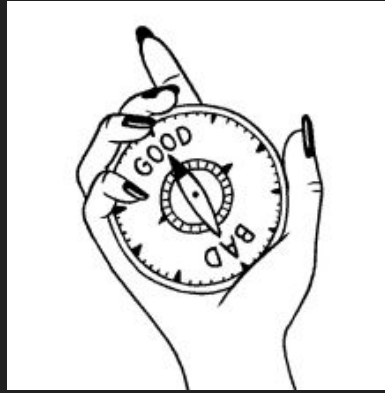


Ethical Concerns in AI for Neuroimaging



Source:
shutterstock



Why is Ethics important in AI and Medicine?

- Normative frameworks: the question of what one *ought* to do
- Supporting improved patient outcomes, increased trust and confidence in healthcare (hopefully)
- AI is a new technology and ethical considerations are just now becoming hot topics of debate

Source:

<https://tenor.com/view/bad-good-good-or-bad-laurene-boglio-boglio-dilemma-gif-15396>

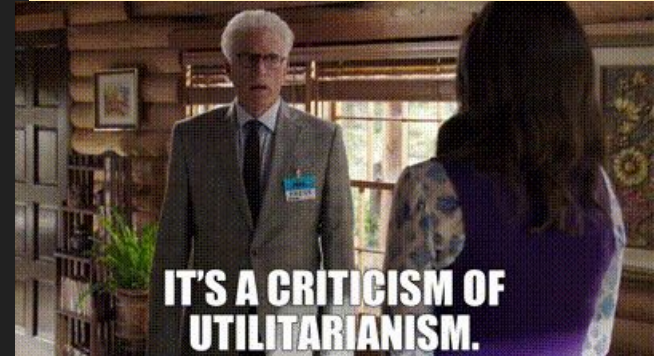
Ethical Frameworks

- Utilitarianism
- Deontology
- Virtue Ethics
- Rights-Based Ethics
- Ethical Relativism
- Many more



Utilitarianism

- The right action is the one that produces the best overall consequences
- Often “measured” in terms of minimizing harm or pain, maximizing happiness or pleasure
- See: John Stuart Mill, Jeremy Bentham, Peter Singer
- Issues: measuring harm, outcome prediction, benefitting majorities



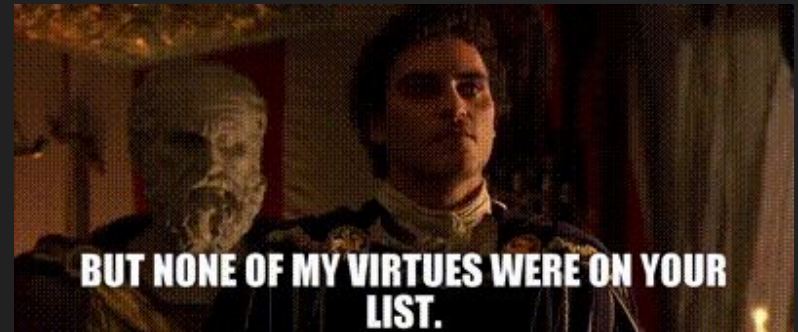
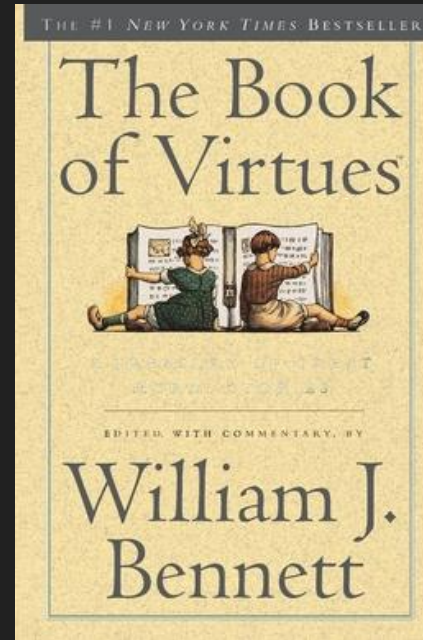
Deontology

- Emphasizes adhering to duty and sets of moral rules.
- Certain actions are inherently right or wrong regardless of outcome.
- Example: Following orders
- See: Immanuel Kant, Thomas Nagel
- Issues: Disagreement between principles, right choice bad consequences



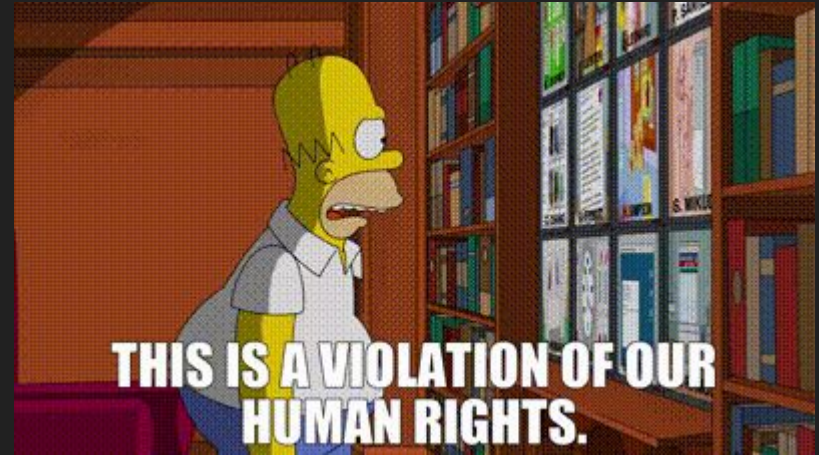
Virtue Ethics

- Focuses on building good character traits: *what kind of person should I be?*
- Emphasizes fostering *virtues* like honesty, empathy, and integrity.
- See: Aristotle, Martha Nussbaum
- Issues: conflicts in virtues, lack of action-guiding principles, emphasizes personal character first before considerations of others



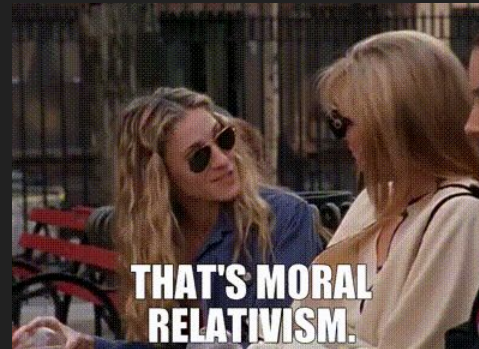
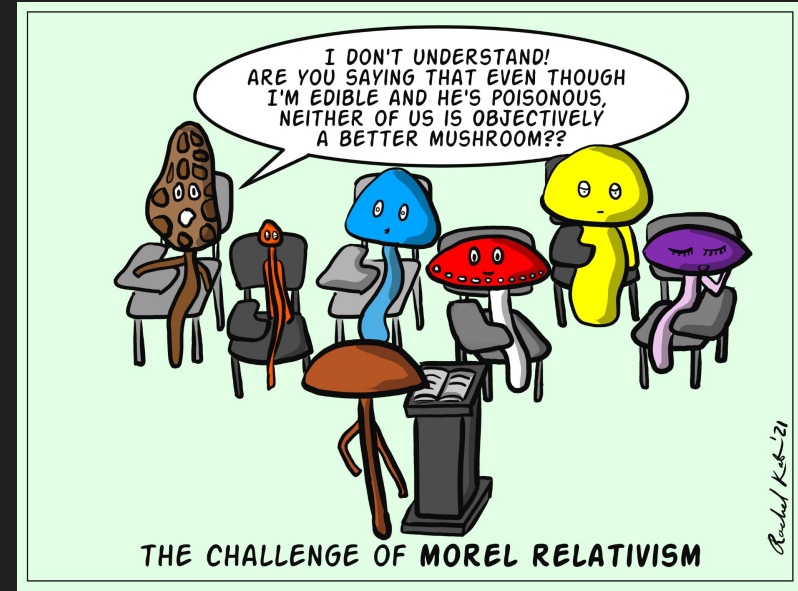
Rights-based Ethics

- People have certain rights simply by virtue of being **human** (may extend to living organisms)
- Involves preserving dignity, and protection of individual freedoms, liberties, rights
- Positive Rights: right to education, healthcare
- Negative Rights: right to privacy, right to life, liberty, pursuit of happiness
- Issues: Conflicts between rights, emphasis on individual interests, rights can be “misconstrued” to cause harm to others e.g. “right to my opinion”
- See: John Locke



Ethical Relativism

- Morality isn't based on universal principles, but determined by cultural norms and preferences
- Can be extremely radical (entirely made up by individual) or more emphasizing theories of social construction (made up by societies, groups of people)
- See: Herodotus, Hume (kind of), Gilbert Harman, Richard B. Brandt
- Issues: moral nihilism, inability to condemn wrongdoing, tolerance as a universal norm



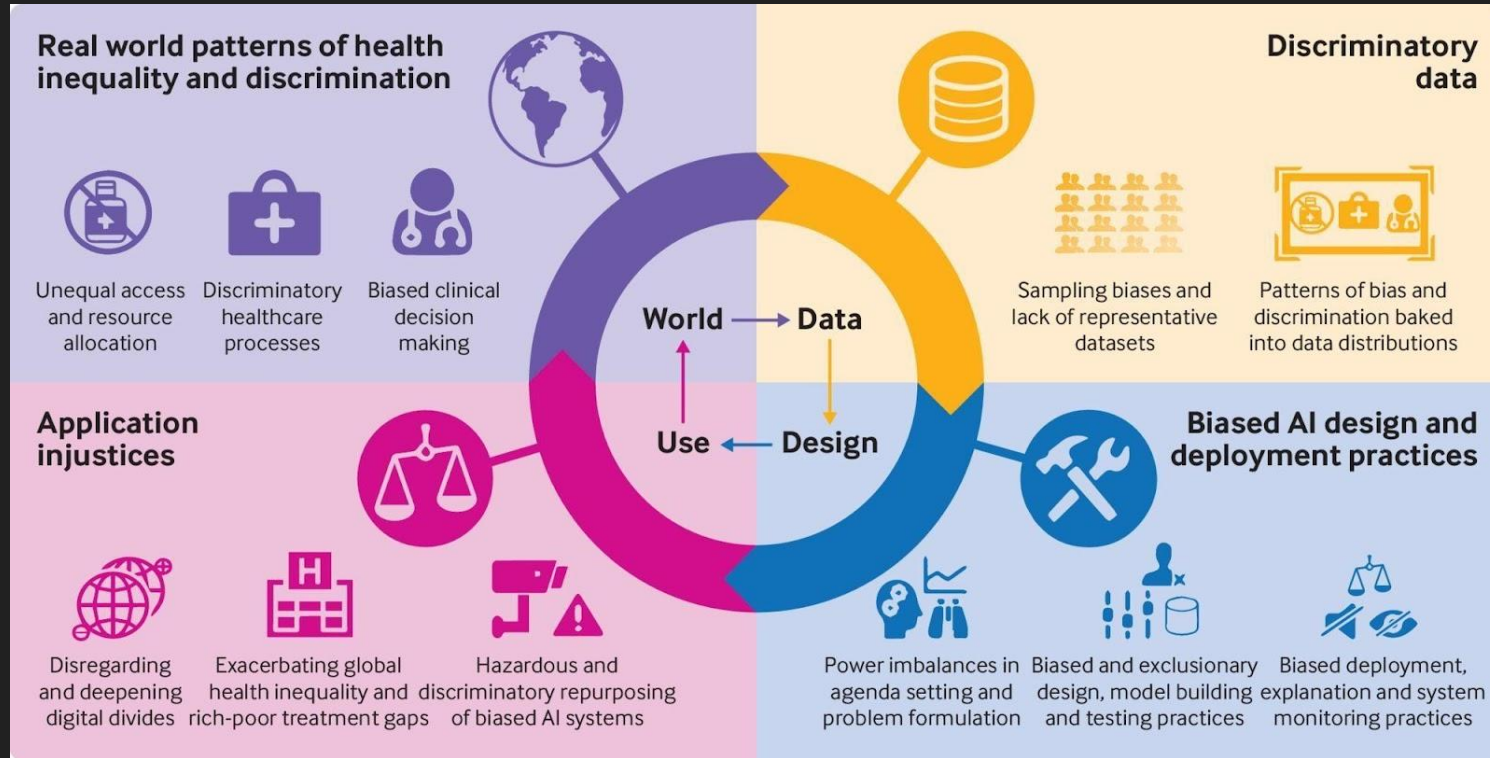
Case Study: Automated Healthcare App

Case Study: Rare Disease Modeling

Case Study: AI and Mental Health

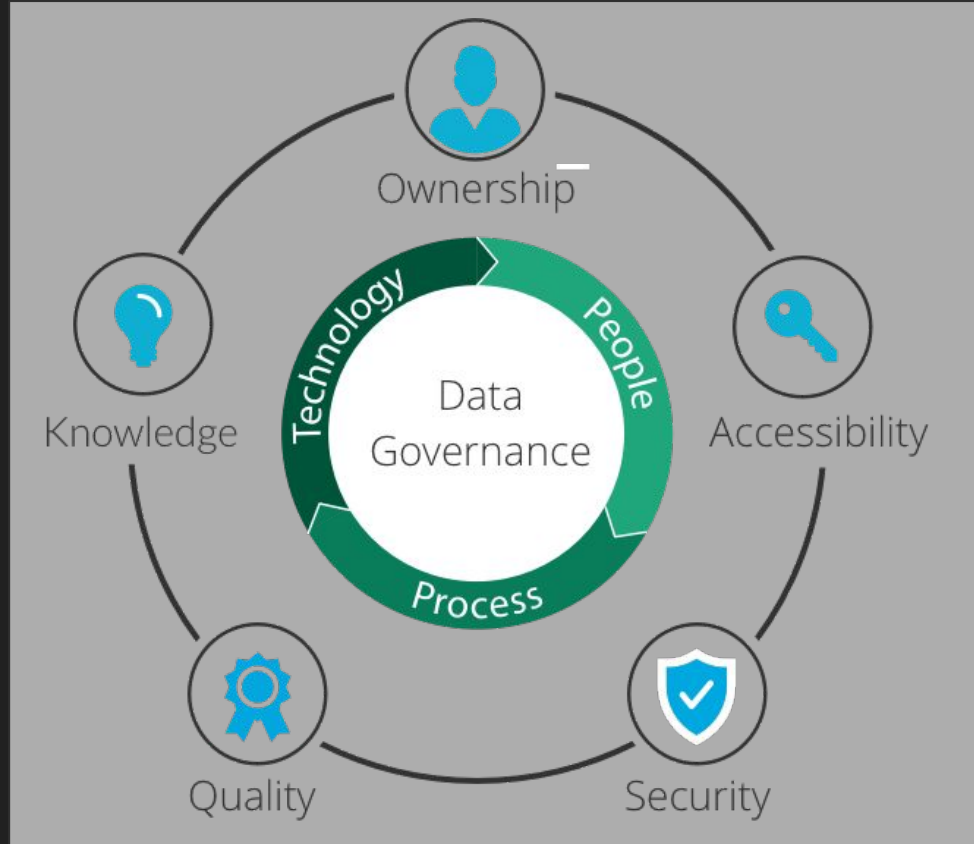
Issue 0: Framing Scientific Questions

Issue 1: Bias in Models and Data



Source: <https://encord.com/blog/reducing-bias-machine-learning/>

Issue 2: Data Privacy and Governance



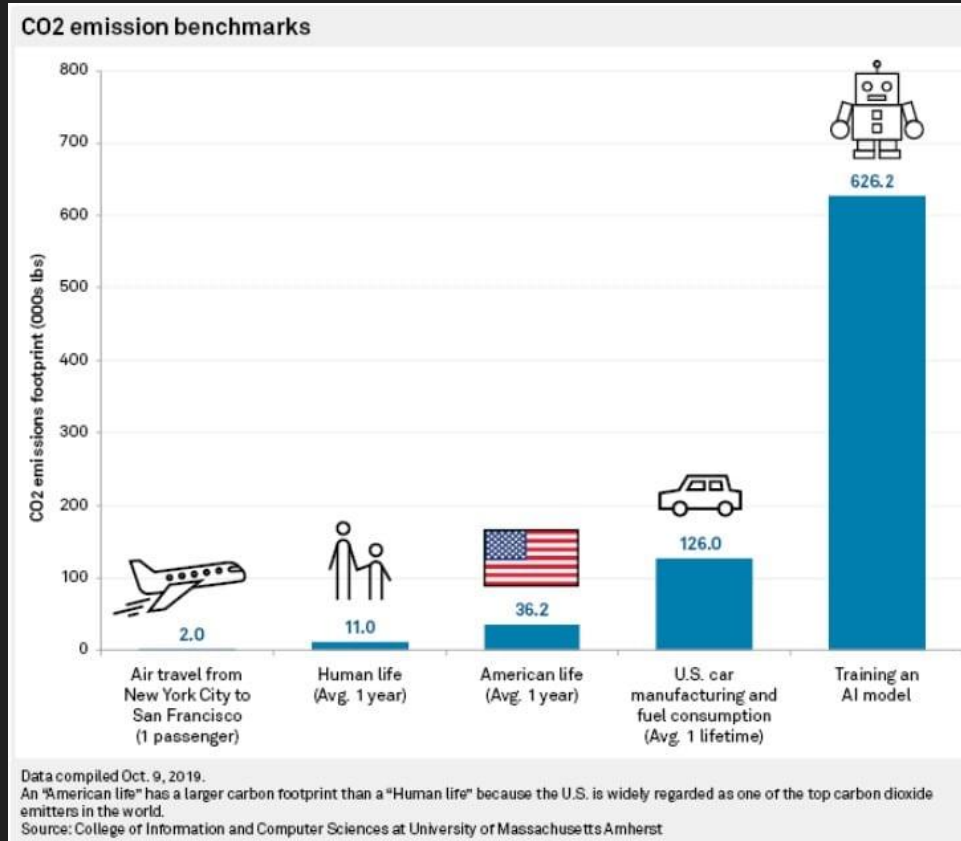
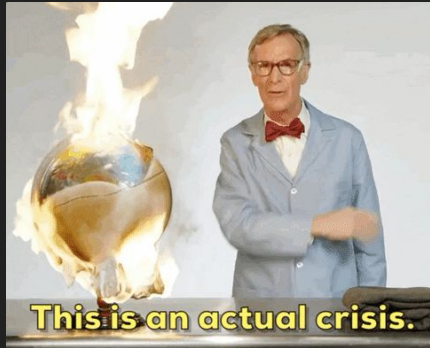
Source:
<https://www.imperiva.com/learn/data-security/data-governance/>

Issue 3: Impacts on the Healthcare Workforce



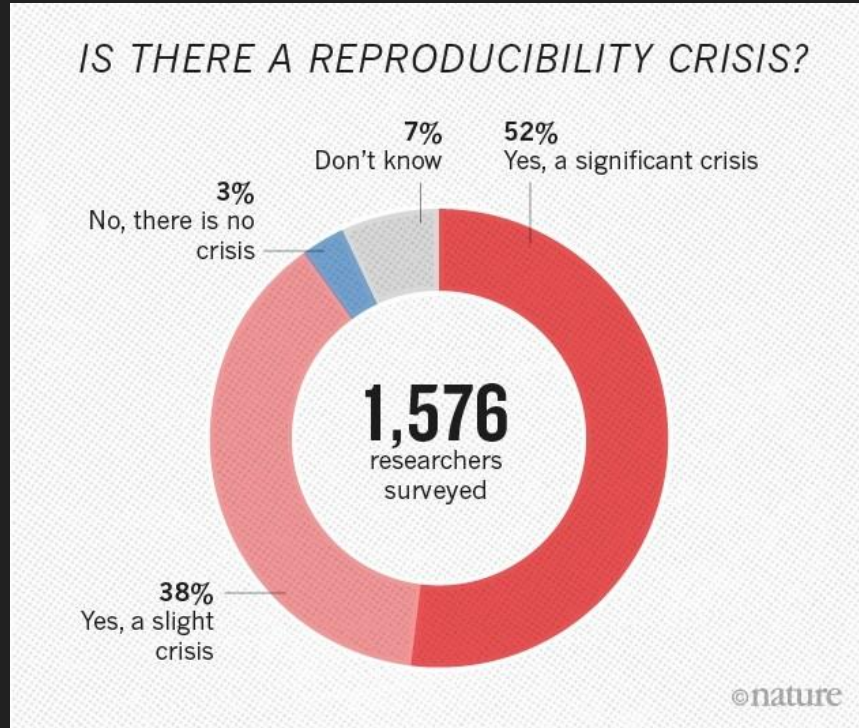
Source: <https://www.ravemobilesafety.com/blog/impact-covid-19-healthcare-service-worker-safety/>

Issue 4: Environmental Impact of Training/Inference



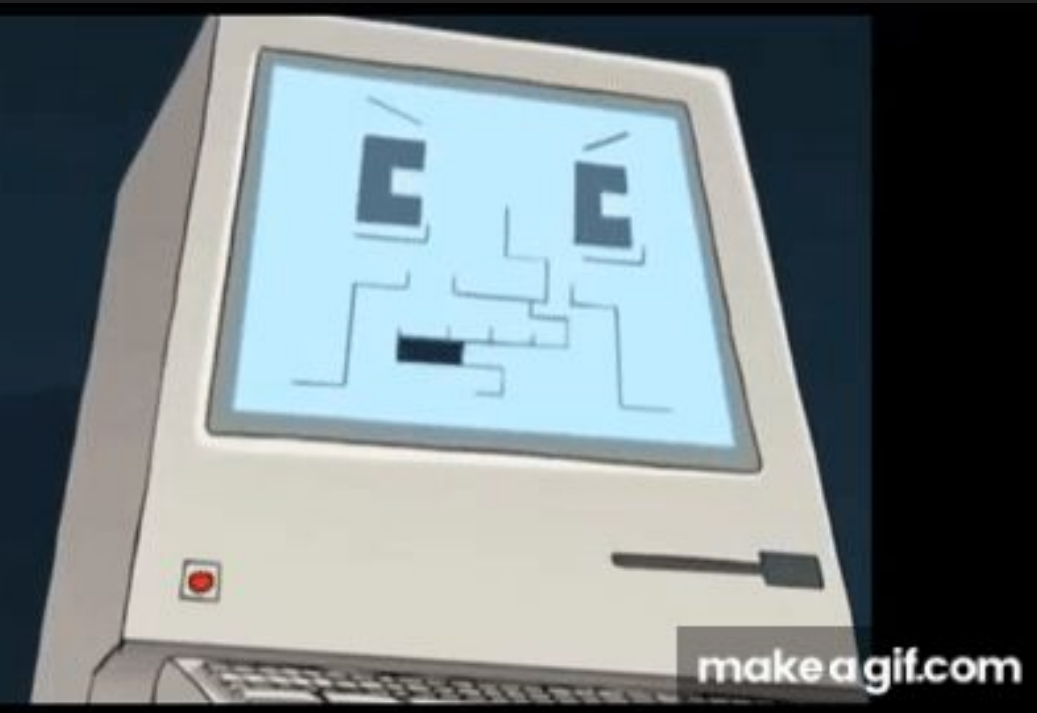
Source:
<https://earth.org/the-green-dilemma-can-ai-fulfil-its-potential-without-harming-the-environment/>

Issue 5: the Replication Crisis



Source: <https://www.nature.com/articles/533452a>

Issue 6: Model Introspection and Accountability



Neuro Issue: Stigma and Mental Health



Source:
Easy
Animal
Studio via
the BBC

Neuro Issue: Prediction of Actions/Mental States



Discussion: Is Model Introspection a Moral Imperative?

Discussion: Further Issues