



Looking Beyond Regulations: Why Ethics Matters for ML

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Ethical and Societal
Challenges of Machine
Learning

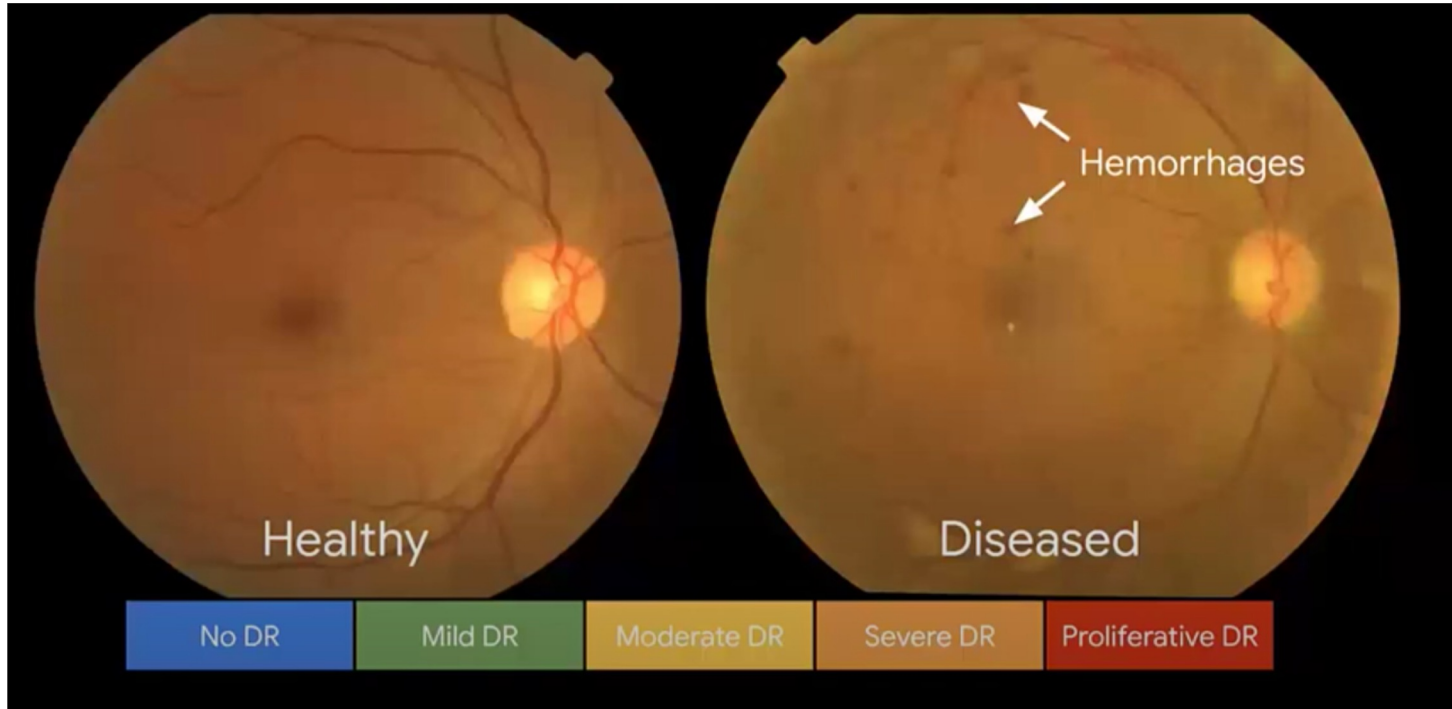


“ Machine intelligence is the last invention that humanity will ever need to make ”

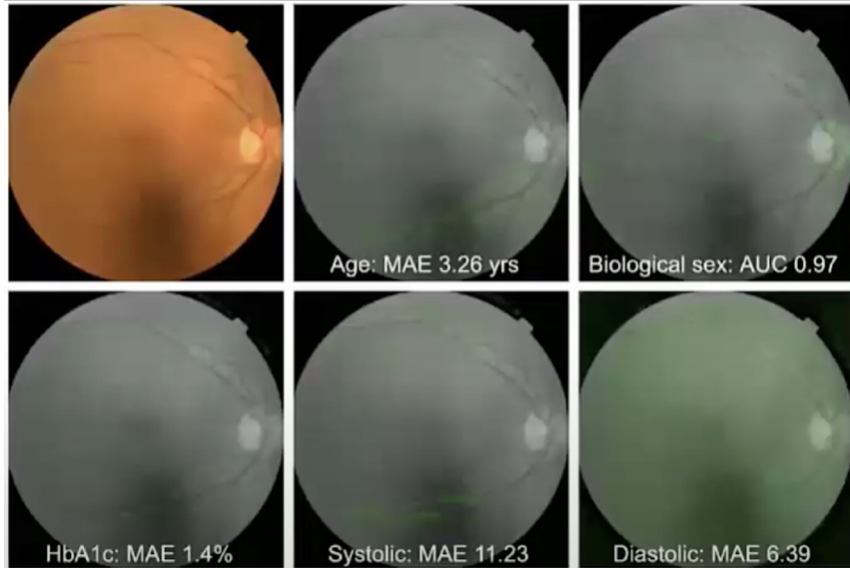
Nick Bostrom

Philosopher, University of Oxford

ML for Diabetic Retinopathy Diagnosis



ML: Superior to Humans?



Predicting things that doctors can't predict from imaging?

- Age
- Sex
- Blood pressure
- etc.

Can we predict...

- Cardiovascular risk?
- Treatment response?

These Algorithms Look at X-Rays—and Somehow Detect Your Race

Thursday, August 5, 2021 | **Wired**

POSTED IN: NEWS

A study raises new concerns that AI will exacerbate disparities in health care. One issue? The study's authors aren't sure what cues are used by the algorithms.

MILLIONS OF DOLLARS are being spent to develop **artificial intelligence** software that reads x-rays and other medical scans in hopes it can spot things doctors look for but sometimes miss, such as lung cancers. A new study reports that these **algorithms** can also see something doctors don't look for on such scans: a patient's race.



GETTY IMAGES

COMPUTING

Racial Bias Found in a Major Health Care Risk Algorithm

Black patients lose out on critical care when systems equate health needs with costs

By Starre Vartan on October 24, 2019



Roadmap

- The Evolving Regulatory Landscape for AI/ML
- The Limitations of Regulation
- Ethics: Starting with “Why?”
- The New Wave of Responsible AI/ML

EU - General Data Protection Regulation



“The toughest privacy and security law in the world”

EU - The AI Act

- 2019 - the High Level Expert Group on AI delivered Guidelines for Trustworthy AI
- 2021 - the AI Act was put forward to address different AI risk levels
- Beyond data privacy and security - It addresses opacity, bias, unpredictability and partially autonomous behavior of AI systems
- Balance between mitigating ethical risks and enabling AI development and innovation

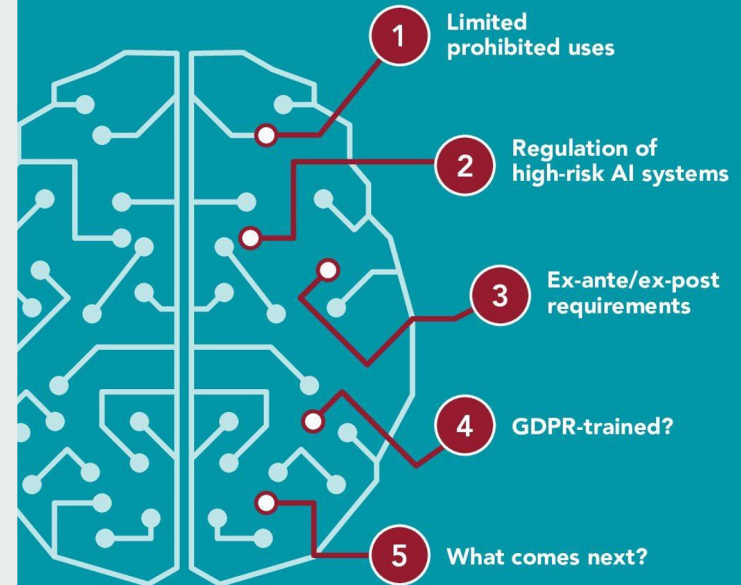
Steptoe

THE EU ARTIFICIAL INTELLIGENCE ACT

Key aspects

On April 21, 2021 the EU Commission published its proposal for an Artificial Intelligence Act.

Here is what you need to know



US - National AI Initiative Act

[Home](#) » [News](#) » [Press Releases](#)

U.S. Department of Commerce Appoints 27 Members to National AI Advisory Committee

Appointments are the first for the recently established committee, which will advise the President

Today, the U.S. Department of Commerce announced the appointment of 27 experts to the National Artificial Intelligence Advisory Committee (NAIAC), which will advise the President and the National AI Initiative Office on a range of issues related to artificial intelligence (AI).

FOR IMMEDIATE RELEASE
Thursday, April 14, 2022

US - Food and Drug Administration

- Predetermined Change Control Plan
 - Shifting from locked algorithms to continuous learning
- Currently underway - Efforts to improve methods to evaluate and address algorithmic bias and to promote algorithm robustness

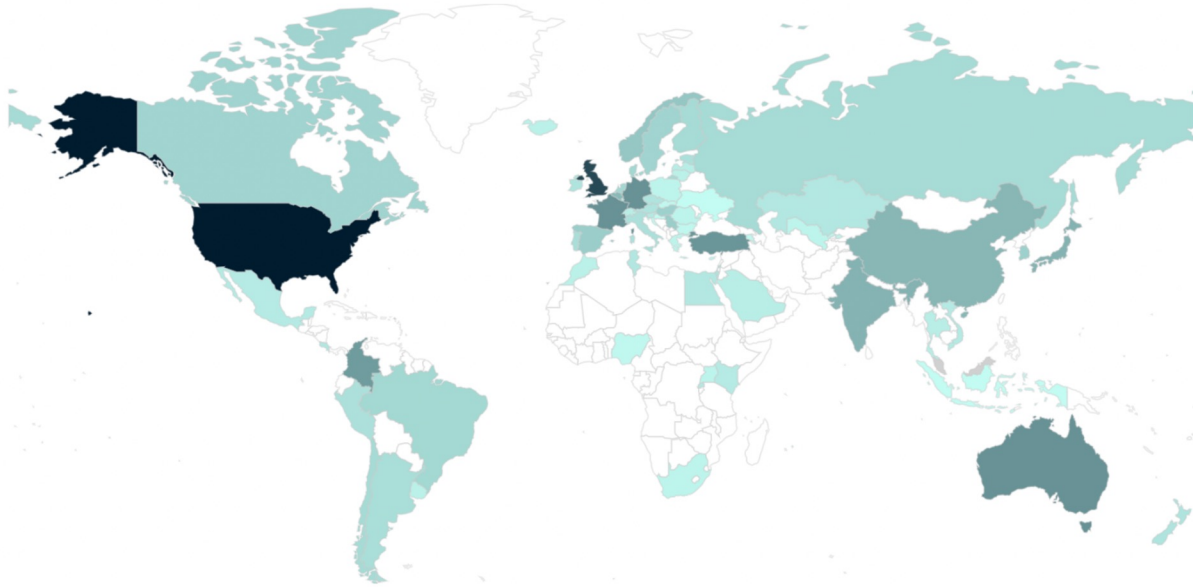
Artificial Intelligence/Machine Learning (AI/ML)-Based Software as a Medical Device (SaMD) Action Plan

January 2021



Choose visualization

By initiative count



Since 2017, at least 60 countries have adopted some form of AI policy

Challenges for Regulation



- Current regulations are not fit for purpose
- New regulations lag behind AI/ML developments
- The fast-paced, evolving nature of AI/ML - Rigid regulations are fruitless
- Patchwork problem - Competing regulatory schemes and approaches create a barrier to international cooperation
- Best practices are unclear (e.g., measuring bias)

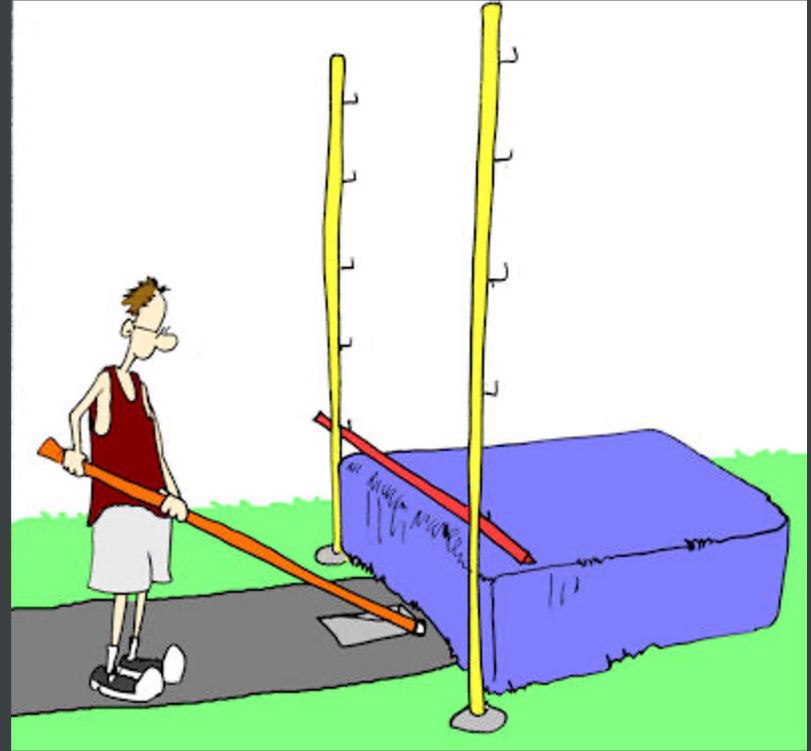
The burden is being shifted to the regulated community

Features of Regulation

Clarity	Explicit guidelines about what <i>needs</i> to be done
Binary	Practices either do or don't comply with regulations
Streamlined	Checklist approach with documentation
Enforced	Compliance is mandatory, penalties for violations
Uniform	Level playing field for developers facing regulations

Limitations of Regulation

- Compliance with regulation is the *bare minimum*
- Avoiding ethical disasters is not the same as ensuring ML contributes positively to human flourishing



Growing Concerns over Ethical Values

- More than half (52%) of knowledge workers are likely to quit their job if company values do not align with their own
- Only 1 in 4 knowledge workers are likely to accept a job if company values do not align with their own



Shift to Responsible AI/ ML

Partnership on AI is bringing together diverse voices from across the AI community

To create resources for advancing positive outcomes for people and society.



Differences between Ethics and Regulation

Regulation	Ethics	
Clarity	Ambiguity	What we <i>should</i> do is less clear than what we <i>must</i> do
Binary	Continuum	Disagreement about ethical solutions
Streamlined	Iterative	Demanding, continuous process
Enforced	Self Imposed	“Soft” vs “hard” guidelines
Uniform	Varied	Commitment may not be shared by others

IBM Global AI Adoption Index 2022

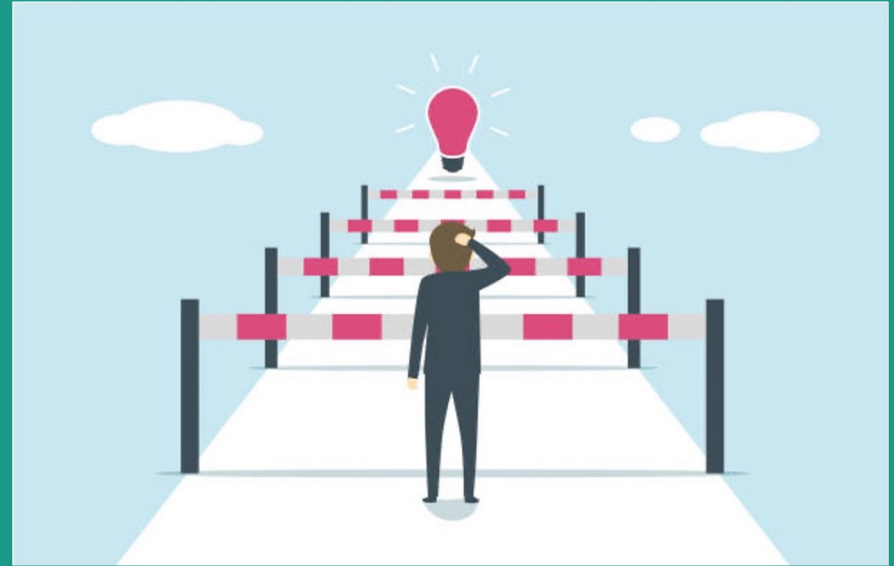
New research commissioned by IBM
in partnership with Morning Consult

A majority of organizations admit they have not taken key steps to ensure their AI is trustworthy and responsible:

- reducing bias (74%)
- tracking performance variations and model drift (68%)
- making sure they can explain AI-powered decisions (61%)

What Makes Ethics So Challenging?

- Continuous - Ethics never sleeps!
- Tension with business interests
- No easy answers
- Translating ethical values into technical solutions
- Lack of skills and training
- Bottlenecks

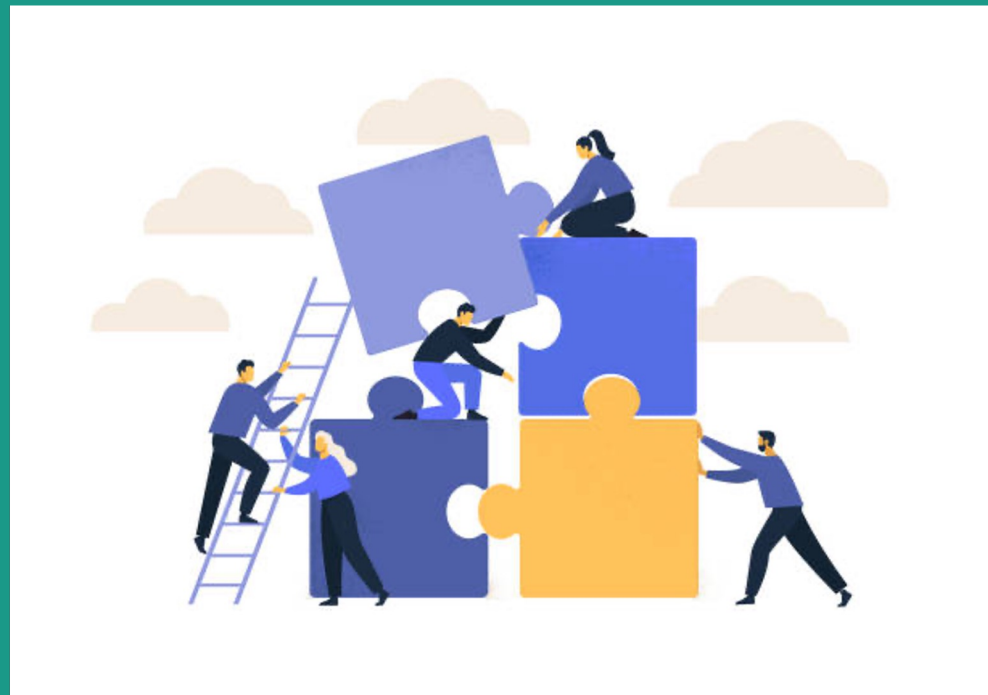


The New Wave of Responsible ML

How to Incorporate Ethics

1 Collective efforts

2 Individual actions



Open Datasets and Crowdsourcing



Accent

23% United States English, **8%** England English, **5%** India and South Asia, **4%** Australian English, **3%** Canadian English, **2%** Scottish English, **1%** Irish English, **1%** Southern African, **1%** New Zealand English

Age

23% 19–29, **14%** 30–39, **10%** 40–49, **6%** < 19, **4%** 50–59, **4%** 60–69, **1%** 70–79

Embedded EthiCS

Ethical reasoning is an essential skill for today's computer scientists. The Embedded EthiCS distributed pedagogy embeds philosophers directly into computer science courses to teach students how to think through the ethical and social implications of their work.

Why Embedded EthiCS?

The aim of Embedded EthiCS is to teach students to consider not merely what technologies they **could** create, but whether they **should** create them.

[Learn More about us](#)



Reinforcing Ethics as an Expectation

NEWS | 23 December 2020 | Correction [23 December 2020](#)

Prestigious AI meeting takes steps to improve ethics of research

For the first time, the organizers of NeurIPS required speakers to consider the societal impact of their work.

Industry Solutions: Data Nutrition Labels

Metadata	
Filename	201612v1-docdollars-product_payments
Format	csv
Url	https://projects.propublica.org/docdollars/
Domain	healthcare
Keywords	Physicians, drugs, medicine, pharmaceutical, transactions
Type	tabular
Rows	500
Columns	18
Missing	5.2%
License	cc
Released	JAN 2017
Range	
From	AUG 2013
To	DEC 2015
Description	This is the data used in ProPublica's Dollars for Docs news application. It is primarily based on CMS's Open Payments data, but we have added a few features. ProPublica has standardized drug, device and manufacturer names, and made a flattened table (product_payments) that allows for easier aggregating payments associated with each drug/device. In [1], one payment record can be attributed to up to five different drugs or medical devices. This table flattens the payments out so that each drug/device related to each payment gets its own line.



A standard label that highlights the “**key ingredients**” of a dataset:

- *Provenance*
- *Metadata*
- *Missing units*
- *Variables*

Industry Solutions: Datasheets for Datasets

Questions for dataset creators to reflect on during the key stages of the dataset lifecycle:

- ***Motivation***
- ***Composition***
- ***Collection Process***
- ***Preprocessing/ labeling***
- ***Uses***
- ***Distribution***
- ***Maintenance***



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Archivist Data Curation

Table 1: Lessons from Archives: summaries of approaches in archival and library sciences to some of the most important topics in data collection, and how they can be applied in the machine learning setting.

Consent	(1) Institute data gathering outreach programs to actively collect underrepresented data (2) Adopt crowdsourcing models that collect open-ended responses from participants and give them options to denote sensitivity and access
Inclusivity	(1) Complement datasets with “Mission Statements” that signal commitment to stated concepts/topics/groups (2) “Open” data sets to promote ongoing collection following mission statements
Power	(1) Form data consortia where data centers of various sizes can share resources and the cost burdens of data collection and management
Transparency	(1) Keep process records of materials added to or selected out of dataset. (2) Adopt a multi-layer, multi-person data supervision system.
Ethics & Privacy	(1) Promote data collection as a full-time, professional career. (2) Form or integrate existing global/national organizations in instituting standardized codes of ethics/conduct and procedures to review violations

Project Euphonia

Google Research Initiative to **collect** data and **refine** speech recognition algorithms to work better for individuals with speech impairments

Partnerships with non-profits and stakeholder engagement



Distributed AI Power / Participatory Design

World view

Don't ask if AI is good or fair,
ask how it shifts power

Those who could be exploited by artificial
intelligence should be shaping its projects.



By Pratyusha
Kalluri

From smart products to smart systems

The importance of participatory design in
the age of artificial intelligence



Dr. Scott Pobiner
United States



Timothy Murphy
United States



Training Your Ethical “Muscles”

1. Ethical Risk Sweeping
2. Expanding the Ethical Circle
3. Case-based Analysis
4. Keeping Human Values at the Center
5. Think about Terrible People
6. Ethical Feedback and Iteration



**Ethics is a muscle
that needs flexing.**