over bolted joints to reduce risk to 1 in 700 yrs



Professional Ethics

Professional ethics encompass the personal, and corporate standards of behavior expected by professionals.

First three “professions”

- Divinity,
- Law
- Medicine

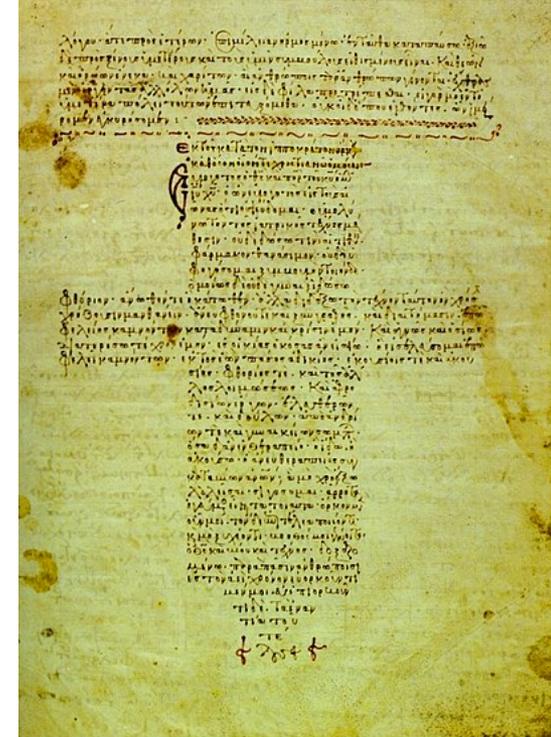


Medicine - Intrinsic

Hippocratic Oath

~450 BCE

“Do no Harm”



Law -Extrinsic

Bar regulates behavior

Oath to follow rules

Malpractice



Legal Malpractice

Not every mistake is legal malpractice. For malpractice to exist:

Attorney must handle a case
inappropriately

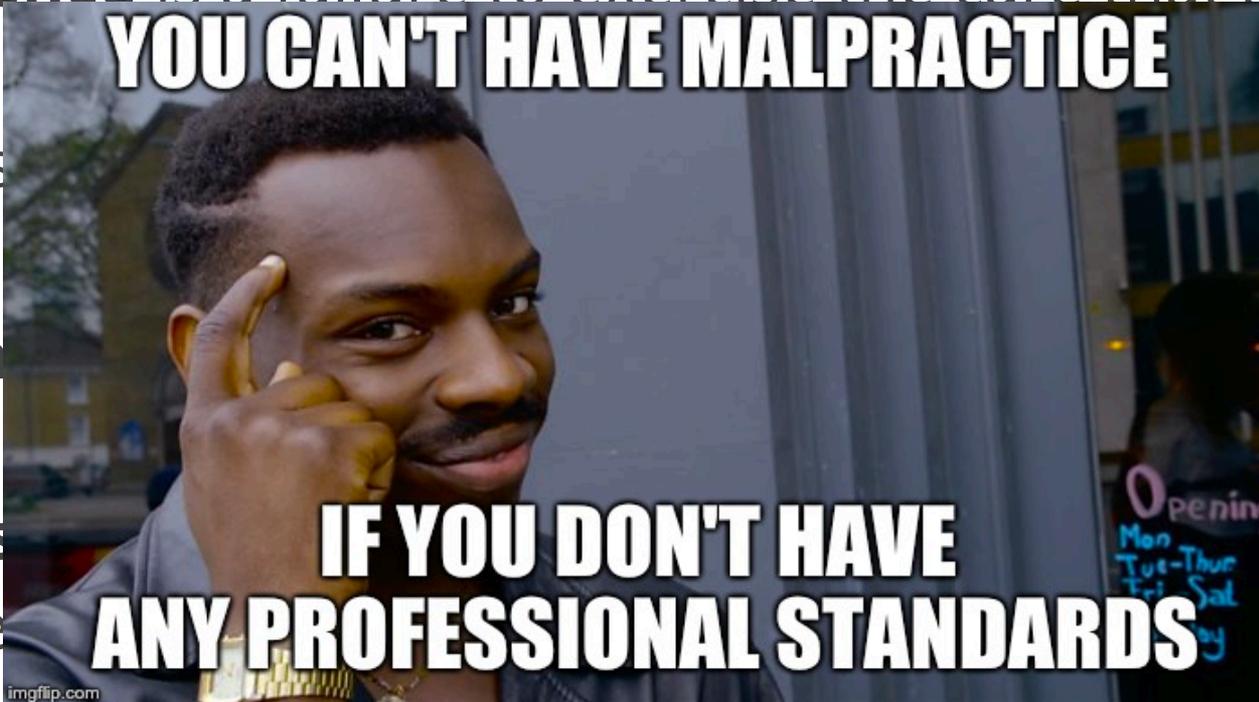
due to negligence or with intent to harm

And cause damages to a client

Malpractice vs. Negligence

Negligence is a failure to exercise the care that a reasonable person would exercise under the same or similar circumstances.

Malpractice is a failure to exercise the care that a reasonable professional would exercise under the same or similar circumstances. It is a subset of negligence, but it requires the presence of a **governing body** ("standard of care"), subsequently causing harm to the plaintiff.



DISCUSSION: What should we do going forward?

Bioengineering Ethics:

- Respect for Autonomy
- Beneficence
- Nonmaleficence
- Justice

Professional Engineers

What {is / could be} the role of **professional engineers** in software?



By ----PCStuff 03:47, 31 July 2006 (UTC), CC BY-SA 2.5, <https://commons.wikimedia.org/w/index.php?curid=10340855>

Will software quality impact human flourishing?

Most traditional emphasis of “engineering ethics”

What can we learn from other professions?

Should software have “Professional Engineers”?

How do we define “safety critical systems”?

How much testing is enough? How can we convince others to do that much testing?

These questions are the **start** of the **conversation**, but as technology evolves, we must be **vigilant** to ensure we are promoting human flourishing

Three questions to promote human flourishing

1. Does my software respect the **humanity** of the **users**?
2. Does my software **amplify positive** behavior, or **negative** behavior for users and society at large?
3. Will my software's **quality** impact the **humanity** of others?