



*ICEAA 2024 Workshop  
Best Paper in the Strategy, Soft  
Skill, & Trending Topics Track*

# ChatGPT **Friend** or **Foe**: Meet Your New EN SME

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All Images From ChatGPT – Dall-E

Prompt: “Can I have an image for this slide?”

Follow Up: “Can I have a cartoon image for this slide?”

Attached to Prompt: “Image of Slide”

# Setting The Stage: Me and ChatGPT

- I am **not an AI expert**; I am just a cost analyst interested in emerging technology
- This is **not an ad** for ChatGPT, there are many AI language models available for use
- I have used ChatGPT in many ways and think it is a **powerful tool** for specific scenarios
- I believe it should be **used with caution** and its further development regulated
- This presentation will focus on the current model's capabilities and will stay away from the more subjective “What-ifs” and philosophical debates





## Intro Questions:



- Who has **heard** of ChatGPT?
  - Should be a good amount of people
- Who has **used** ChatGPT?
  - Could be fewer people
- Who has made their **life or work easier** with ChatGPT?
  - Might not be anyone; want to talk to those that do
- Who is **afraid** of ChatGPT?
  - Potentially many people



# The Genesis of Gab: ChatGPT Background

- The birth of ChatGPT can be traced back to **OpenAI**, a trailblazer in the AI realm
  - The model relies on a transformer-based language processing AI, with GPT standing for **Generative Pretraining Transformer**
- Despite its sophistication, it's critical to remember that ChatGPT doesn't possess beliefs, intentions, or desires; it merely **mimics human-like text** generation based on the information it was trained on



# The “GPT” in ChatGPT



- **Generative Pretraining Transformer (GPT)** models, a groundbreaking development by OpenAI, represent a class of **transformer**-based language processing artificial intelligence systems
  - The basis of the GPT models is a transformer architecture that uses self-attention mechanisms to understand **contextual relationships** between words in a text
- Initially **pre-trained** on a vast corpus of internet text, the models learn to **predict the next word in a sentence**, enabling them to generate text that is remarkably human-like
  - This pretraining phase is followed by a fine-tuning stage, where the model is trained on a smaller, task-specific dataset to optimize its performance

## Model Progression: GPT 1-4

- From P. Verma & K. Schaul, “See why AI like ChatGPT has gotten so good, so fast”, Washington Post, WP Company, 25May2023, [Link](#)
- Prompt: “**A clever name for a play about dinosaurs is**”

- **2018** – OpenAI GPT – “to quote the most brilliant of examples : ‘who can say for sure they weren’t aliens or aliens or aliens? they had the appearance of aliens ; they wore black leather pants and they walked with much”

- **2019** – GPT-2 – “Dino-Brawl. Dinosaur-Brawl — which can be viewed in the player’s perspective — starts with Mr. D, a dino-hunter, chasing down a lone”

- **2023** – ChatGPT-3 – “Dino-Mite: The Mesozoic Extravaganza!”

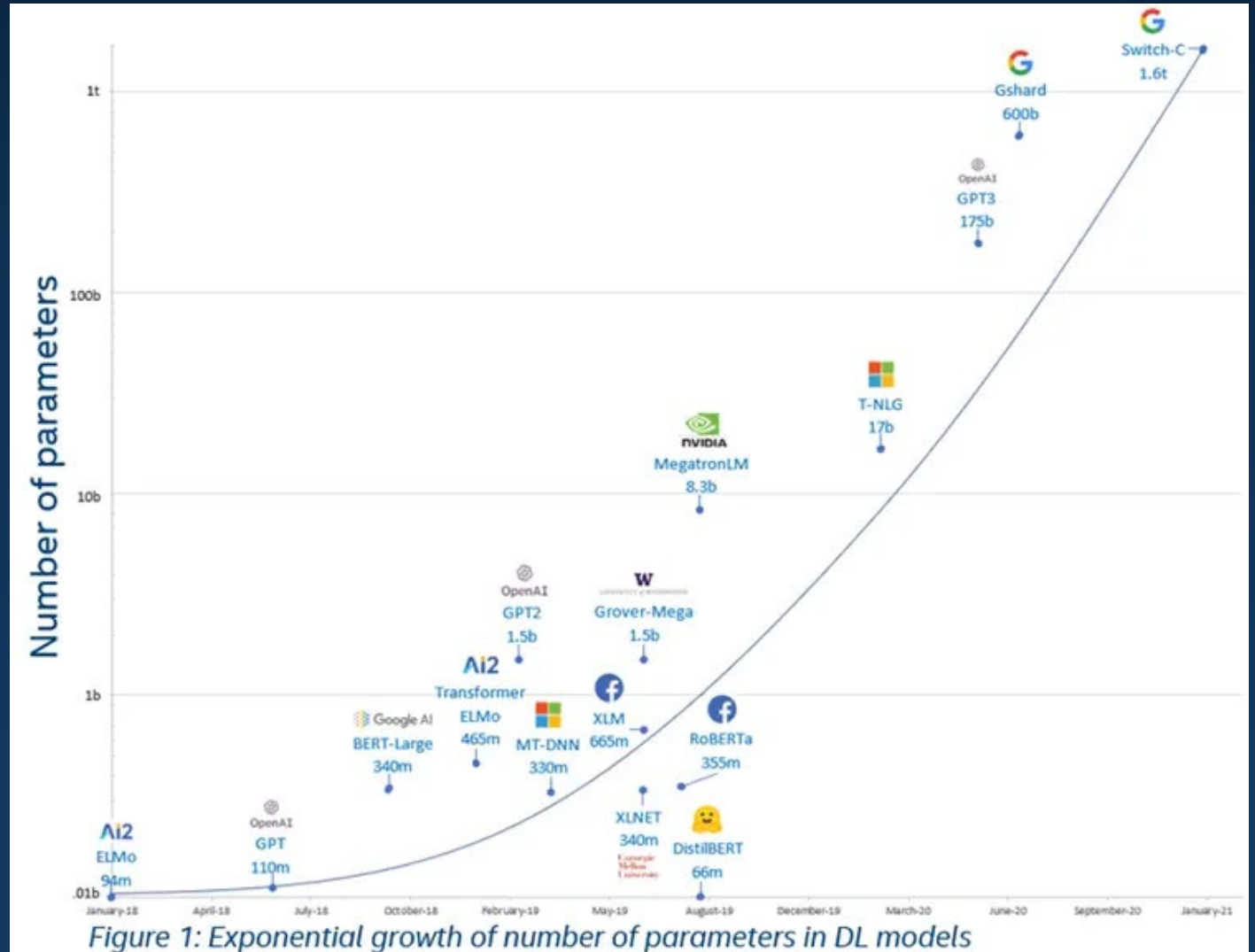
- **2023** – ChatGPT-3.5 – “Jurassic Jamboree: The Mesozoic Melodrama”

- **2023** – ChatGPT-4 – “Jurassic Jest: A Comedic Romp Through Prehistory”



# Model Progression: 100 Thousand to 1 Trillion Parameters

- 1<sup>st</sup> graph from G. Statie, “The Hitchhiker's Guide to GPT3”. Published online at [heits.digital](https://heits.digital), 16Feb2022, [Link](#)



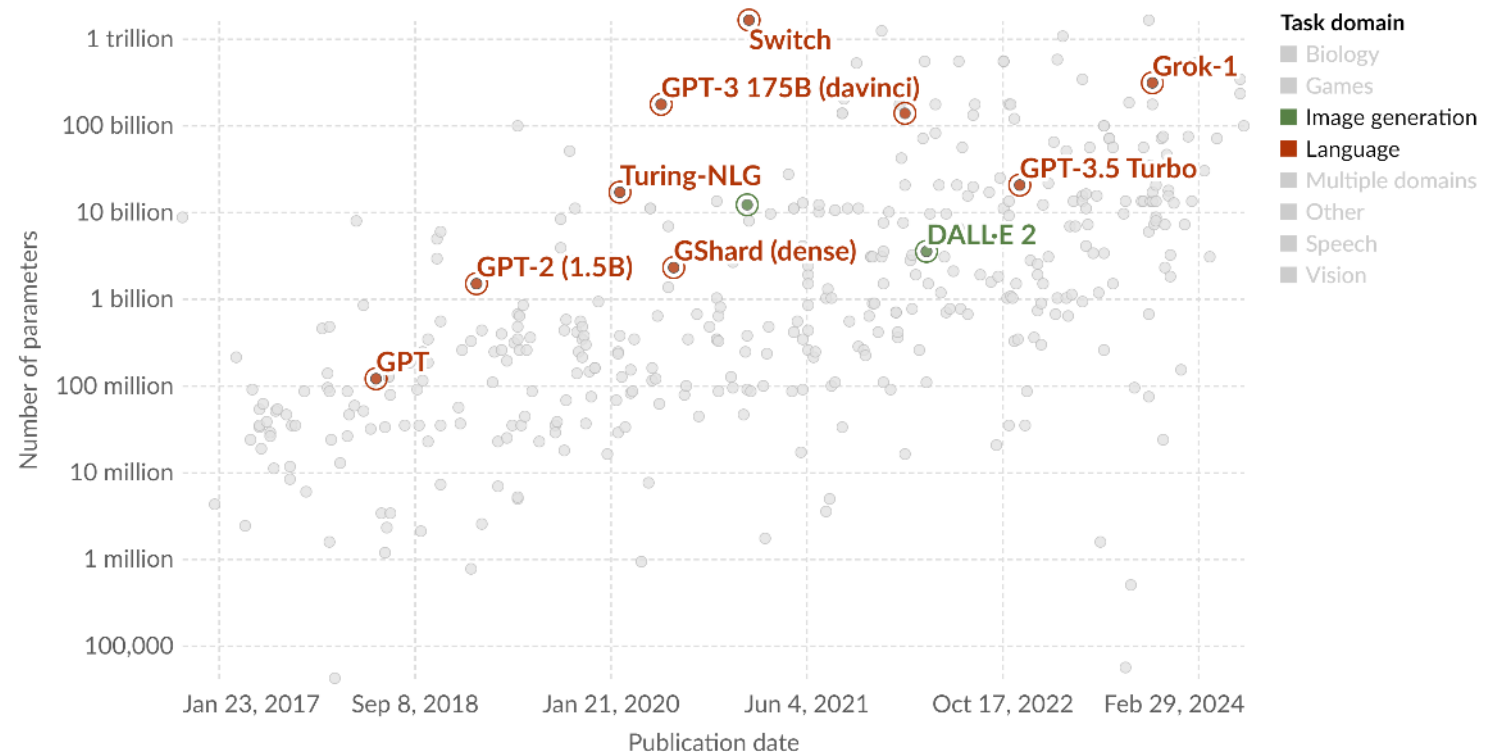
# Model Progression: 100 Thousand to 1 Trillion Parameters

- 2<sup>nd</sup> graph from Epoch AI, 'Parameter, Compute and Data Trends in Machine Learning'. Published online at [epochai.org](http://epochai.org), [Link](#)

## Parameters in notable artificial intelligence systems

Our World in Data

Parameters are variables in an AI system whose values are adjusted during training to establish how input data gets transformed into the desired output; for example, the connection weights in an artificial neural network.



Data source: Epoch (2024)

OurWorldInData.org/artificial-intelligence | CC BY

Note: Parameters are estimated based on published results in the AI literature and come with some uncertainty. The authors expect the estimates to be correct within a factor of 10.

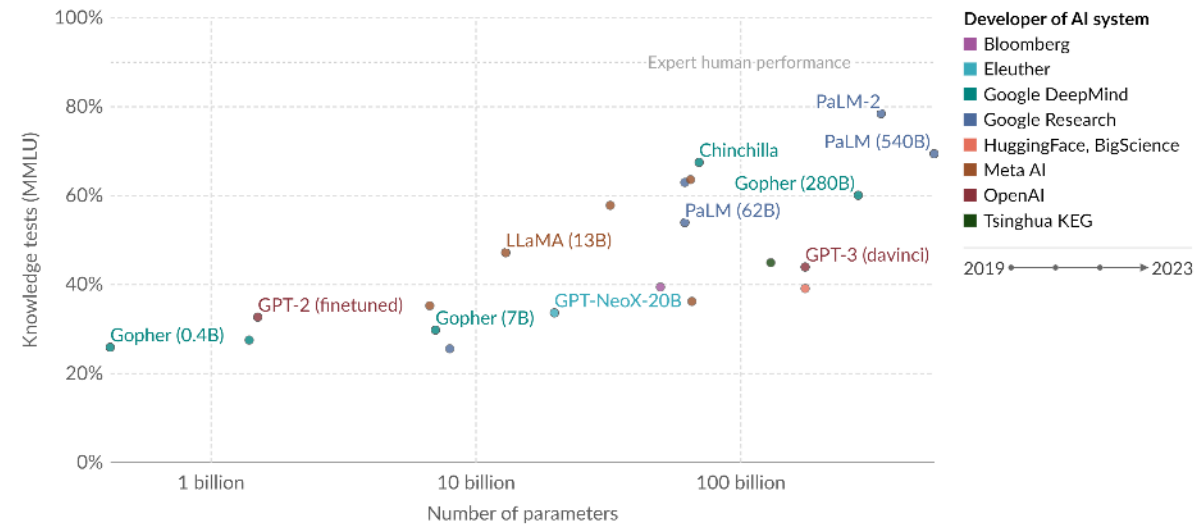
# Model Progression: 100 Thousand to 1 Trillion Parameters

- 3<sup>rd</sup> graph from Epoch (2023) – with minor processing by Our World in Data. “Performance on knowledge tests (MMLU)” [Link](#)

## Artificial intelligence: Performance on knowledge tests vs. number of parameters

Our World in Data

Performance on knowledge tests is measured with the MMLU benchmark<sup>1</sup>, here with 5-shot learning, which gauges a model's accuracy after receiving only five examples for each task. Parameters are variables in an AI system whose values are adjusted during training to establish how input data gets transformed into the desired output; for example, the connection weights in an artificial neural network.



Data source: Epoch (2023)

OurWorldInData.org/artificial-intelligence | CC BY

**Note:** The values for the number of parameters are estimates and come with some uncertainty, especially for models for which only minimal information has been disclosed.

**1. MMLU benchmark:** The Massive Multitask Language Understanding (MMLU) benchmark mimics a multiple-choice knowledge quiz designed to gauge how proficiently AI systems can comprehend various topics like history, science, or psychology. It has 57 different sections, each one looking at a particular subject. The MMLU test has 15,908 questions in total, which are split up into smaller sets. There are at least 100 questions about each subject. The questions in the test come from many places, like practice tests for big exams or questions from university courses. The difficulty of the questions varies, some are as easy as elementary school level, while others are as hard as what professionals in a field might know. The scores achieved by humans on this test are largely dependent on their level of expertise in the subject matter. Individuals who are not specialists in a given area typically achieve a correctness rate of around 34.5%. However, those with a deep understanding and proficiency in their field, such as doctors sitting for a medical examination, can attain a high score of up to 89.8% on the test.



# Halftime Questions:

- Who has had to rely on **engineering input** to estimate the cost of something?
  - WBS Decision, Technical Specifications, Analogous Systems/Programs
- How **easy** was it to get the info you needed?
  - Did you have a **dedicated EN**?



- Were **follow-up meetings** necessary to obtain all info?
  - How much time did back-and-forth meetings take?
- Can your engineers explain the same topic in **multiple ways**?
  - Without getting annoyed?

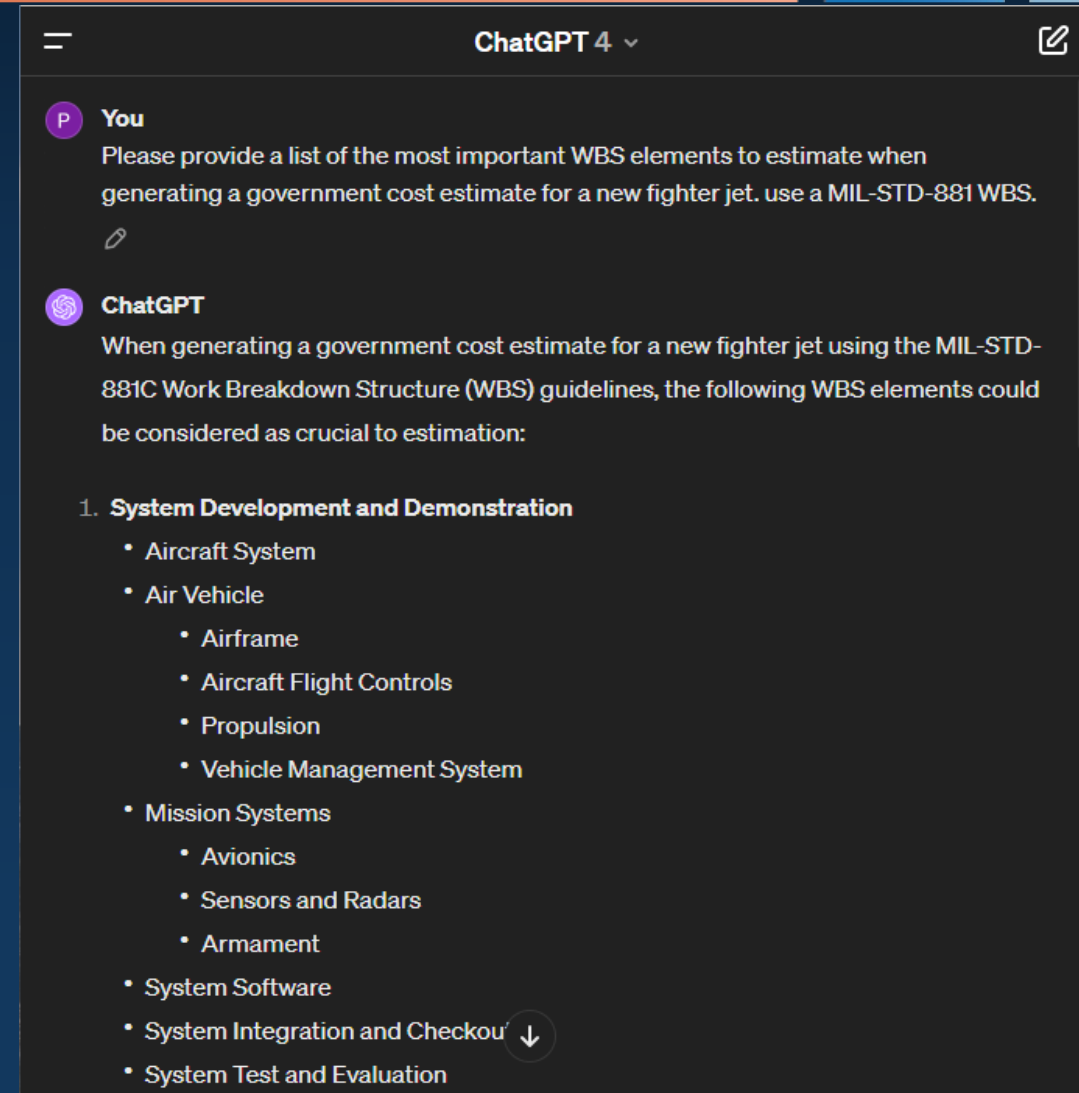
# Understanding the ChatGPT Persona

- ChatGPT-4 can provide valuable insights into various engineering concepts due to its training on a wide range of internet text, including technical documents, making it a **virtual Engineering SME**
  - Its ability to process and generate language can help in creating an initial **Work Breakdown Structure (WBS)**, where it could propose tasks, dependencies, and milestones based on the provided project scope
  - Moreover, by analyzing technical specifications inputted by the user, ChatGPT can help identify **analogous programs or projects**, potentially aiding in cost estimation
  - It can also be a resource for explaining the **specifications and potential applications** of various **hardware items**, contributing to a more informed decision-making process
- However, users should bear in mind that while it can provide valuable insights, it's **NOT a replacement for a human expert**



# Use Case 1 – WBS Considerations

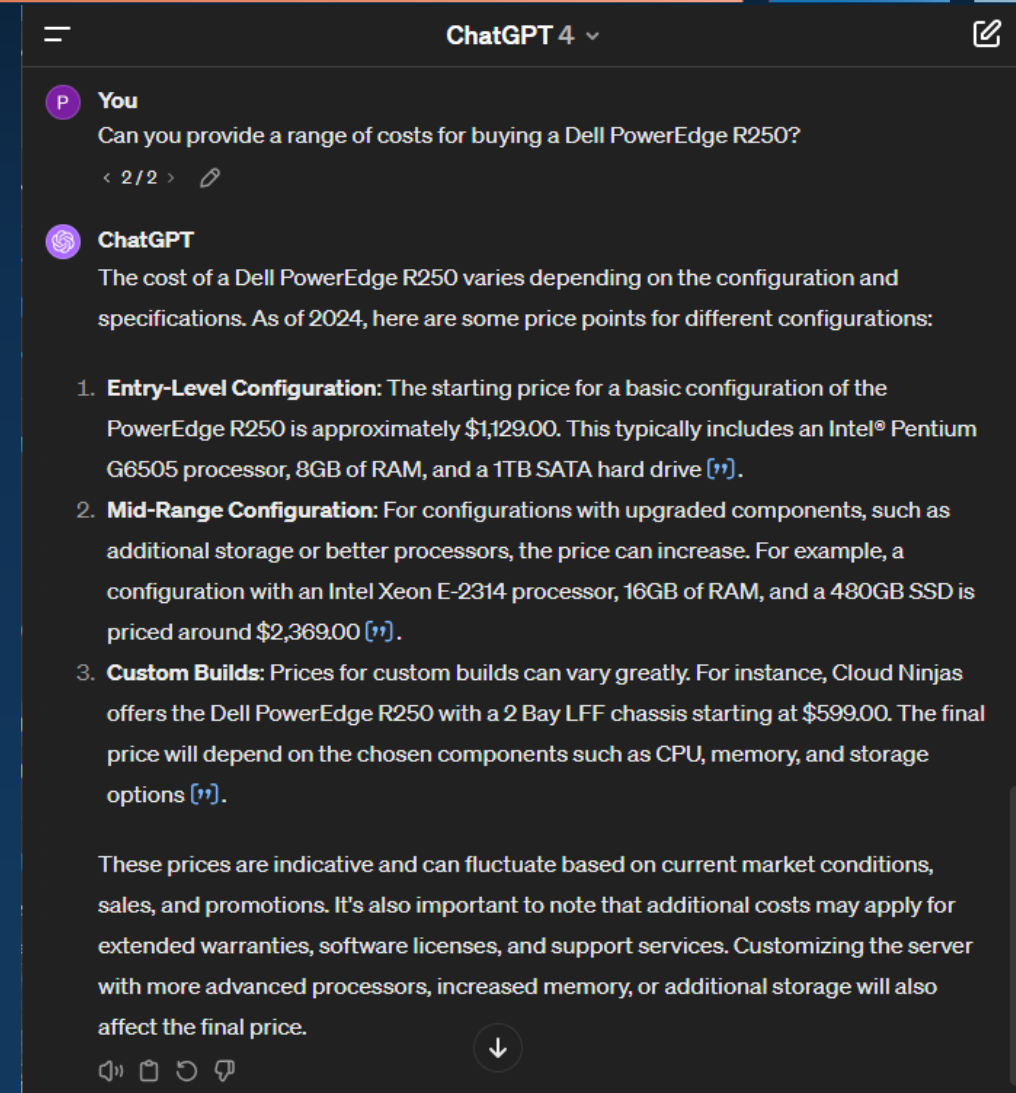
- Prompt: “Please provide a list of the **most important WBS elements** to estimate when generating a government cost estimate for a new fighter jet. Use a MIL-STD-881 WBS.”
- Response Highlights:
  - “When generating a government cost estimate for a new fighter jet using the MIL-STD-881C Work Breakdown Structure (WBS) guidelines, the following WBS elements could be considered as crucial to estimation:
    - System Development and Demonstration | Production, Deployment, and Operational Support | Sustainment | Program Management | System-Specific Cost Elements | Common-Support Equipment
  - Each of these elements would need a cost estimate, accounting for labor, materials, equipment, software, and other costs. The cost estimate should also factor in risk and uncertainty.
  - Remember, cost estimating for such a complex project is an iterative process, so estimates should be updated and refined as more information becomes available.”





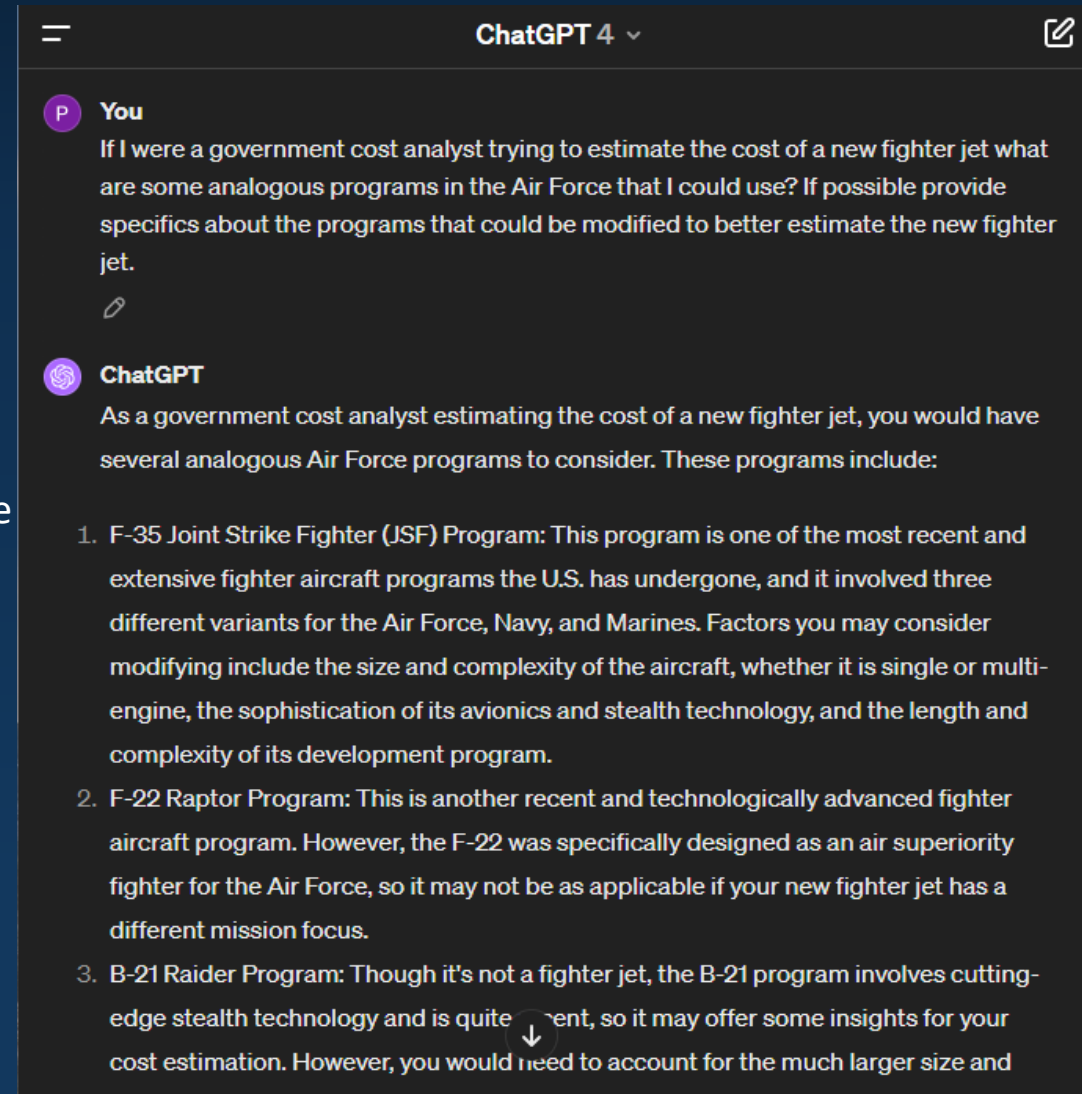
## Use Case 2 – HW Specifications

- Prompt: “Can you provide a range of costs for buying a **Dell PowerEdge R250**?”
  - Assuming we heard the term “**PowerEdge R250**” but know nothing else
- Response Highlights:
  - “**Entry-Level Configuration**: The starting price for a basic configuration of the PowerEdge R250 is approximately \$1,129.00. This typically includes an Intel® Pentium G6505 processor, 8GB of RAM, and a 1TB SATA hard drive.
  - **Mid-Range Configuration**: For configurations with upgraded components, such as additional storage or better processors, the price can increase. For example, a configuration with an Intel Xeon E-2314 processor, 16GB of RAM, and a 480GB SSD is priced around \$2,369.00.
  - **Custom Builds**: Prices for custom builds can vary greatly. For instance, Cloud Ninjas offers the Dell PowerEdge R250 with a 2 Bay LFF chassis starting at \$599.00. The final price will depend on the chosen components such as CPU, memory, and storage options.”
- Also provides links to [Dell](#) & [Cloud Ninjas](#)



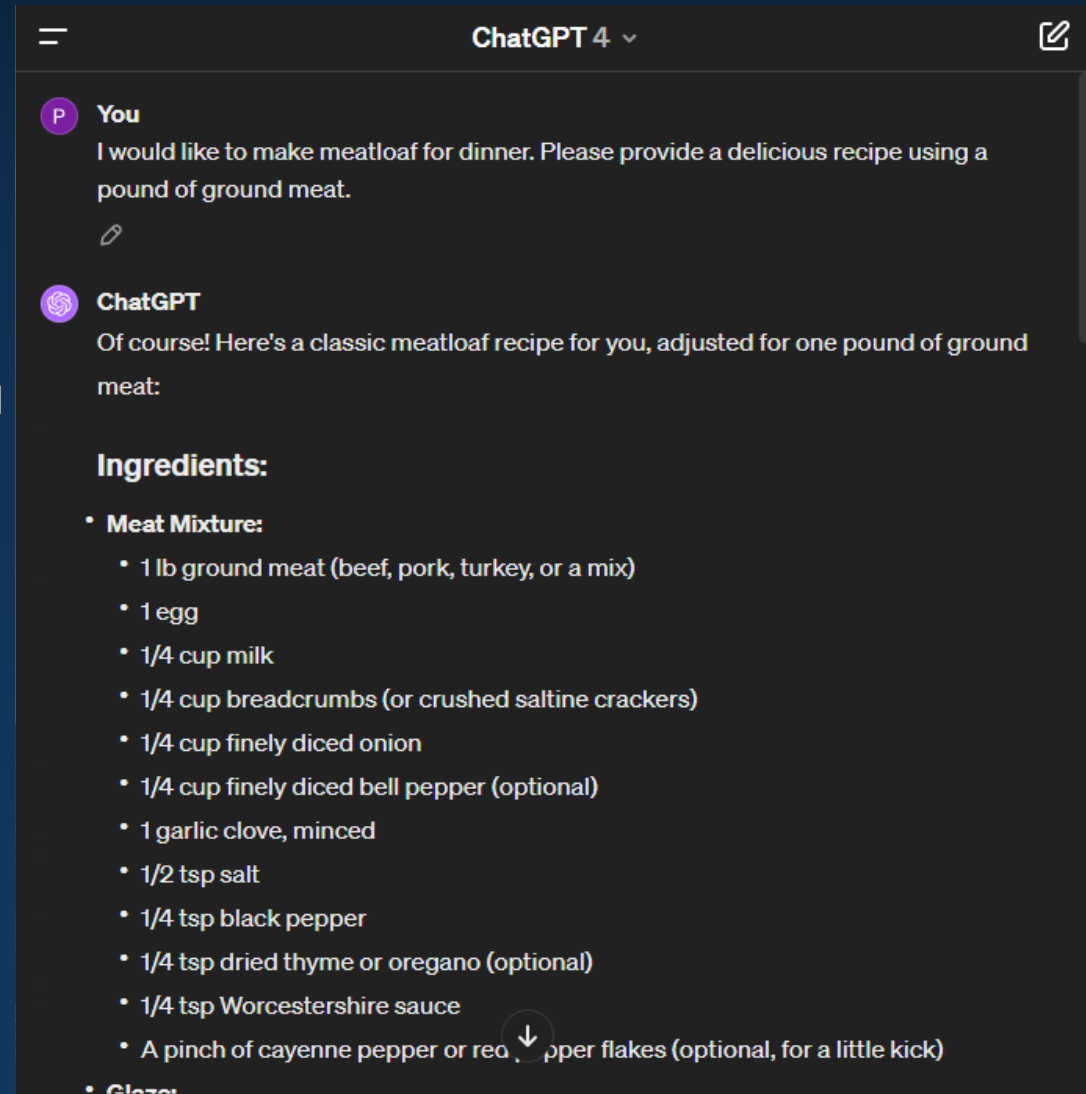
## Use Case 3 – Analogous Program Possibilities

- Prompt: “If I were a government cost analyst trying to estimate the cost of a **new fighter jet** what are some **analogous programs** in the Air Force that I could use? If possible, **provide specifics** about the programs that could be modified to better estimate the new fighter jet.”
- Response Highlights:
  - As a government cost analyst estimating the cost of a new fighter jet, you would have several analogous Air Force programs to consider. These programs include:
    - F-35 Joint Strike Fighter (JSF), F-22 Raptor, B-21 Raider, KC-46 Pegasus Tanker
  - In each case, you would need to adjust for various factors to make the analogy work for your new fighter jet. For example:
    - Technological complexity, Size and capabilities, Development and procurement timeline, Inflation and labor rates, Industrial base considerations
  - Remember, analogy-based cost estimating is an art as much as a science, and it requires a deep understanding of both the new program and the programs being used as analogies.



## Use Case 4 – Recipe Creation & Modification

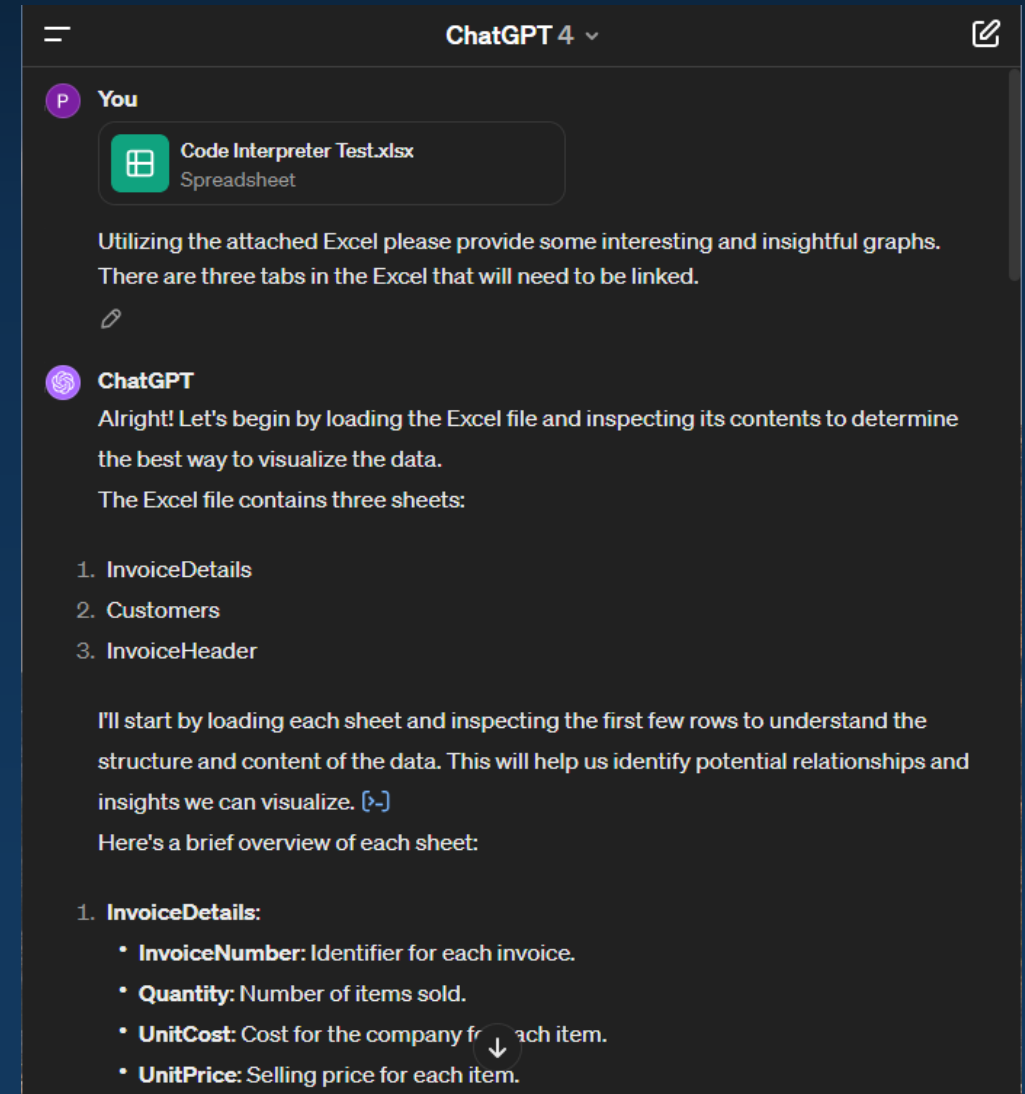
- Prompt: “I would like to make meatloaf for dinner. Please provide a delicious recipe using a pound of ground meat.”
- Response Highlights:
  - Meat Mixture and Glaze ingredients, Oven Temp, Meat Mixture Directions, Forming the Meatloaf, Preparing the Glaze, Baking Time and Directions, Serving Suggestions
- Prompt Response: “I don't have breadcrumbs... But I have some stale bread... Can I still have meatloaf?”
- Response Highlights:
  - Absolutely! Stale bread is actually an excellent substitute for breadcrumbs in meatloaf.
  - Prepare Bread, Soak Bread, Integrate into Recipe, Proceed as Directed
  - Stale bread used in this way can even result in a moister meatloaf than using dry breadcrumbs. Enjoy your dinner!





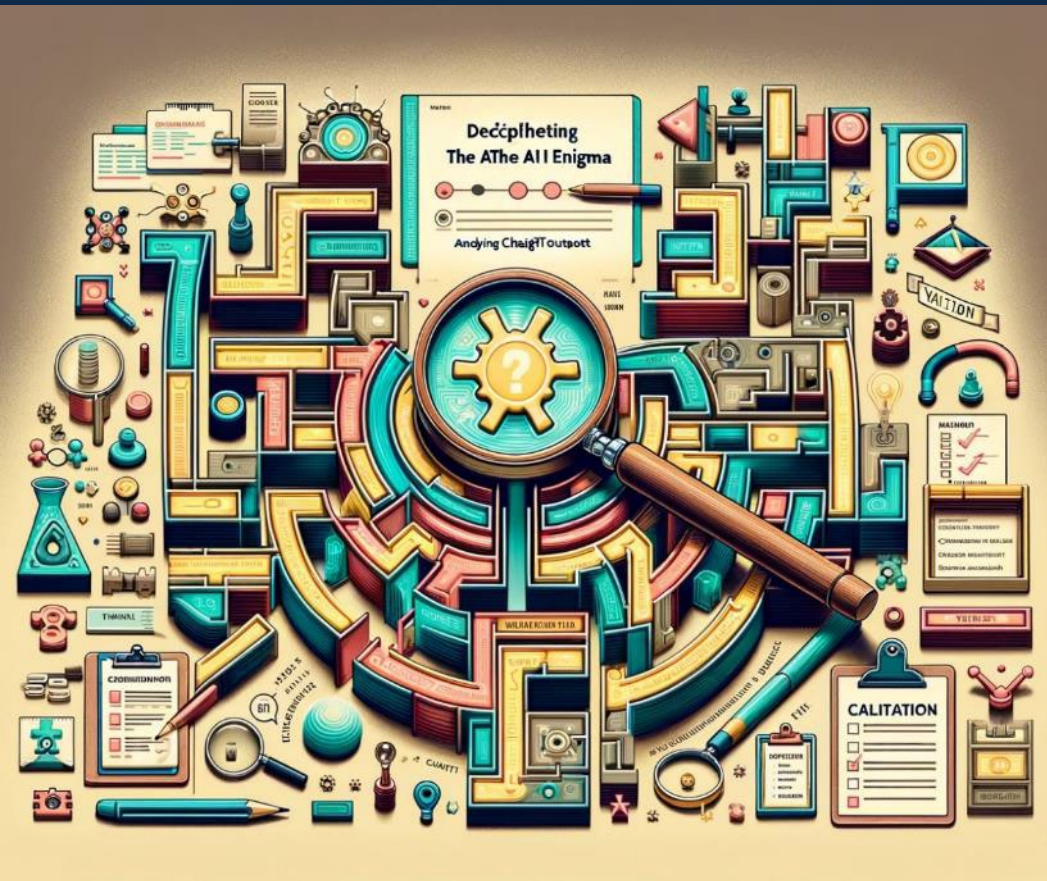
## Use Case 5 – Data Analysis Beta Feature

- This may be the scariest of the Use Case Examples...
- Prompt: “Utilizing the attached Excel please provide some interesting and insightful graphs. There are three tabs in the Excel that will need to be linked.”
  - An Excel was also attached to the prompt, Excel originates from a “PowerPivot for Dummies” example file.
- Response Highlights:
  - The Excel file contains three sheets:
    - “InvoiceDetails”, “Customers”, & “InvoiceHeader”
  - Brief overview of each sheet, column descriptions.
  - Calculates revenue, joins all sheets.
  - Creates visualizations for:
    - Total Revenue by Customer
    - Distribution of Customers by Country
    - Monthly Revenue Trend
  - Summarizes results and allows for further exploration.



# Deciphering the AI Enigma: Analyzing ChatGPT Output

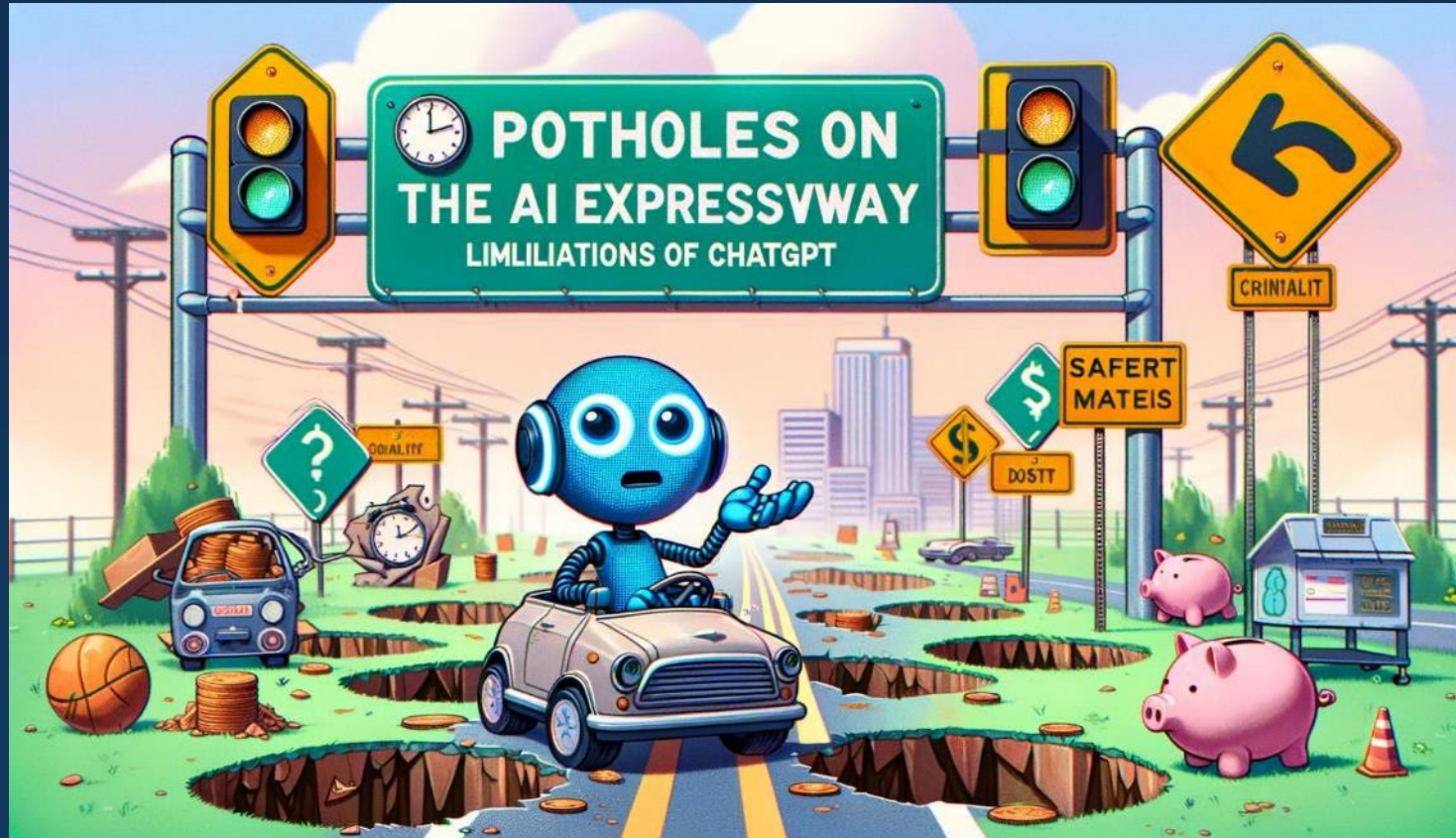
- **Understanding ChatGPT's output** requires a discerning eye, as it does not provide sources for its statements
  - Its knowledge is based on a diverse set of training data, and it generates responses based on patterns and information in this data, not on external databases or live internet sources
- When it provides a citation, it is fabricating this citation based on its training in academic writing and should not be taken as a proper reference
  - Therefore, it is crucial to **validate any critical information** provided by ChatGPT independently
- Despite its significant capabilities, it should be seen as a **tool to provide initial guidance** rather than as a primary source of information



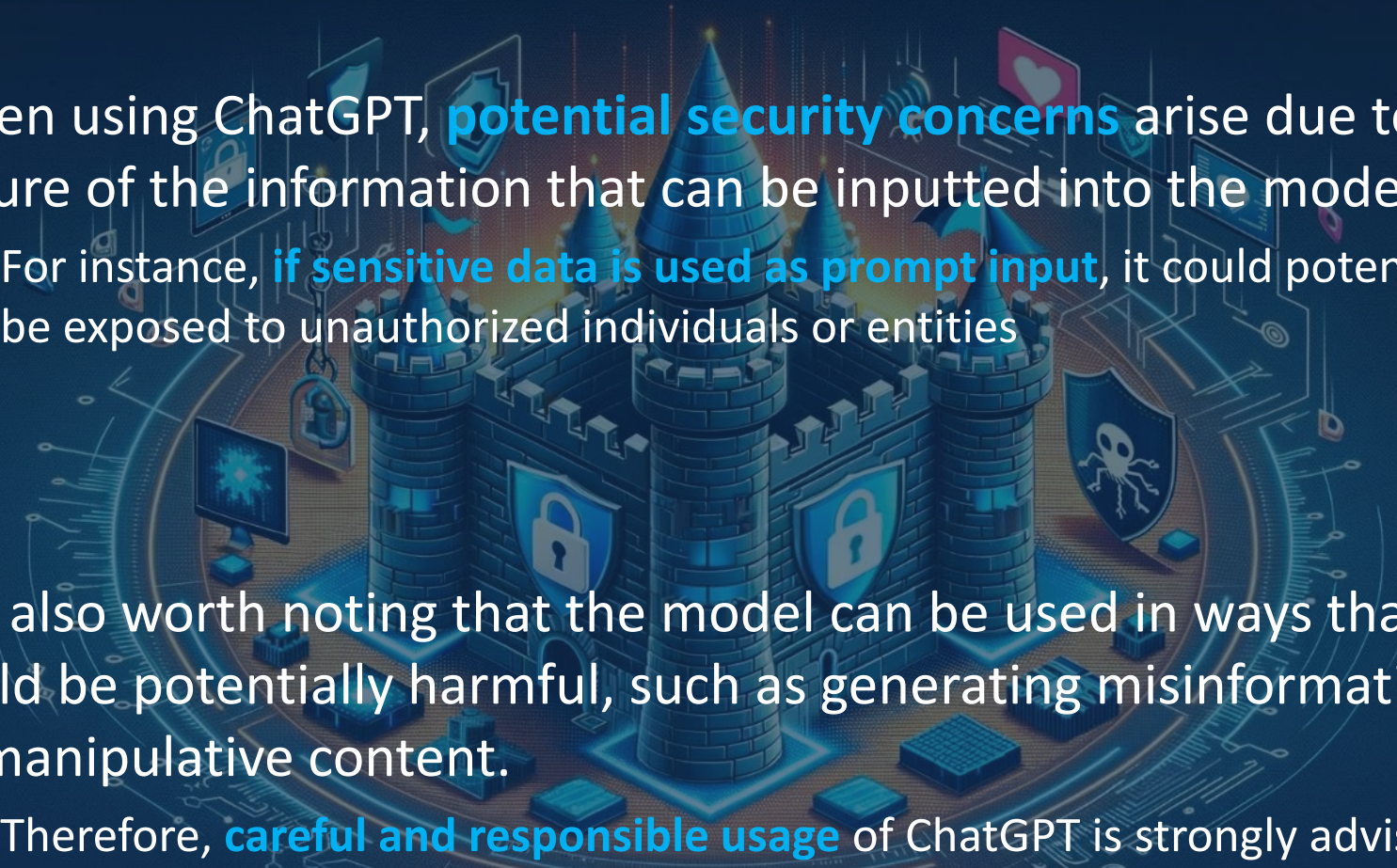


# Potholes on the AI Expressway: Limitations of ChatGPT

- A significant limitation of ChatGPT lies in its **inability to access real-time, specific cost data**, which could potentially lead to inaccurate cost estimates
- Moreover, it **occasionally produces incorrect or nonsensical answers**, and it's sensitive to input phrasing, sometimes producing different responses to slight re-phrasings
- As for **safety measures**, while efforts have been made to refuse to generate inappropriate content, it might sometimes respond to harmful instructions or exhibit biased behavior



# Guarding the AI Fortress: Security Concerns with ChatGPT

- 
- When using ChatGPT, **potential security concerns** arise due to the nature of the information that can be inputted into the model
    - For instance, **if sensitive data is used as prompt input**, it could potentially be exposed to unauthorized individuals or entities
  - It is also worth noting that the model can be used in ways that could be potentially harmful, such as generating misinformation or manipulative content.
    - Therefore, **careful and responsible usage** of ChatGPT is strongly advised.



## Ice Cube Does Not Like AI

- In April 2023, a “**Drake**” song titled “Heart on My Sleeve” emerged on SoundCloud and YouTube
- It even got mentions in both **TMZ** and the **Daily Mail**
- However, the track was actually composed of multiple preexisting elements, and the **AI-generated “voice”** of Drake
- Other artists have had similar music made utilizing AI, and it opens **Pandora’s Box** of copyright and legal considerations



[Link](#) | Ali Condon | Published 20:57, 22 May 2023 BST

# Engaging ChatGPT in a Dynamic Conversation

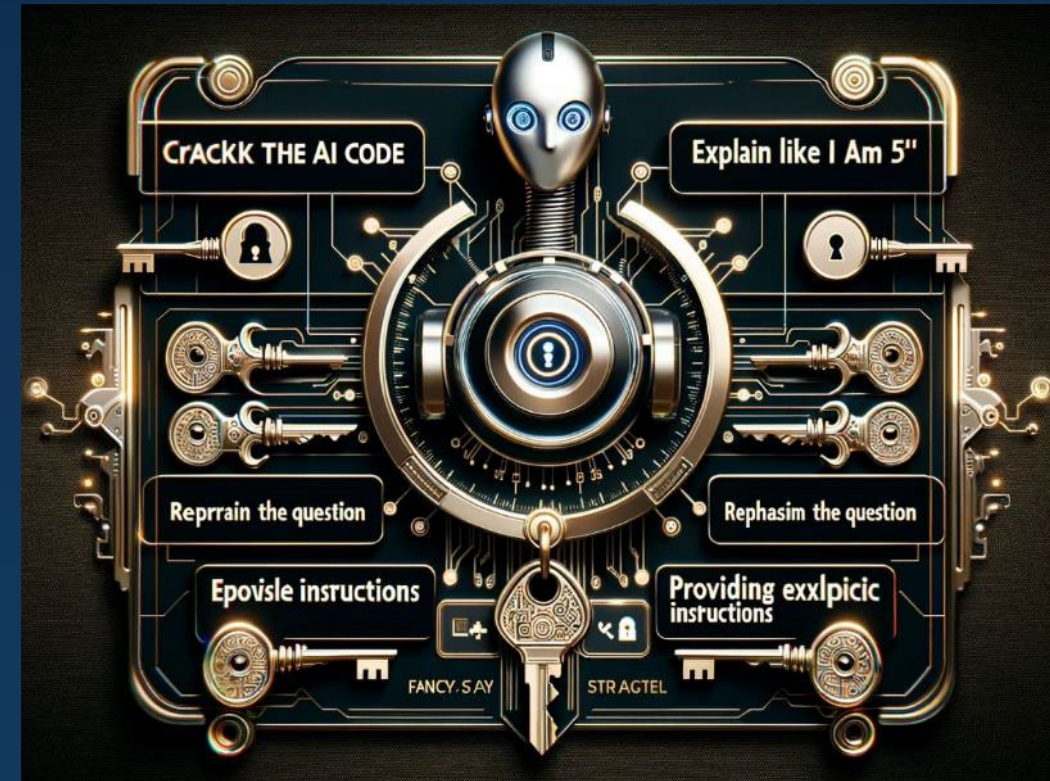


- ChatGPT excels at **maintaining context** over multiple turns of conversation, allowing for dynamic dialogues
- It's capable of understanding and responding to **follow-up questions**, providing deeper insights into a topic
  - However, due to its lack of persistent memory, it might not provide consistent answers over different sessions or contexts
- So, while engaging in a conversation, it's essential to **provide enough context** for each new question to ensure a relevant response
  - Additionally, users should be aware that it may sometimes guess user intent rather than asking clarifying questions when faced with ambiguous queries



# Cracking the AI Code: Handy ChatGPT Tips and Tricks

- To get the most out of ChatGPT, users can employ a variety of tips and tricks
  - For instance, you can make use of system-level instructions like "**Explain Like I Am 5**" to guide the model's output
- If the model isn't providing the desired answer, you can try **rephrasing the question** or asking the model to think step-by-step or debate the pros and cons before settling on an answer
- However, these techniques might not always work, and users should **apply them judiciously** based on the task at hand





# Way Forward – ChatGPT 5 and Beyond

- **ChatGPT 5** is already in development, and its capabilities should be exponentially better than 4
- It is imperative that we **stay curious** while also being **cautious and analytical**
- Future data sources, news, art, and even live videos may require an **even more critical eye** to determine if what you are looking at is real or was fabricated/created by AI
- Lastly, I will always advocate for **utilizing a tool** instead of being replaced by it





# Inference to Reference: Summarizing ChatGPT

- In closing, while ChatGPT presents a **significant advance in AI language** models, it's not without its limitations and potential pitfalls
- Its potential as an Engineering SME and as a tool for cost estimation and analysis is substantial, yet it **should not replace human judgment** or be relied upon for up-to-date or specific cost info
- Potential security concerns and the need for independent verification of its outputs further underline the importance of a **thoughtful and responsible approach** to using the model
- Nevertheless, with careful use, ChatGPT can be a powerful tool for providing **initial guidance and insights** across a wide range of topics
- As AI technology continues to evolve, it will be fascinating to see how these models develop and what new opportunities and challenges they bring

# Pepperoni Hug Spot: 100% AI-Created TV Commercial

- Everything in this video is AI made
- PizzaLater, Creator: “Definitely wasted 3 hours of my life making this today... Everything is AI from the VO to the video and images. Assembled in After Effects.”
- USA Today: “‘Cursed’ Pizza Commercial Generated By AI Is Terrifying The Internet”
- Business Insider: “This AI-generated Ad For A Fake Pizza Restaurant Shows The Tech Still Has A Long Way To Go”

