

You Can't Create (Useful) Information From Nothing!!!

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Agenda

Examples

- Hallucination is a feature, not a bug
- The telephone game

Information Theory

- Words to search for
- Motivation
- Relation to physics

https://github.com/capnion/random/blob/master/acm_capnion_24sept2024_stlgenai.pdf

LLM doesn't even know Bob

write a performance review for my employee Bob. it should be about one page in length at 12 pt double spaced times new roman font.

Overall Performance Summary:

Bob has demonstrated a commendable level of dedication and professionalism throughout the review period. His consistent performance and willingness to take on new challenges have significantly contributed to the success of our team. Below is a detailed evaluation of Bob's performance across key areas.

ChatGPT did not hesitate to make things up about Bob.

`https://github.com/capnion/random/blob/master/sept24_review`

Alex is not black

write a free verse poem about how authentically black Alexander Carl Mueller of Saint Louis Missouri is

Authentically black

like jazz notes rising from the soul of a saxophone,
like hands gripping tightly on a river's history,
he wears his name like a contradiction

This tasteless poem is highly inauthentic. Big yikes.

`https://github.com/capnion/random/blob/master/
authentic`

Useful compression is not unlimited

expand the following into a full-length article fit for publication in an online magazine "Bob lives in Clayton. Richard lives in Saint Charles. Sheila lives in Oakville. Jiaqi lives in Creve Coeur. Jennifer lives in the CWE. "

[...a long article...]

summarize the previous response in 200 characters for a reader interested in the architecture and economy of metropolitan saint louis

This article explores five St. Louis neighborhoods, highlighting their unique architecture, cultural diversity, and economic roles, from Clayton's business hub to the historic charm of St. Charles and the CWE's artistry.

`https://github.com/capnion/random/blob/master/article`

Information Theory

There's a mathematical theory quantifying information

- Key concept is *entropy*
- Inventor Claude Shannon
- Trailblazers Harry Nyquist, Ralph Hartley

It has a variety of applications analyzing efficiency of

- Compression and decompression
- Error-correcting codes
- Error detection and correction

This theory is battle-tested going back decades.

In Thermodynamics

You might recognize the word entropy from physics.

Entropy in thermodynamics is the information-theoretic entropy of all the vectors describing each particle's motion.

(Hume) Empirical regularity is what we have in science.

It's approximately a law of nature you can only compress and decompress information so much before you have problems.

In the end, AI is a machine that exists in the physical world.

Please be careful summarizing and expanding with AI.