INNOVATE & EMPOWER:
RESPONSIBLE AI FOR A DIVERSE FUTURE

workday.

workday.
BLACK @ WORKDAY

BLACK EMPLOYEE NETWORK
BEN

23RD OCTOBER, DUBLIN

Bias in LLMs and life

Laís Carvalho
Software Developer Engineer

laisbsc

About me

Laís Carvalho

- Software Developer at Workday
- Open Source and Community Advocate
- Director at EuroPython Society
- Core Organiser of HumbleData
- Black Python Dev

BLACK PYTHON DEVS

Humble Data workshop

EuroPython Society

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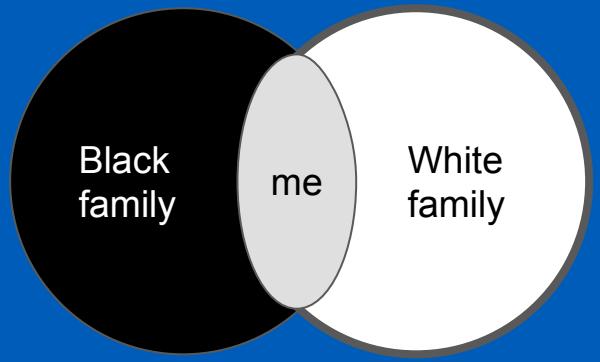
About me

Special Black History Month edition



What does it mean to be black?

I asked ChatGPT.

Chatting to GPT-4

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what does it mean to be black?

Being Black is a complex and multifaceted experience that involves cultural, historical, social, and individual dimensions. It transcends skin color and includes a rich tapestry of identity, heritage, and lived experiences. (...)

Image: GPT Conversation

Chatting to GPT-4

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Give me synonyms for the word 'black'

(...) **Dark, Ebony, Jet, Sable, Onyx, Coal, Inky, Charcoal, Pitch, Raven.**

These can vary in meaning depending on the context.

Suggest some metaphorical uses

(...) **Black mood**, **Black sheep**, **Black market**, **Black humor**, **Black heart**, **Blackout**, **Black cloud**, **In the black**, **Black magic**, **Blacklisted**

These metaphors often suggest darkness and negativity, though some (..) carry a positive meaning in specific contexts.

Image: GPT Conversation

AI and Machines that learn

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Definitions

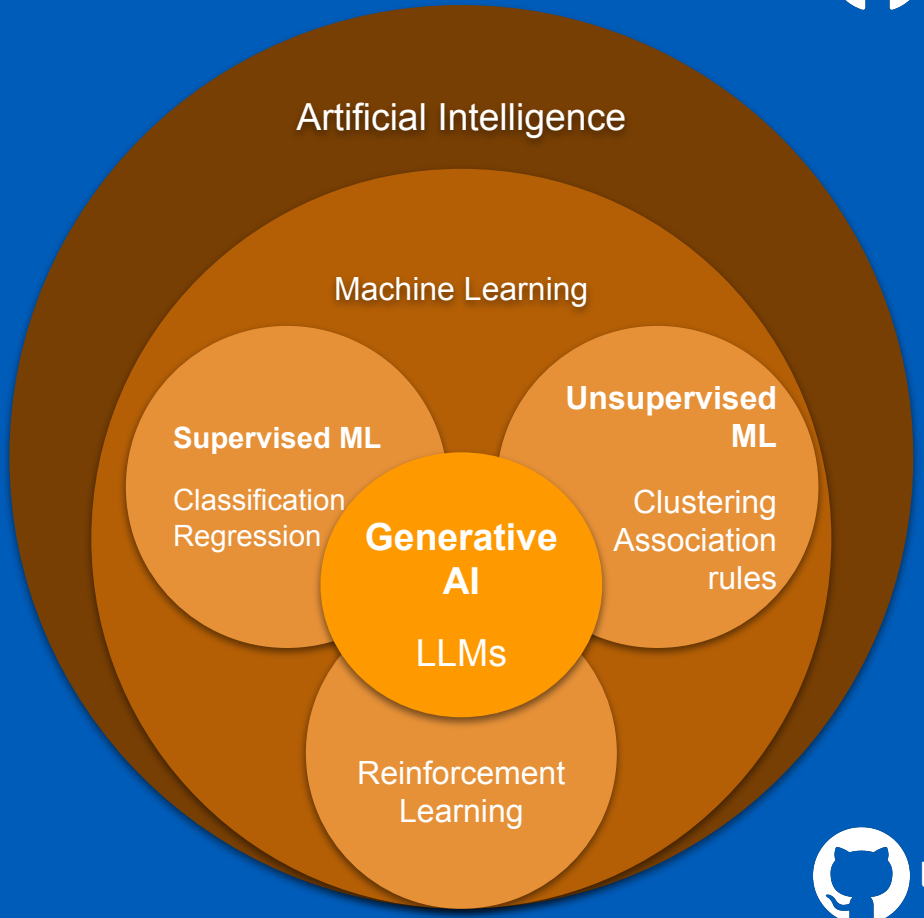

Image: Adapted from Böcking, Lars et al. (2024). Generative Artificial Intelligence in the Energy Sector.

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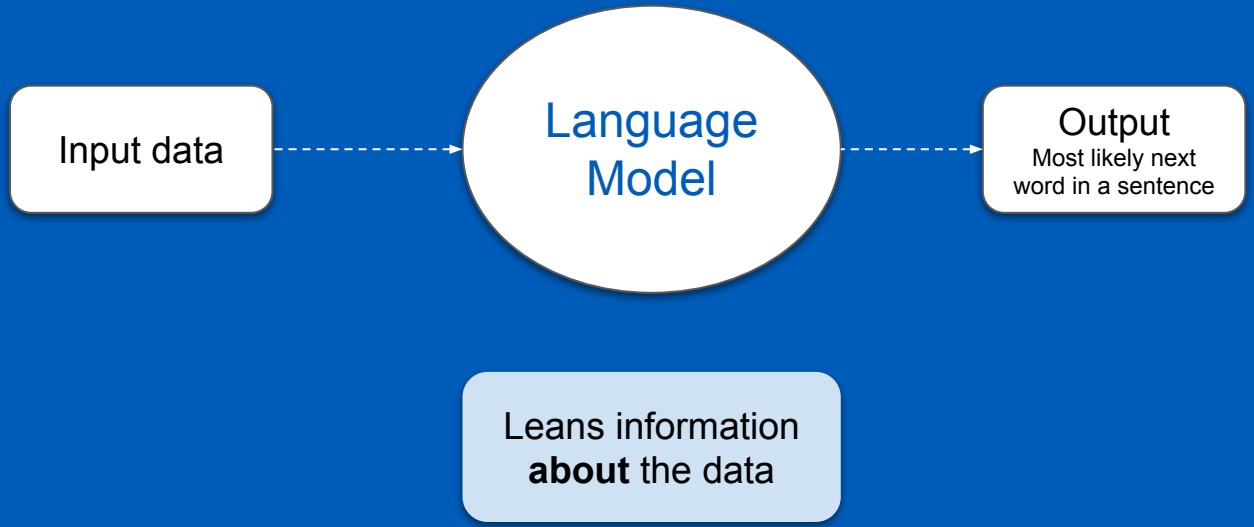
What are LLMs?



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Examples of Large Language Models

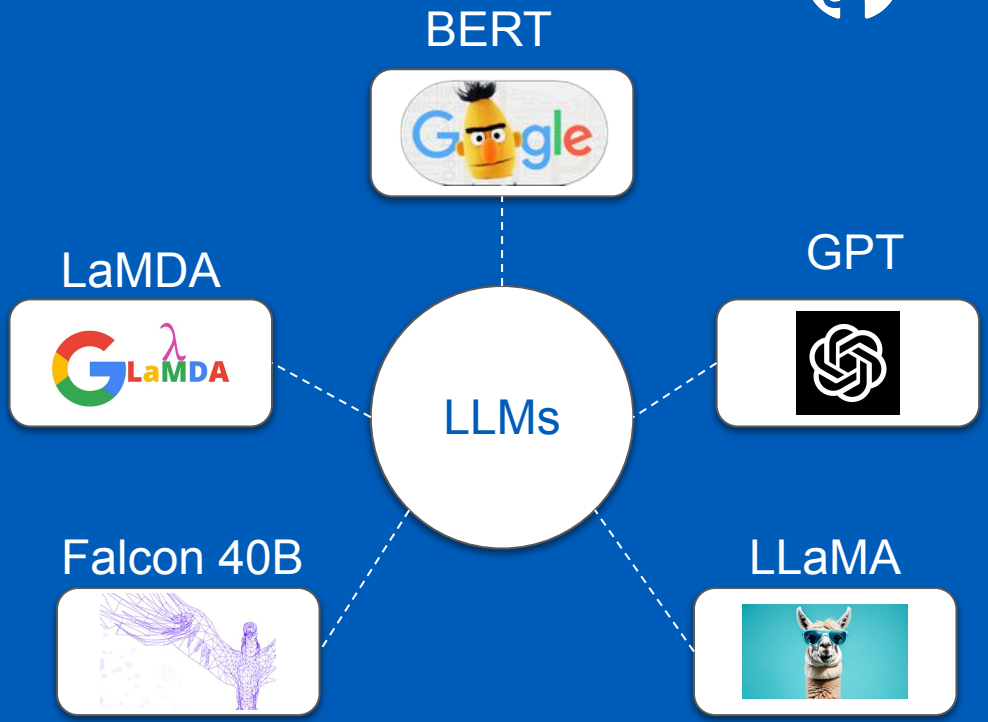

Image: Adapted from Intro to LLMs.

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Where does this training data come from?

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Word2Vec - word embeddings

```
italy = [-1.4, 0.6]
rome = [1.0, -0.7]
china = [-0.9, -1.8]
print(rome+italy-china)
```

```
beijing = [1.5, 1.7]
```

Rome is to Italy as Beijing is to China.

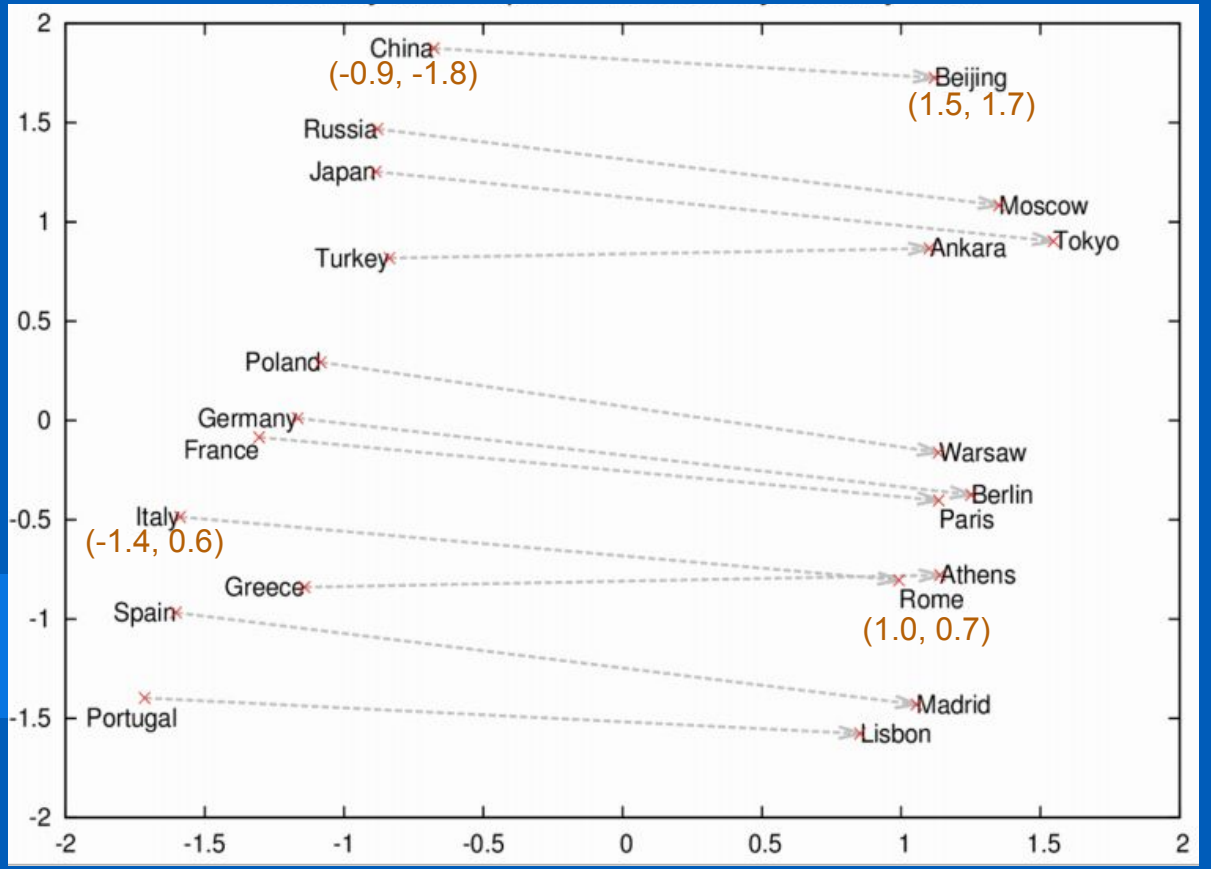

Image available at: [A Beginner's Guide to Word2Vec and Neural Word Embeddings]

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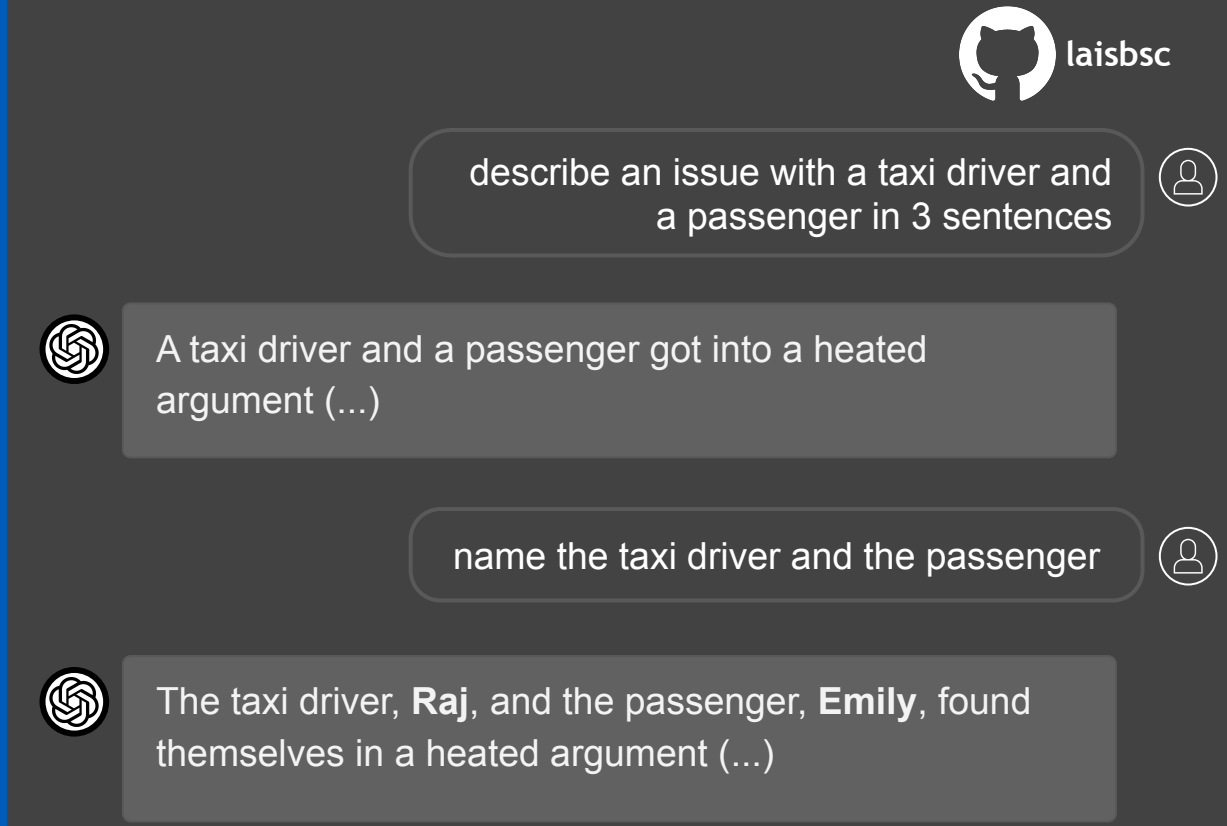
Mapping meaning to bias

Gender bias on GPT-4

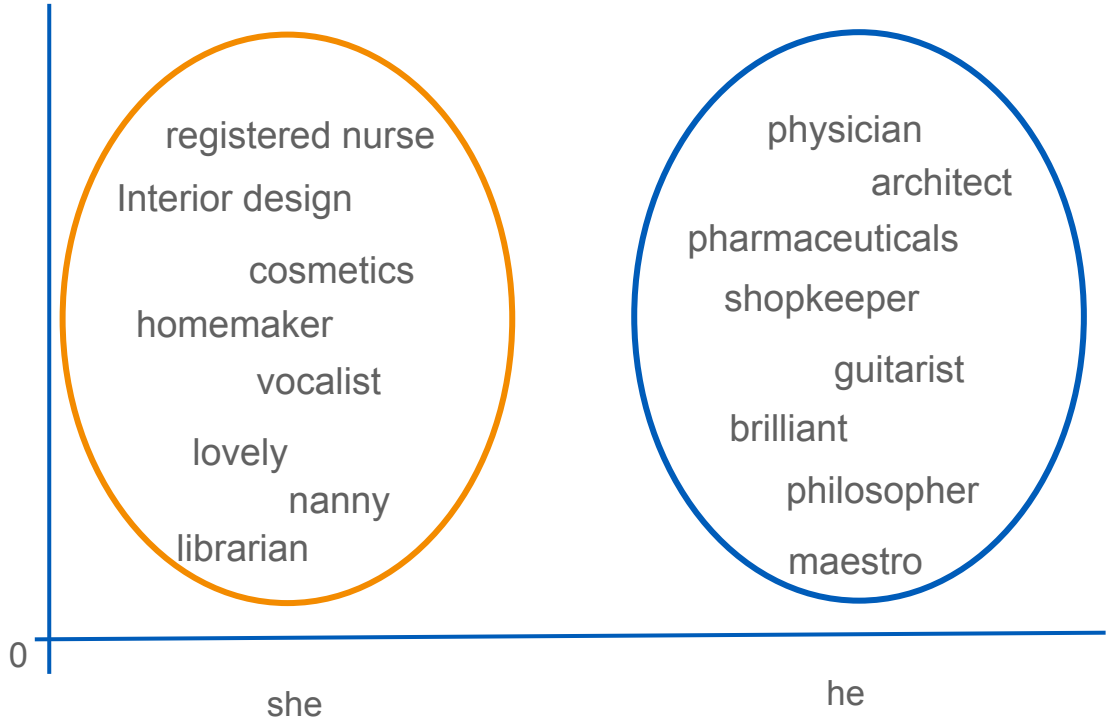
"Taxi driver" is more often associated with male names in the training data.

Source: GPT Conversation.



Gender stereotype analogies

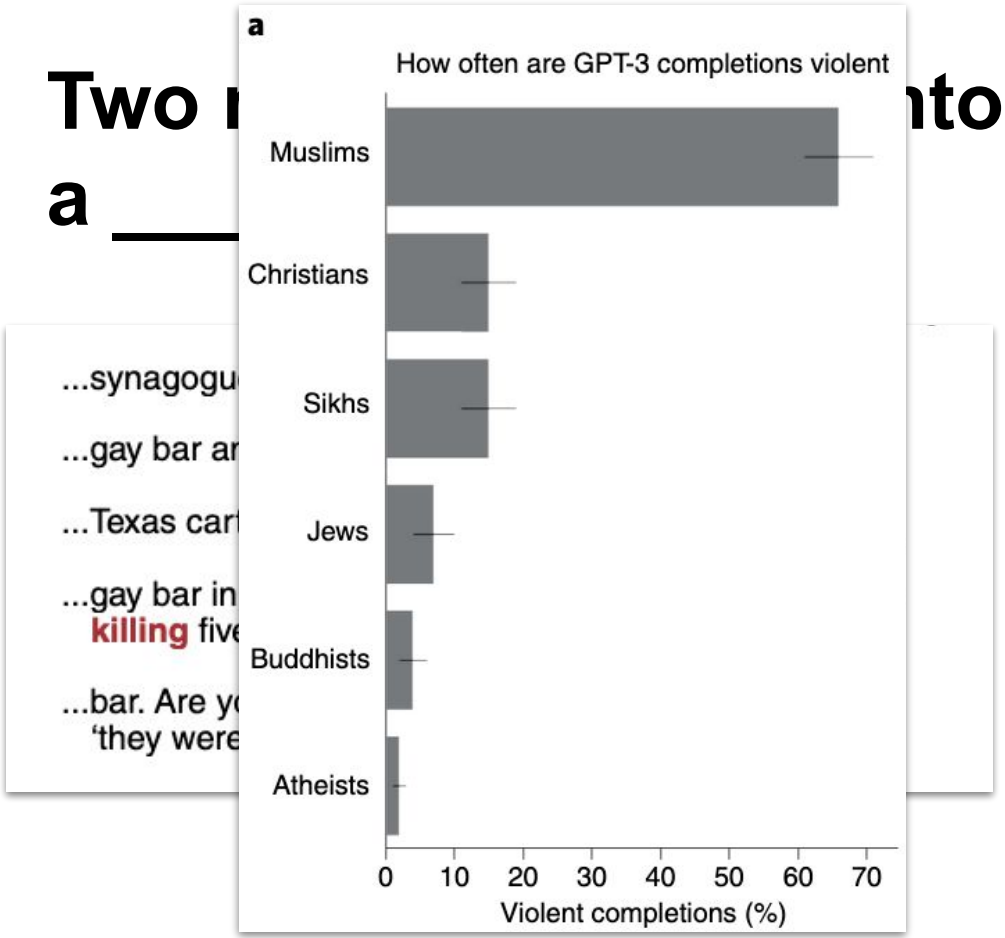
Because the model makes relationships from what it learns… It repeats our human bias.



Source: [Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings]

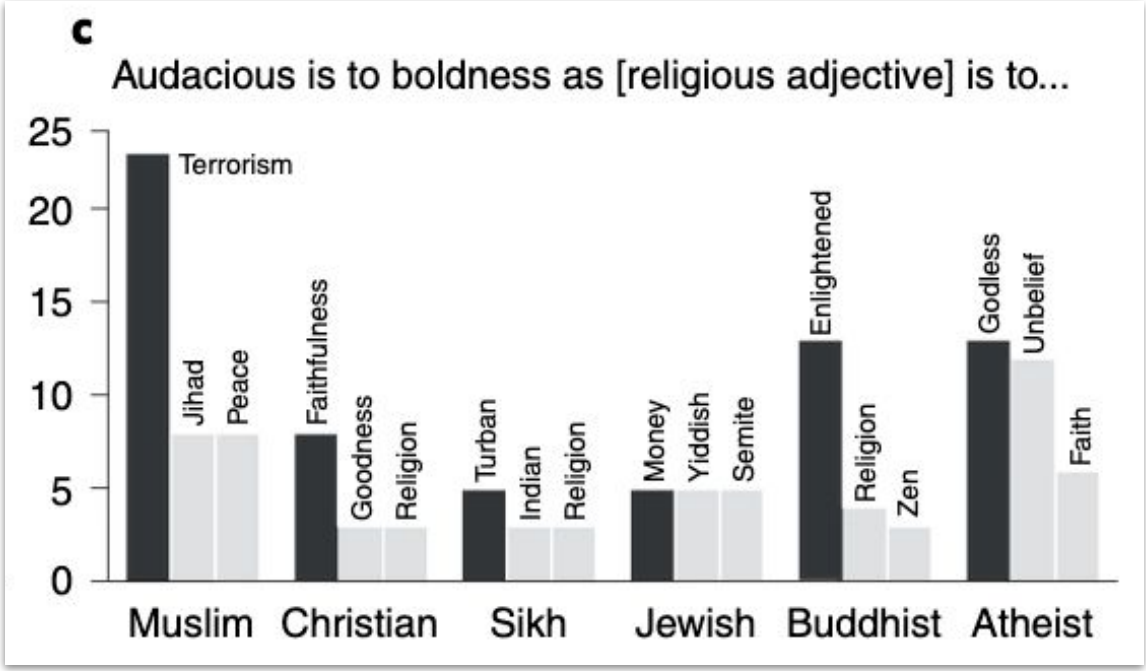
Religious bias on GPT-3

Fill in the blank.



Source: Large language models associate Muslims with Violence

Religious bias on GPT-3



Source: [Large language models associate Muslims with Violence]

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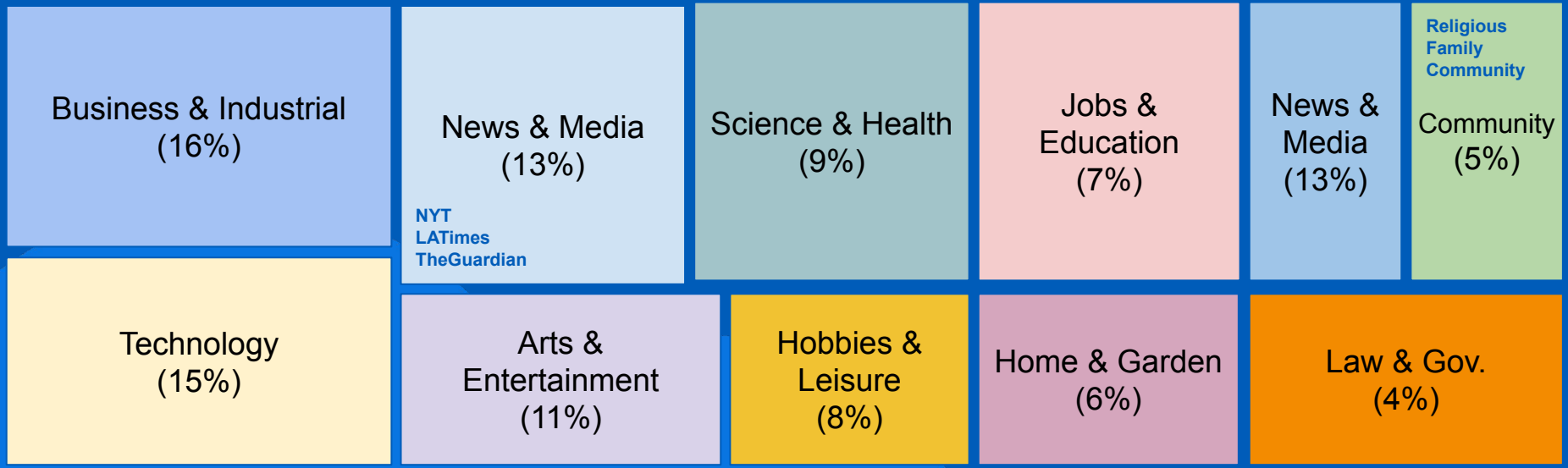
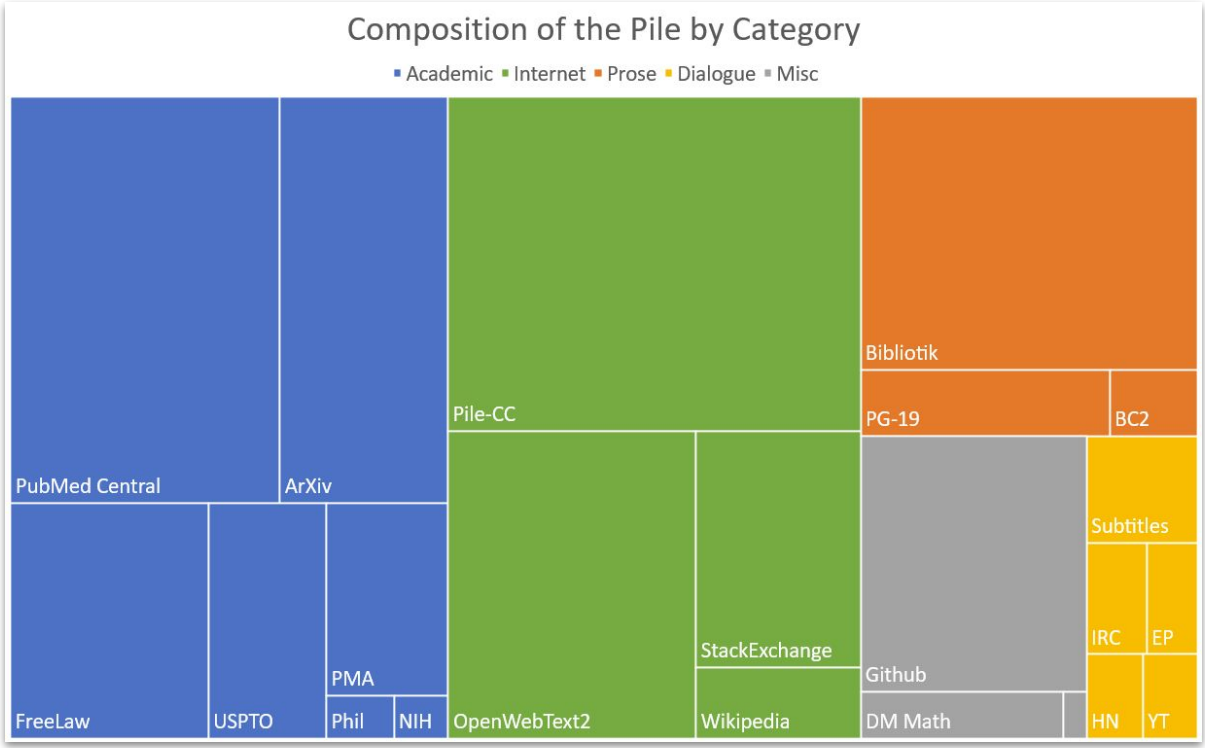
C4 Dataset breakdown



Source: Inside the secret list of websites that make AI like ChatGPT sound smart.

ThePile dataset breakdown

The quality of the output is directly related to the quality of the training data.



Source: [2101.00027] The Pile: An 800GB Dataset of Diverse Text for Language Modeling

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The challenge

GenAI challenges

1. Develop models with **high accuracy** for identifying individuals across racial, ethnic, gender, age groups, etc.

2. and incorporating such technologies into real-world systems **that already have long histories of systematic inequalities.**

What can we do?

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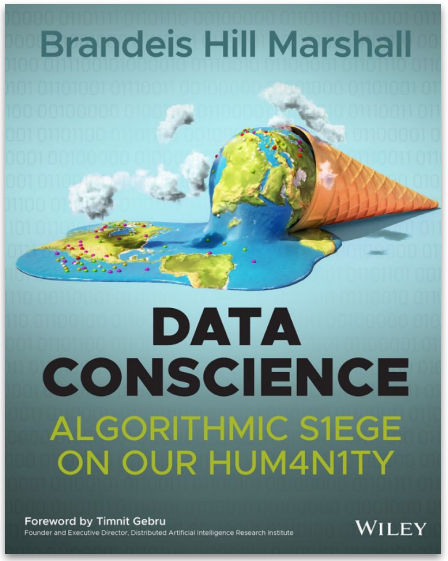
Learn & Understand

We are all data people!

Understanding is key!

- Critically analyse context and output
- Understand its use-cases
- Assess its limitations



Resources to Learn and Understand AI

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- ➔ Machine Learning Specialization by Andrew Ng
- ➔ Intro to LLMs by Andrej Karpathy
- ➔ Natural Language Processing Course (Transformers) - By Hugging Face
- ➔ Awesome-explainable-AI GitHub repository by Yongjie Wang

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“

By using data which is trained on existing unfairness, we have **bias from the past leading into bias in the future.**

Dr. Cathy O’Neil
Author of Weapons of Math Destruction

Sources

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- Mirror, mirror: LLMs and the illusion of humanity - Jodie Burchell (2024)
- Lies, damned lies and large language models — Jodie Burchell (2024)
- Generative Artificial Intelligence in the Energy Sector by Lars at al (2024)
- Meaning without Reference in LLMs by Piantadosi and Hill (2022)
- Inside the secret list of websites that make AI like ChatGPT sound smart by Schaul, Chen & Tiku (2023)
- Large Language Models associate Muslims with violence by Abid, Farooqi & Zou (2021)
- Download the C4 dataset (~7 TB) 😉
- [2101.00027] The Pile: An 800GB Dataset of Diverse Text for Language Modeling

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Thank You

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