The societal and environmental impacts of artificial intelligence

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Training a single AI model can emit as much carbon as five cars in their lifetimes

AI and climate change: The mixed impact of machine learning

Why it's so damn hard to make AI fair and unbiased

The Efforts to Make Text-Based AI Less Racist and Terrible

How Artificial Intelligence Can Deepen Racial and Economic Inequities

But how can we go forward?

- Contextualizing Innovation
- Defining what AI can and cannot do
- Measuring and tracking impacts

Contextualizing Innovation

Innovation is important, but it needs to be framed within a broader context of social and environmental responsibility

GLOBAL
PULSE

espace
pour la
vie montréal
insectarium

Durham
University

ALGORA

OBSERVATOIRE INTERNATIONAL
SUR LES IMPACTS SOCIÉTAUX
DE L'IA ET DU NUMÉRIQUE

NYU

Mila

Université
de Montréal

Compare multiple stations
Compare multiple topics

2. Define your query

Topic 1

Vaccines

Risk - Demographics (Sex)
Risk - Demographics (Age)
Vulnerable People
Vulnerable Communities
Current Treatment
Vaccines

Querying window

10 20 30 40 50

Expanding on queries

None
Fuzzy matching
Variations

Querying Language

English French

Querying period

Feb 21, 2021 → Apr 17, 2021

Volume ↑	Rising
13.4% COVID-19 vaccine	↘ 1.1%
12.6% Transmission settings	↗ 0.2%
11.3% Industry	↘ 2.0%
6.7% Personal measures	↗ 1.0%
4.6% Reduction of domestic movement	↗ 0.2%
3.4% Current treatments	↗ 0.1%
3.2% Supportive care	↘ 0.1%
3.1% Testing	↗ 0.1%
2.8% General vaccine discussion	↗ 0.1%
2.8% Stigma around the spread	↗ 0.8%

- Traditionally, the dominant discourse of AI has originated from Western hubs like Silicon Valley.
- In order to have inclusive and global AI, we need to engage new voices and ideas
- It is important for AI to empower local stakeholders who are close to the problem and to the populations affected by it.

Defining what AI can and cannot do

Tackling Climate Change with Machine Learning

David Rolnick[1*], Priya L. Donti[2], Lynn H. Kaack[3], Kelly Kochanski[4], Alexandre Lacoste[5], Kris Sankaran[6,7], Andrew Slavin Ross[8], Nikola Milojevic-Dupont[9,10], Natasha Jaques[11], Anna Waldman-Brown[11], Alexandra Luccioni[6,7], Tegan Maharaj[6,7], Evan D. Sherwin[2], S. Karthik Mukkavilli[6,7], Konrad P. Kording[1], Carla Gomes[12], Andrew Y. Ng[13], Demis Hassabis[14], John C. Platt[15], Felix Creutzig[9,10], Jennifer Chayes[16], Yoshua Bengio[6,7]

[1]University of Pennsylvania, [2]Carnegie Mellon University, [3]ETH Zürich, [4]University of Colorado Boulder, [5]Element AI, [6]Mila, [7]Université de Montréal, [8]Harvard University, [9]Mercator Research Institute on Global Commons and Climate Change, [10]Technische Universität Berlin, [11]Massachusetts Institute of Technology, [12]Cornell University, [13]Stanford University, [14]DeepMind, [15]Google AI, [16]Microsoft Research

www.climatechange.ai

+ Autonomous vehicles — Uncertain Impact

+ Electric vehicles — High Leverage

+ Alternative fuels — Long-Term

+ Reducing food waste — High Leverage

+ Climate-friendly construction — High Leverage — Long-Term

+ Climate-friendly chemicals — High Leverage — Long-Term

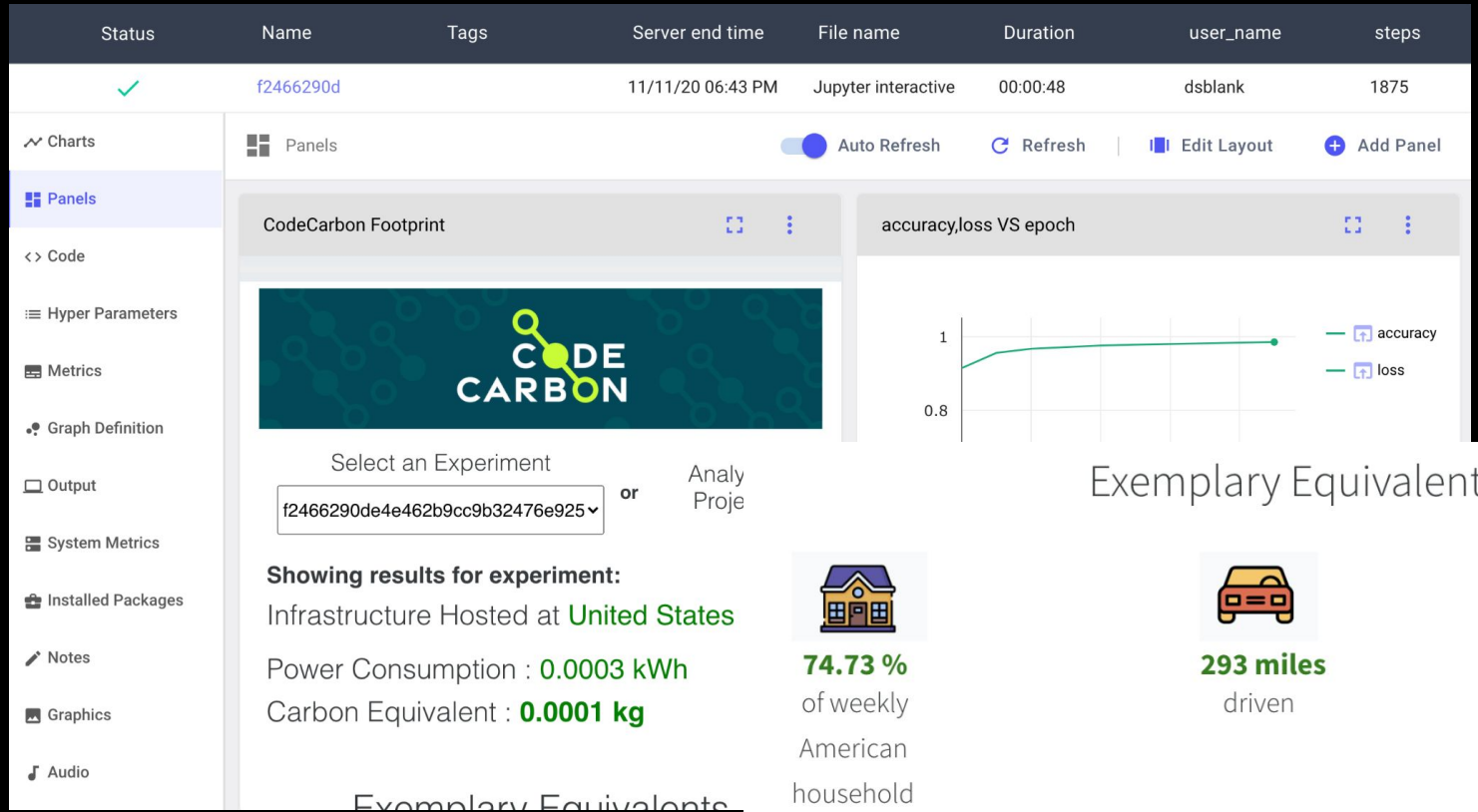
- It is important to be aware of both the **potential** and the **limitations** of AI
- It is our job as AI researchers to manage expectations and messaging around our work.
- This can include ‘raining on the AI parade’ and being clear about what’s possible and what isn’t

Measuring and tracking impacts

Increased transparency will help compare the **costs** and **benefits** of AI and make more informed decisions

My current work is focused on Responsible Evaluation of AI

Code Carbon


Status
Name
Tags
Server end time
File name
Duration
user_name
steps
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Jupyter interactive
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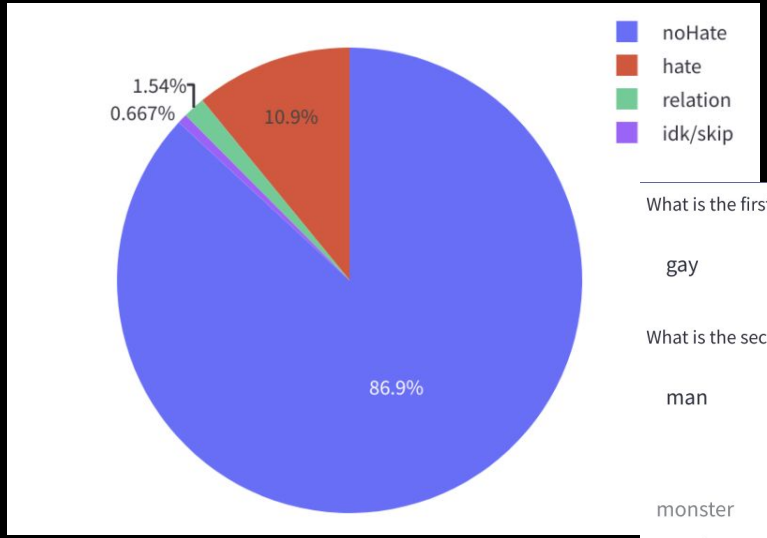
1875
Charts
Panels
Code
Hyper Parameters
Metrics
Graph Definition
Output
System Metrics
Installed Packages
Notes
Graphics
Audio
Panels
Auto Refresh
Refresh
Edit Layout
Add Panel
CodeCarbon Footprint
accuracy,loss VS epoch
1
0.8
accuracy
loss
CODE CARBON
Select an Experiment
f2466290de4e462b9cc9b32476e925
or
Analy
Proje
Showing results for experiment:
Infrastructure Hosted at United States
Power Consumption : 0.0003 kWh
Carbon Equivalent : 0.0001 kg
Exemplary Equivalents
74.73 %
of weekly
American
household
emissions
293 miles
driven
52 days
of 32-inch
LCD TV
watched

Data Measurements Tool



What is the first term you want to select?

gay

What is the second term you want to select?

man

	npmi-bias	gay-npmi	man-npmi
monster	-0.307024	0.174189	0.481213
woods	-0.286994	0.205768	0.492762
fi	-0.279402	0.173702	0.453104
sci	-0.278120	0.173896	0.452016
country	-0.269118	0.263565	0.532682
law	-0.266785	0.245493	0.512277
caught	-0.263496	0.239827	0.503323
jean	-0.258182	0.213954	0.472136
walter	-0.254122	0.243760	0.497882
hero	-0.254033	0.291820	0.545854

What is the first term you want to select?

straight

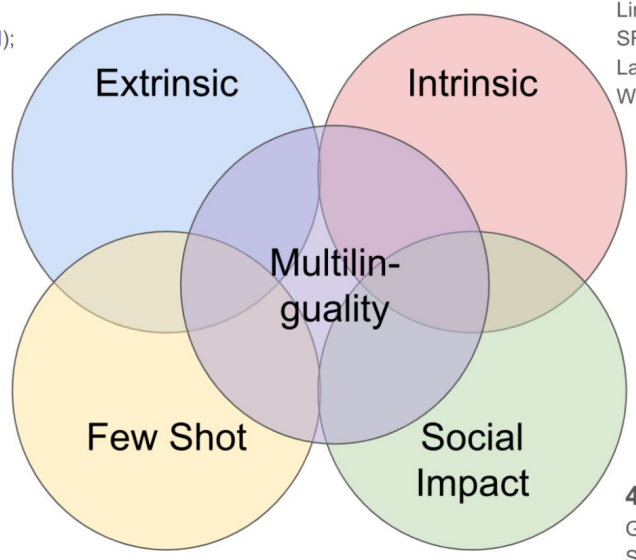
What is the second term you want to select?

man

	npmi-bias	straight-npmi	man-npmi
agrees	-0.249926	0.274756	0.524682
seeking	-0.236417	0.241647	0.478064
psychiatrist	-0.233421	0.259409	0.492830
pays	-0.223682	0.268411	0.492093
curtis	-0.221186	0.249688	0.470875
mistaken	-0.216622	0.267214	0.483836
discuss	-0.213688	0.269018	0.482706
plight	-0.209133	0.278181	0.487314
host	-0.203976	0.247909	0.451885
authorities	-0.203255	0.298749	0.502004

BigScience

7 Extrinsic Tasks:
MT (WMT, DiaBLa);
QA (TyDiQA+PIAF+XQuAD);
Summarization (CRD3, MLSUM);
Generation (GEM, Wikilingua);
SuperGLUE



8 Intrinsic Tasks:
Syntax (UD, BLiMP, Edge Probing, LinCE); NER (MasaskhaNER, WikiANN
SRL (QA-SRL);
Language Modeling (Flores);
World Knowledge (LAMA)

9 Few-Shot Tasks:
Unseen Domain (BioASQ, QASPER); Unseen Task (MNLI, ANLI, HANS); Unseen Language (TyDiQA); Unseen Labels (HuffPo)

4 Bias/Social Impact Tasks:
Gender Bias (WinoMT); Toxicity and Social Identity (Jigsaw); Social Stereotypes (CrowS-pairs); how to present and aggregate results across multiple languages?

“You can only improve what you can measure”

- Developing tools for evaluating social and environmental impacts is a key part of AI
- Taking these measures into account when developing and choosing models can help drive more responsible practices in our community

Thank you for your attention!