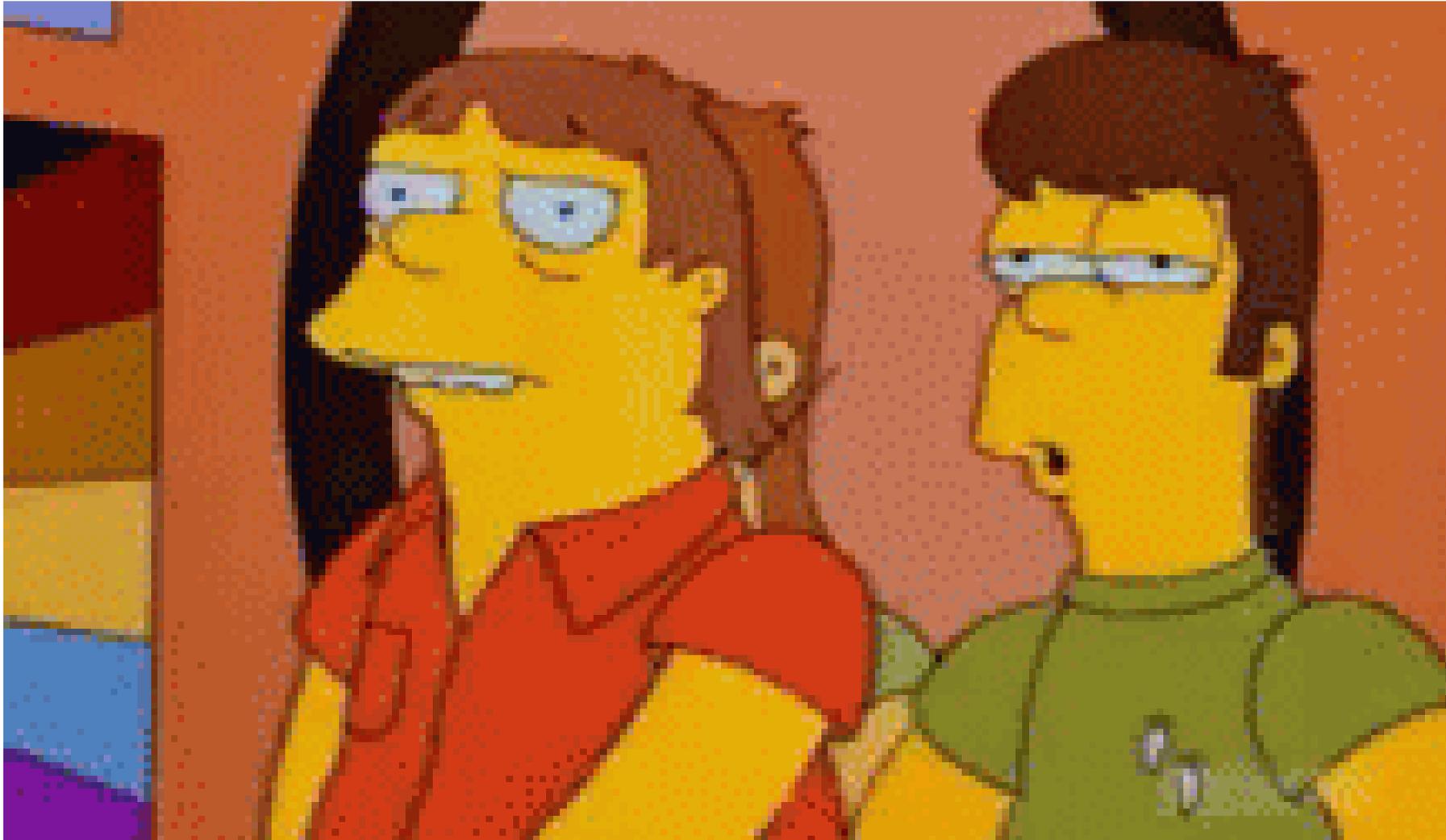


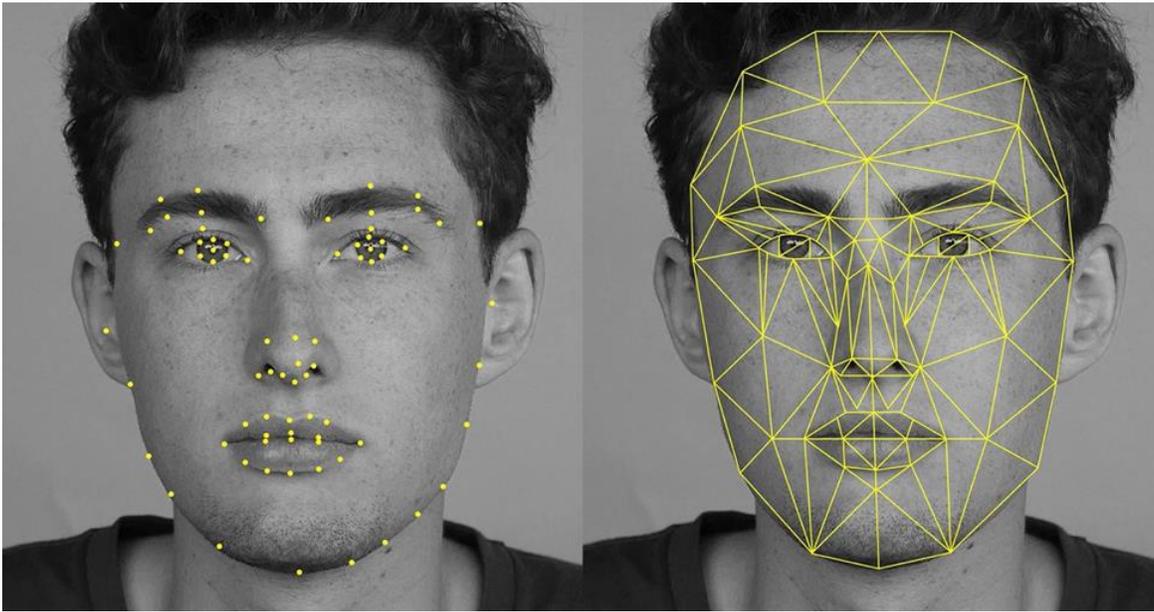


**Carl Vinson
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A Gentle Introduction to GenAI

**Thursday, February 26, 2026
Georgia Fiscal Management Council**





Presentation Goals

Hopefully by today presentation's you will:

- Understand how AI and GenAI systems are built.
- Learn three new prompting engineering techniques.
- Identify ethical and legal challenges in integrating AI.



What the @#\$%&! is AI?

Understanding the Basics



artificial intelligence (AI).

according to John McCarthy, Stanford University Professor of Computer Science, it is “the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.”



artificial intelligence (AI).

refers to technology that is designed and deployed to mimic intelligent human behavior.



What is intelligent human behavior?

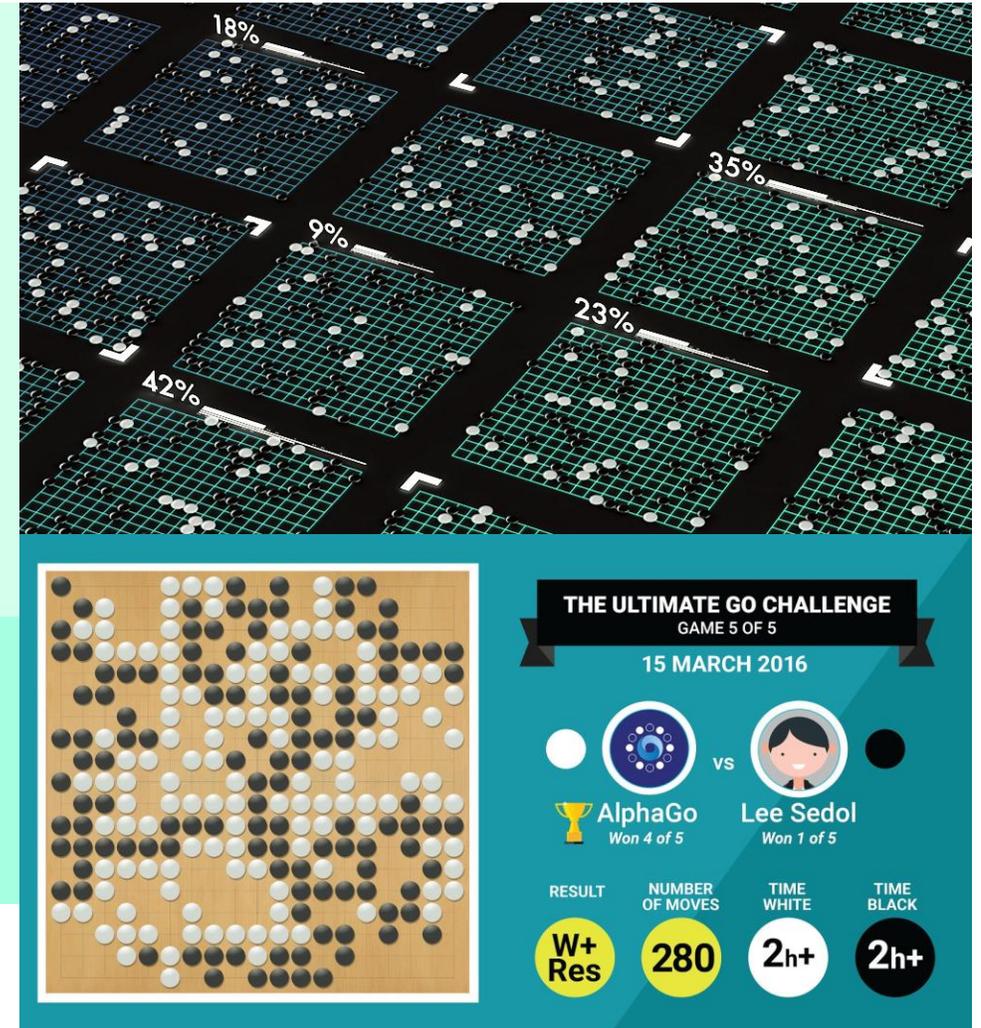
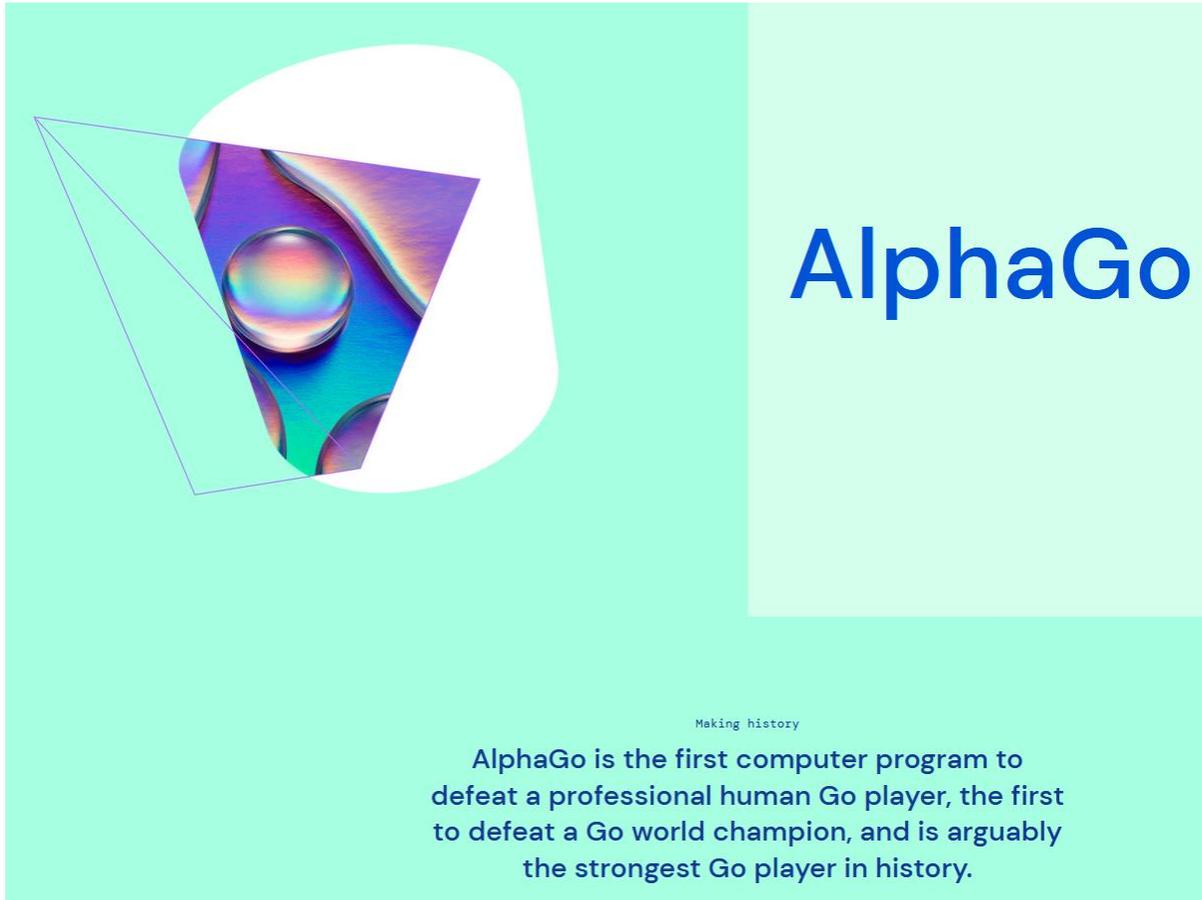
1. Learning from experience.
2. Recognizing and identifying emerging trends.
3. Automating complicated processes.
4. Solving complex problems (e.g., optimize, predict, and recommend).



What is intelligent human behavior?



What is intelligent human behavior?



artificial general intelligence (AGI).

refers to the hypothetical intelligence of a machine that possesses the capacity to understand, learn, adapt, and apply its intelligence to solve intellectual tasks humans can. Unlike conventional AI models, which are designed for a specific task (e.g., playing chess), AGI abilities can be deployed across many subjects and tasks.



What is intelligent human behavior?

Weak (Narrow) AI

- Specialist (Tool).
- Learns patterns from historical data about the task or subject.
- Designed and deployed for one specific task or subjects.
- Simulates “understanding” through pattern matching.
- Requires human interaction.

Strong (General) AI

- Generalist (Agent).
- Can understand and perform any intellectual task a human can.
- Can transfer knowledge and skills between tasks and subjects.
- Possesses genuine comprehension, common sense, and context.
- Potentially autonomous.



What is intelligent human behavior?

Weak (Narrow) AI



Strong (General) AI



Select AI Index technical performance benchmarks vs. human performance

Source: AI Index, 2025 | Chart: 2025 AI Index report

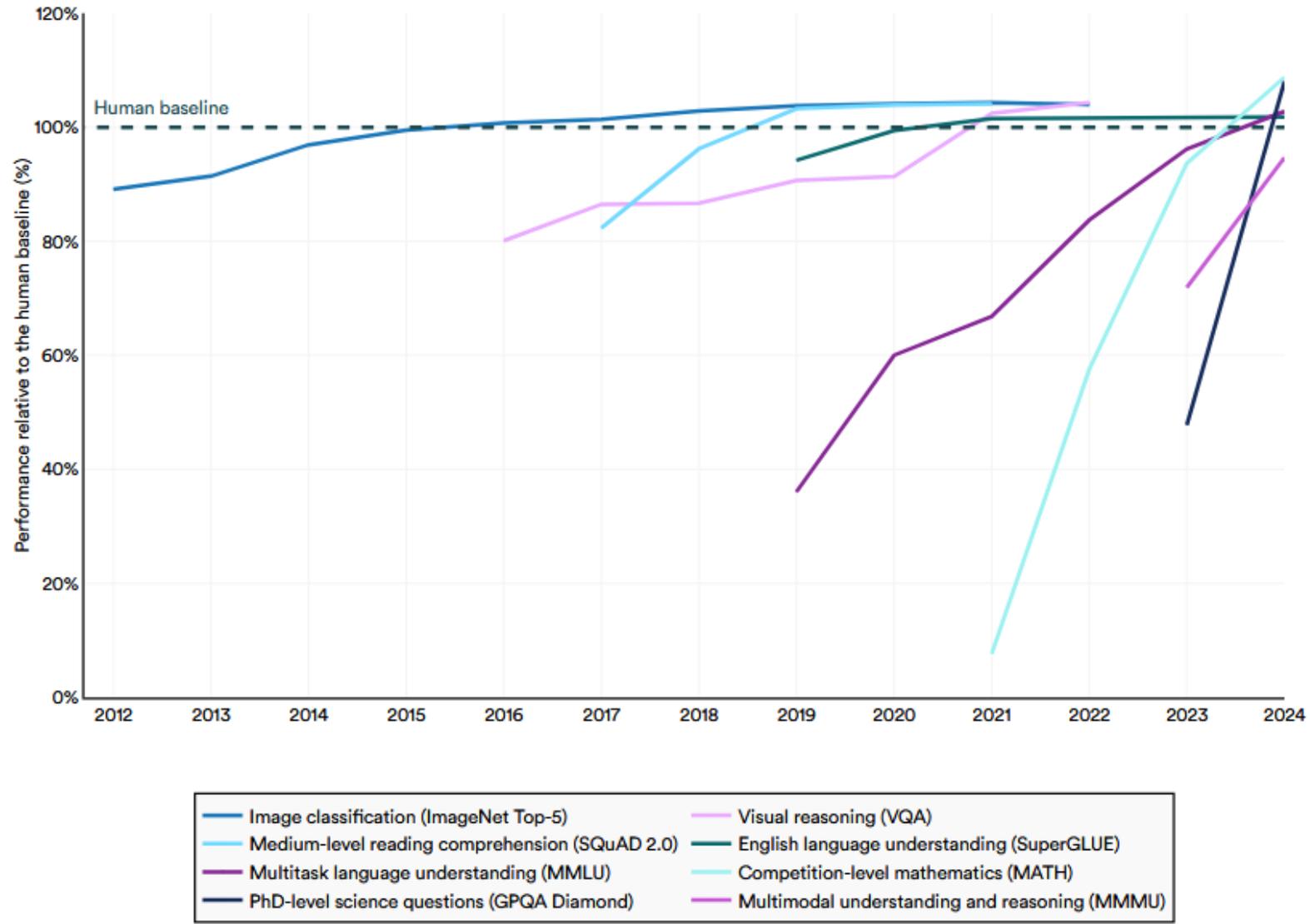


Figure 2.1.33*



Performance (rows) x Generality (columns)	Narrow <i>clearly scoped task or set of tasks</i>	General <i>wide range of non-physical tasks, including metacognitive tasks like learning new skills</i>
Level 0: No AI	Narrow Non-AI calculator software; compiler	General Non-AI human-in-the-loop computing, e.g., Amazon Mechanical Turk
Level 1: Emerging <i>equal to or somewhat better than an unskilled human</i>	Emerging Narrow AI GOFAI (Boden, 2014); simple rule-based systems, e.g., SHRDLU (Winograd, 1971)	Emerging AGI ChatGPT (OpenAI, 2023), Bard (Anil et al., 2023), Llama 2 (Touvron et al., 2023), Gemini (Pichai & Hassabis, 2023)
Level 2: Competent <i>at least 50th percentile of skilled adults</i>	Competent Narrow AI toxicity detectors such as Jigsaw (Das et al., 2022); Smart Speakers such as Siri (Apple), Alexa (Amazon), or Google Assistant (Google); VQA systems such as PaLI (Chen et al., 2023); Watson (IBM); SOTA LLMs for a subset of tasks (e.g., short essay writing, simple coding)	Competent AGI not yet achieved
Level 3: Expert <i>at least 90th percentile of skilled adults</i>	Expert Narrow AI spelling & grammar checkers such as Grammarly (Grammarly, 2023); generative image models such as Imagen (Saharia et al., 2022) or Dall-E 2 (Ramesh et al., 2022)	Expert AGI not yet achieved
Level 4: Virtuoso <i>at least 99th percentile of skilled adults</i>	Virtuoso Narrow AI Deep Blue (Campbell et al., 2002), AlphaGo (Silver et al., 2016; 2017)	Virtuoso AGI not yet achieved
Level 5: Superhuman <i>outperforms 100% of humans</i>	Superhuman Narrow AI AlphaFold (Jumper et al., 2021; Varadi et al., 2021), AlphaZero (Silver et al., 2018), StockFish (Stockfish, 2023)	Artificial Superintelligence (ASI) not yet achieved



What the @#\$%&! is AI?

Understanding the Basics



generative ai (GenAI).

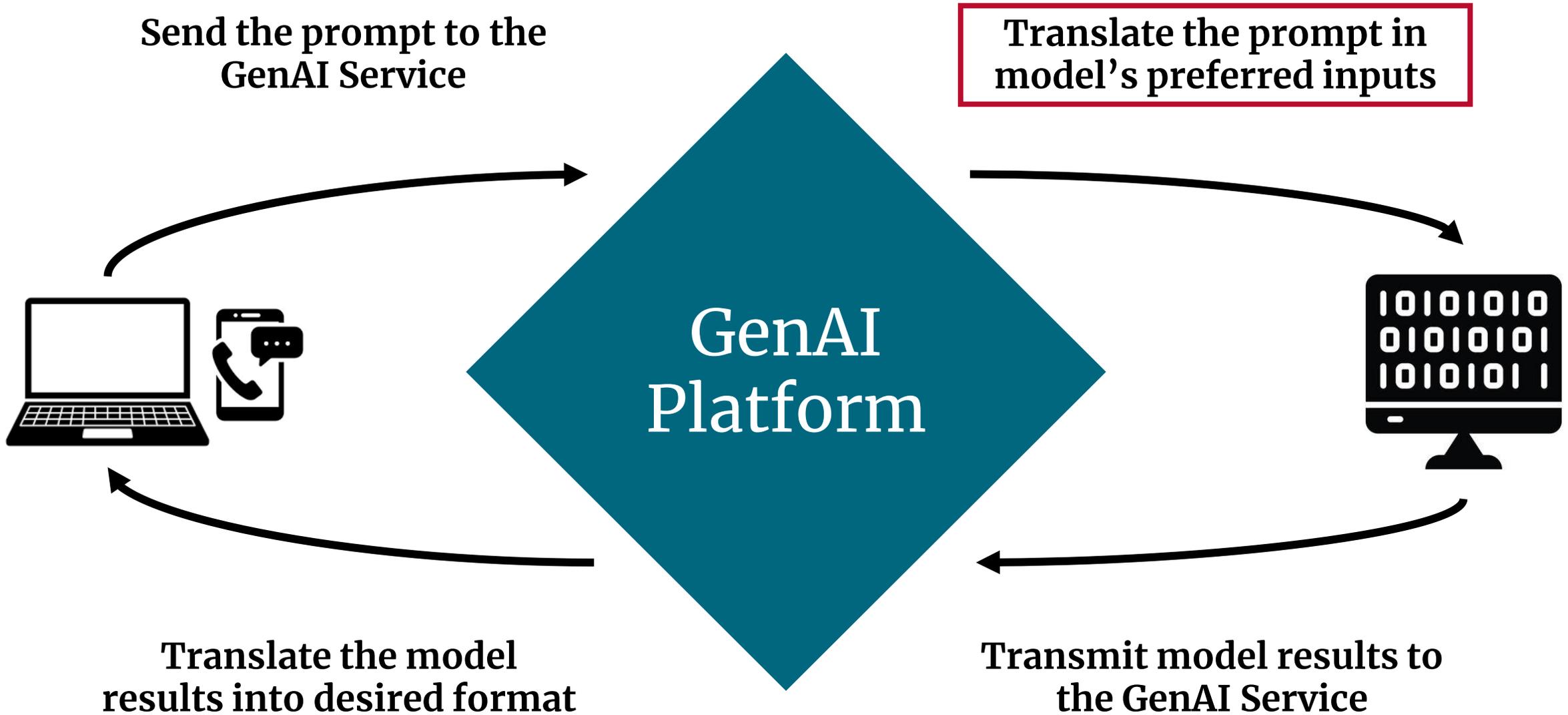
refers to AI systems capable of producing novel content like text, images, audio, or video, based on prompts or input data. Unlike traditional AI model that primarily analyzing, interpreting, and predicting outcomes, generative AI focuses solely on creation.



large language models (LLMs).

an artificial intelligence model designed to understand, generate, and work with human language. It is built using deep learning, specifically the transformer architecture, and trained on vast amounts of text data so it can predict and produce coherent language.





tokenization.

the process of breaking down human language into smaller units called tokens, which are the building blocks that large language models (LLMs) use to process information. Depending on the prompt these tokens may be words, sub-words, colors, boundaries, or characters.



prompt engineering.

the iterative process of composing optimized instructions to guide GenAI models to generate relevant and reliable outputs.



prompts.

a carefully crafted instruction given to a GenAI model to generate a specific output (e.g., text and images). Prompts are the bridge between humans and AI capabilities when generating content.



For breakfast, I would like to have

oatmeal

1%

French toast

31%

eggs

68%

with

75%

on

15%

in

10%

bacon

95%

sausage

4%

toast

1%

For breakfast, I would like to have eggs with bacon.



Making GenAI Work For You

Temperature

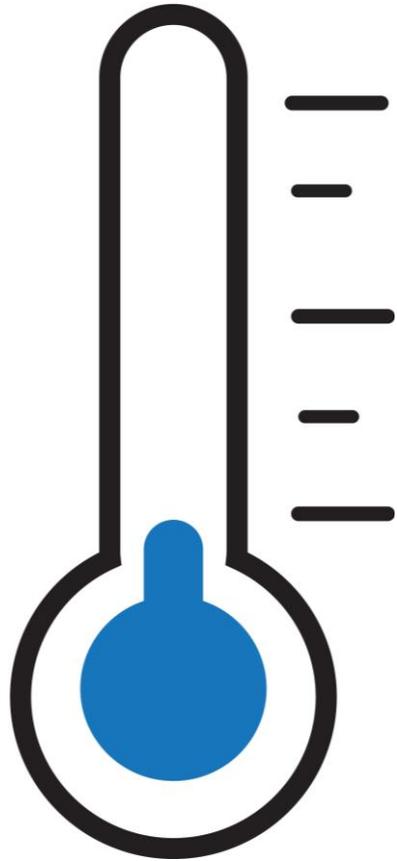


temperature.

is a GenAI model setting that controls the randomness of responses by how much the AI "weighs" the probabilities of tokens.



Lowering GenAI's Temperature

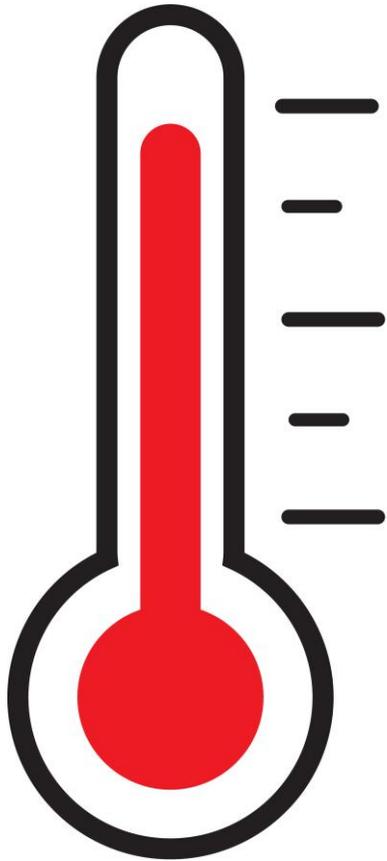


Lowering the temperature setting will lead:

- To more specific, factual, and realistic responses.
- Higher probability tokens (e.g., words, pixels, etc.) are favored over less probable ones.
- Useful for tasks requiring consistency and accuracy such as information retrieval.
- You can indirectly lower the temperature by using phrases like “be precise and factual”.



Raising GenAI's Temperature



Raising the temperature setting will lead:

- To more creative, diverse, but occasionally unforeseen or non-sensical responses.
- All potential tokens (e.g., words, pixels, etc.), even extremely divergent ones, are more probable.
- Useful for tasks needing expressive and creativity such as brainstorming and social media.
- You can indirectly lower the temperature by using phrases like “be creative and exploratory”.



Prompt #1:

Using a temperature of 0.0, what is the typical day of a state government fiscal officer in 50 words?

Gemini:

A state government fiscal officer manages financial operations, oversees budgets, and ensures regulatory compliance. They monitor expenditures, process payroll, and prepare financial reports. Their day includes auditing accounts, managing investments, and coordinating with department heads to maintain fiscal responsibility. They ensure that public funds are used efficiently and according to law.

Prompt #2:

Using a temperature of 0.0, what is the typical day of a state government fiscal officer in 50 words?

Gemini:

Sunlight dissects skyscraper ledgers. The fiscal sentinel navigates tectonic budget-plateaus, balancing gravitational debt-swirls with digital ink-alchemy. Amidst a hurricane of legislative whispers and auditing-tempests, they forge crystalline transparency from the molten chaos of public coffers, anchoring the state's economic heartbeat within a vault of shimmering, mathematical stardust.



Making GenAI Work For You

Top-K Sampling



top-k sampling.

is a GenAI model setting that limits responses to the expanding or restricting the "pool" of tokens that it can choose from.



Top-K Sampling

1. **Ranking:** A GenAI platform ranks every possible next token from highest to lowest probability of occurring.
2. **Thresholding:** The platform will then only keep the specified top k number of tokens and throws away everything else.
3. **Rescaling:** The platform will then recalculate the specified top k number of tokens, so they add up to 100%.
4. **Sampling:** The platform will then pick one of those tokens based on their new probabilities.



Prompt #1:

Using top-k setting of 1, what is the typical day of a fiscal auditor working in government in 50 words or less?

Gemini:

A typical day for a government fiscal auditor involves reviewing financial records, auditing government agencies, and ensuring compliance with laws. They examine budgets, identify financial discrepancies, and prepare detailed reports. Their work focuses on maintaining fiscal accountability and ensuring the efficient use of public funds for the citizens.

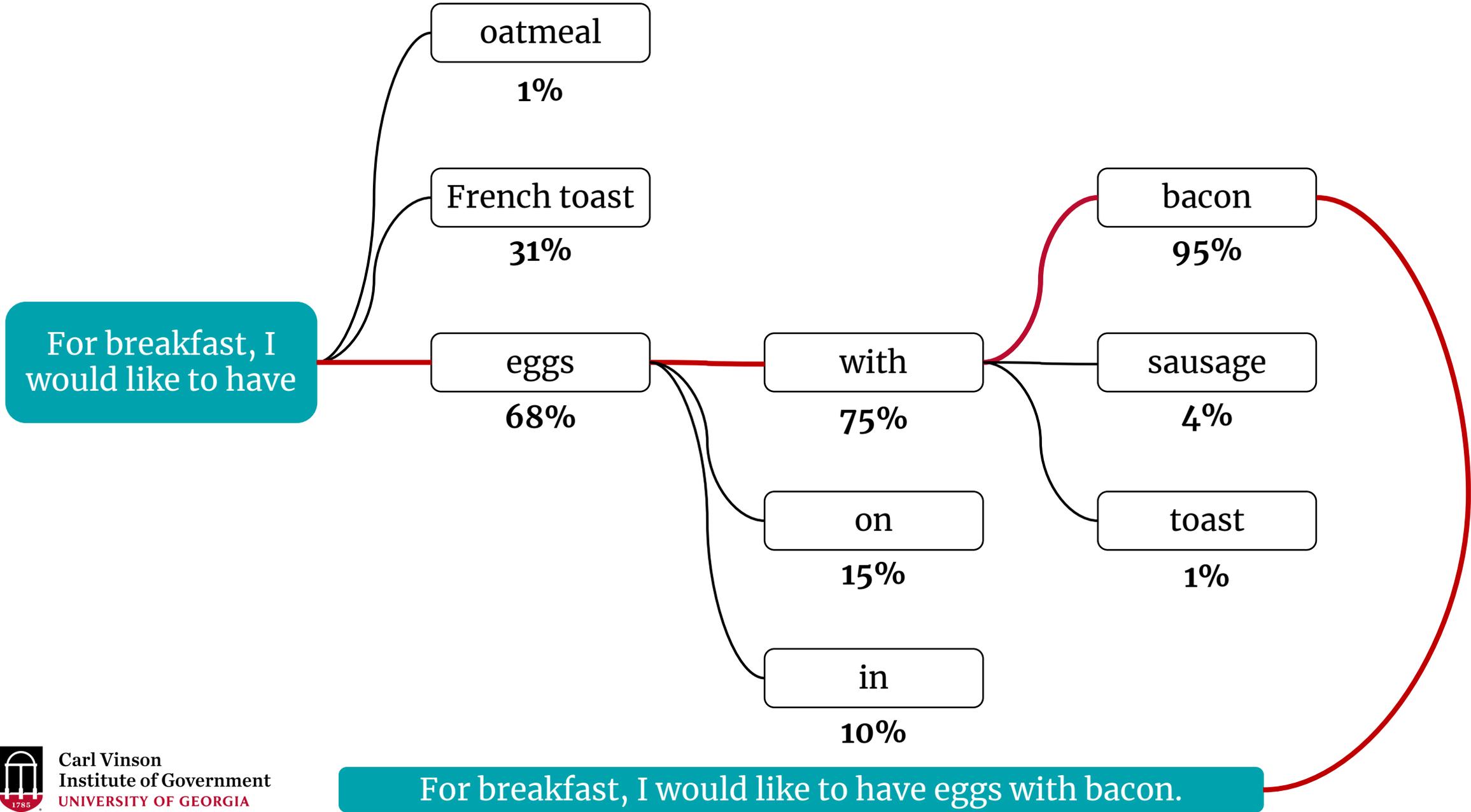
Prompt #2:

Using top-k setting of 250, what is the typical day of a fiscal auditor working in government in 50 words or less?

Gemini:

A government fiscal auditor's day is an intensive pursuit of financial integrity. They scrutinize complex ledgers, verify compliance with stringent statutes, and dissect budgetary anomalies. Navigating through bureaucratic layers, they synthesize raw data into authoritative findings, ensuring that public resources are safeguarded with unwavering transparency and analytical precision.





Making GenAI Work For You

Top-P Sampling



top-p sampling.

also known as nucleus sampling refers to a GenAI model setting that dynamically filters tokens based on their cumulative probability surpassing a specified threshold “p”.



Top-P Sampling

1. The GenAI platform will sort all potential tokens by probability.
2. The platform then sums up their probabilities and identify all the words whose cumulative probability is higher than the specified threshold.
3. The platform will then throw away all other tokens and sample from that “nucleus”.



Top-P Sampling

For breakfast, I would like to have eggs with...

Top-P = .50

<u>Next Word</u>	<u>Probability</u>
Bacon	50%
Pork Sausage	25%
Chicken Sausage	10%
Steak	14%
Tofu	1%

Top-P = .80

<u>Next Word</u>	<u>Probability</u>
Bacon	50%
Pork Sausage	25%
Chicken Sausage	10%
Steak	14%
Tofu	1%



Prompt #1:

Using top-p of 0.01, what is the process for developing a budget for a state agency?

Gemini:

The process for developing a state agency budget involves several key steps. First, the agency prepares a budget request based on strategic goals and historical spending. This request is submitted to the state budget office for review. Finally, the governor includes the request in the executive budget for legislative approval.

Prompt #2:

Using top-p of 0.99, what is the process for developing a budget for a state agency?

Gemini:

The journey begins with agencies meticulously projecting fiscal needs against shifting policy landscapes. These requests undergo rigorous scrutiny by budget analysts before the Governor harmonizes competing priorities into a unified executive proposal. Finally, the budget enters the legislative arena, where intensive hearings and political negotiations forge the final spending authority.



Making GenAI Work For You

GenAI Settings Wrap-Up



GenAI Settings Wrap-up

GenAI Setting	Purpose	Low Setting	High Setting
Temperature	Randomness	Precise, factual, and repetitive.	Creative, risky, and unpredictable.
Top-K	Vocabulary	Picks from a tiny pool. Very consistent and stable.	Accesses a massive dictionary for rich descriptions.
Top-P	Diversity	Only considers the "crème de la crème" of likely words.	Includes rare but interesting "long-tail" vocabulary.



Temperature



Top-K



Top-P



GenAI Settings Profiles

The Fact-Checker (Precise & Literal)

- **Settings:** Temperature: 0.1 (0.1), Top-P: 0.1, Top-K: 1
- **Use for:** Tasks needing a higher level of precision such as developing code, summarizing documents, or language translation.
- **Result:** Focus is geared toward accuracy

The Professional Assistant (Balanced & Polished)

- **Settings:** Temperature: 0.7 (0.3), Top-P: 0.9, Top-K: 50
- **Use for:** Tasks balancing creativity and accuracy such as writing emails, blog posts, or daily rote tasks.
- **Result:** Sounds human and articulate without losing the point.



GenAI Settings Profiles

The Creative Storyteller (Evocative & Varied)

- **Settings:** Temperature: 0.9 (0.6), Top-P: 0.99, Top-K: 100
- **Use for:** World-building, poetry, or character dialogue.
- **Result:** Uses metaphors, vivid adjectives, and unexpected phrasing.

The Chaos Engine (Surreal & Experimental)

- **Settings:** Temperature: 1.5+ (0.8+), Top-P: 1.0, Top-K: 1000
- **Use for:** Intense brainstorming or “abstract” inspiration.
- **Result:** Often nonsensical, but can spark wild, original ideas.



Making GenAI Work For You

Best Practices



Best Practices

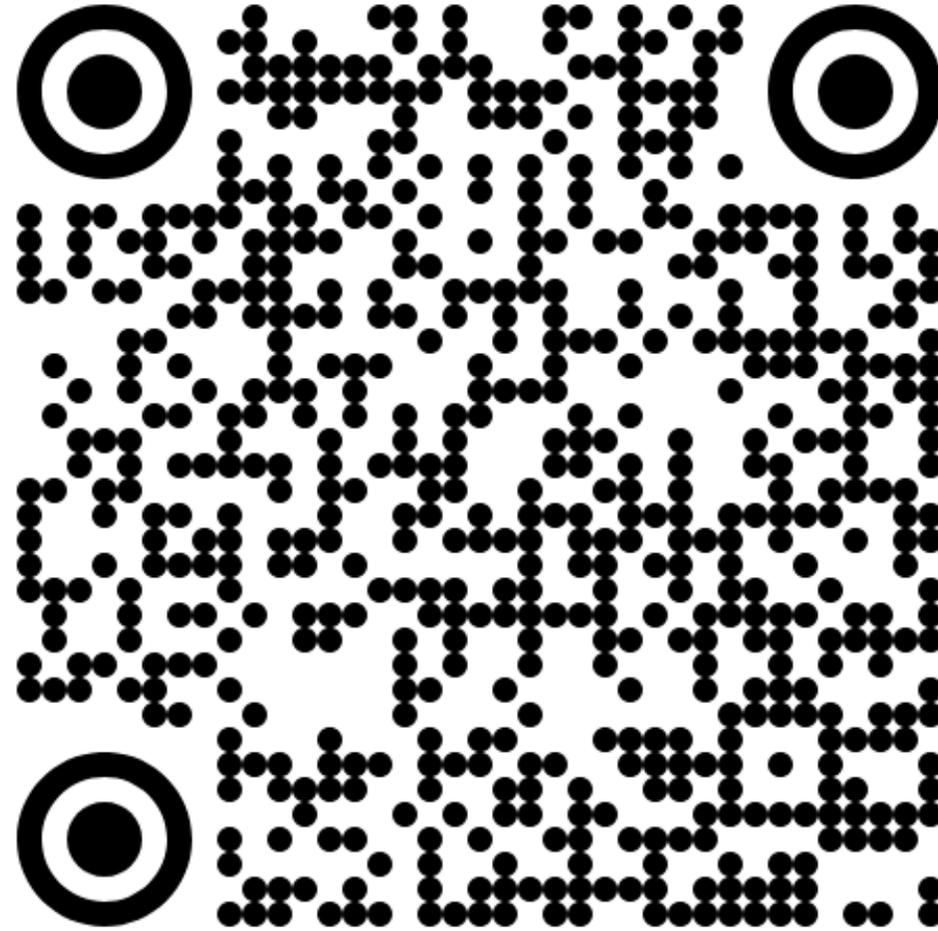
1. Be succinct and do not say the word “please”.
2. Set up different chats or notebooks for specific tasks.
 - Manually set a GenAI internal setting, if possible.
 - Create a setting profile as a global setting.
1. Leveraging the chat’s long- and short-term memory and purge when necessary.
2. Adopt prompt chaining techniques which is an iterative process of breaking down tasks into smaller, interconnected prompts.



Questions & Answers



Contact Information





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