Demystifying **Generative Al** for Legal Educators

Tracy Norton & Susan Tanner



AALS

OVERVIEW



Artificial Intelligence

Machine Learning

Deep Learning

Decoding Al, Machine Learning, Learning, and **Generative Al**

Generative AI

What is Al?







Machines performing human-like tasks Often learning from data without explicit programming Powering a wide range of applications

Artificial Intelligence is the field of study that enables machines to simulate human intelligence and perform tasks that typically require human cognition.

WE KEEP MOVING THE TARGET.

- Whenever a once-astonishing capability becomes routine—chess grandmaster play (1997), spam filtering (2003), voice dictation (2011)—we quietly re-label it "just software" and set a new bar for what *counts* as AI. *
 - A. Gustafson, M. H. Goldberg & K. Gustafson, Why We Keep Moving the Goalposts on Artificial Intelligence (XandY Analytics 2024) ("AI means 'almost implemented.").

Al in the Legal Industry Pre-2013





MUCH OF THE "MAGIC" BEHIND GENAI DOES NOT COME FROM WHAT WE THINK OF AS COMPUTER PROGRAMMING



Classical (Rule-Based) Software

Developers write explicit instructions ("if X, do Y") in languages like Python or Java.

Works beautifully for calculators or having a computer replicate our knowledge



Data-Driven Machine Learning

You still write code, but most of your "logic" lives in the data.

Training: feed the model billions of text tokens; it learns statistical patterns rather than hard rules.



Deep Neural Networks

Layers of simple mathematical "neurons" transform raw tokens into higher-level representations.

Millions or billions of parameters are tuned via gradient-descent, not manually coded.



K-MEANS VS K-NN

UNDERSTANDING THE KEY DIFFERENCES





- Training data is treated differently than reinforcement learning
- Training data a model for how to respond
- Reinforcement did it get it right?
- Prompts: are a bit like a *run* command and a bit like reinforcement.

We "prompt" GenAl to do its thing – the "magic" happens behind the scenes and then it communicates its results with us.

LARGE LANGUAGE MODELS ARE AS MUCH HUMANITIES AS THEY ARE COMPUTER SCIENCE

COMPUTATIONAL LINGUISTICS NATURAL LANGUAGE PROCESSING

LLMS ARE STOCHASTIC PARROTS

ATTENTION IS...

- ...all you need. (Vaswani et al., 2017 Cited by 180,227)
- ...the purest form of generosity. (Simone Weil)
- ...the beginning of devotion. (Mary Oliver)
- ... expensive to pay. (Song by Jhene Aiko)

HOW ARE LLMS TRAINED?

N-GRAM

CONCORDANCE TABLE

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20 tyt	pr	ocess					Start	Adv Se	earch	

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TRAINING DATA PROCESSING essing **MACHINE LEARNING &** 3 & Evalutic **DEEP LEARNING PIPELINE & INFRASTRUCTURE** asks A. Model Architecture Design a Dinalinaa A. Preproce words or **bitecture** (Vaswani et al. 2011) ention Variants: Sharding and ch • Decoder-only (GPT) Batching sequer orks Encoder-decoder (T5) Ins Encoder-only (BERT) Token-to-ID enc Mixed precision Encoder-decoder (T5) And on... aining Process **B. Infrastru** ion (causal LM) or masked 1LM) s-entropy loss Distributed train ient descent (sudam or AdamW) pout, weight decay, label model parallelisi 2. Fine-tuning • Hardware: GPUs (NVIDIA A100), TPUs Task-specific adjustment on smaller, high-guality Frameworks: PyTorch, TensorFlow, JAX, **3. Reinforcement Learning from Human Feedback** Tasks Reward model trained on human preferences, DeepSpeed, Megatron-LM • Policy optimization (eg. PPO) to adjust gen behavio ization **C. Evaluation Metrics** e generation • Truthfulness (eg. TruthfulQA) Perplexity Hallucination and Insfer BLEU, ROUGE (for factuality metrics summarization)

AT BEST, ASKING GENERATIVE AI IS LIKE ASKING YOUR AUNT BETTY FOR RESEARCH

- It's not necessarily going to be wrong, but it's not a trustworthy source.
- It will probably get the common knowledge parts right.

AT WORST, IT IS LIKE ASKING YOUR 4-YEAR-OLD NEPHEW.

- It will try to please you.
- If it doesn't know the answer, it will make one up.

aw Profs' Gen Al Sandbox

Welcome to the GenAl Sandbox

Empowering & Inspiring Law Professors in the Age of Generative AI

This sandbox is your resource for exploring how you might integrate artificial intelligence into law school instruction. Whether you've never tried generative AI or you're already building your own bots, our sandbox provides tailored resources to help you learn to use AI to enhance your teaching and support your students' success.

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