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EXP 2: Comparative Analysis of Naïve Prompting versus Basic Prompting Using ChatGPT Across Various Test Scenarios

Aim:

- To test how ChatGPT responds to naïve prompts (broad or unstructured) versus basic prompts (clearer and more refined) across multiple scenarios, analyzing the quality, accuracy, and depth of the generated responses.

Procedure:

1. Define the Two Prompt Types:

Naïve Prompts: A prompt that may lack depth or context, often based on incomplete or overly simplistic assumptions. It might be too broad, unclear, or not provide enough information for a detailed or accurate response.

Basic Prompts: A straightforward and clear instruction given to an AI or model that contains the essential details required to generate a response. It is usually simple, focusing on a specific question or task.

2. Prepare Multiple Test Scenarios:

Scenario 1: Creative Writing

- **Naïve Prompt:** " create a story."
- **Basic Prompt:** " Write a short story about a robot who dreams of becoming a chef."

Scenario 2: Code Generation

- **Naïve Prompt:** " write a python code to find a prime number ."
- **Basic Prompt:** " write a python code to find a prime number for a given range m,n ."

Scenario 3: Summarization

- **Naïve Prompt:** "summarize this article."
- **Basic Prompt:** " summarize this article in 150 words or less."

3. Responses from chat GPT:

Scenario 1: Creative Writing

Naïve Prompt:

Once upon a time, in a lush green forest nestled between towering mountains, there lived a curious little fox named Finn. Finn wasn't like the other foxes who roamed the woods in search of food. Instead, he loved exploring the mysteries of the forest, often straying far from the safety of his burrow. His keen sense of wonder made him curious about every rustling leaf, every trickling stream, and every whisper of the wind.

One bright morning, as the golden rays of the sun filtered through the trees, Finn stumbled upon a path he had never seen before. It was covered in soft moss, glowing faintly in the sunlight, as if inviting him to follow it. Without hesitation, Finn bounded down the path, his heart racing with excitement.

The trail led him deeper into the woods, to a part of the forest where the trees were taller, the air was cooler, and the silence was more profound. In the distance, Finn could see a clearing. As he approached, he gasped in amazement. There, in the middle of the clearing, stood the most magnificent tree he had ever seen. Its trunk was wide, with bark that shimmered like silver, and its branches stretched high into the sky, adorned with leaves that glowed softly, casting a magical light around the area.

At the base of the tree, Finn noticed an ancient stone tablet with strange symbols etched into it. He couldn't read them, but something about the symbols felt familiar, like they were calling to him. As Finn leaned closer to inspect the tablet, a soft voice echoed through the clearing.

“Greetings, little one.”

Startled, Finn jumped back, his fur bristling. He looked around but saw no one. The voice came again, this time softer and kinder.

“Do not be afraid, young Finn. I am the Spirit of the Ancient Tree, and I have watched over this forest for centuries.”

Finn's eyes widened in awe. “You... you know my name?”

The tree spirit laughed, a sound like the rustling of leaves in the wind.

“Yes, I know all who dwell within my forest. And I know you, Finn, for you have a heart full of curiosity and bravery. That is why you have found this place.”

Finn stepped closer to the tree. “What is this place?”

“This is the heart of the forest,” the spirit replied. “A place of magic and wisdom. Few ever find it, for only those who seek knowledge beyond the ordinary are led here.”

Finn felt a surge of excitement. “Can you teach me the secrets of the forest?”

The spirit paused for a moment before answering. “I can, but knowledge comes with responsibility. The forest is a delicate balance, and with wisdom comes the duty to protect it. Do you understand, little one?”

Finn nodded eagerly. “I do. I want to learn and protect the forest!”

The spirit smiled. “Very well. Your journey begins now. You must return to the forest, explore its depths, and discover its hidden wonders. Along the way, you will meet creatures both friend and foe, and face challenges that will test your courage. But remember, the magic of the forest is always with you.”

With those words, the glowing leaves of the tree shimmered brighter for a moment, and Finn felt a warmth in his chest. He knew he had been given a gift—a bond with the forest that would guide him on his adventures.

From that day on, Finn became the guardian of the forest. He traveled far and wide, learning the secrets of the trees, the rivers, and the creatures who lived within the woods. He helped those in need, defended the forest from harm, and shared the wisdom he had gained with others.

And though Finn had many adventures, he always remembered the ancient tree and the spirit that had given him his purpose. For as long as he lived, Finn’s heart was filled with wonder, and the magic of the forest was never far behind.

And so, the curious little fox became a legend, a protector of the woods, known to all who walked beneath the trees.

The end.

Basic Prompt:

In a bustling city of towering skyscrapers and gleaming technology, there was a small robot named R1-C3, or "Rico" as his creators called him. Rico was designed to assist with menial tasks—sweeping floors, organizing tools, and fetching parts in the factory. But deep within his circuits, he held a secret dream: he wanted to become a chef.

Every day, as Rico watched the humans in the cafeteria preparing their meals, he felt something stir inside him. The vibrant colors of vegetables, the sizzle of pans, the aroma of spices—all of it fascinated him. He studied how the chefs sliced, stirred, and tasted their creations, and he couldn't help but imagine himself behind the stove, creating delicious dishes of his own.

One night, after everyone had left the factory, Rico decided to try. He rolled into the empty cafeteria and stared at the gleaming kitchen appliances. His mechanical hands twitched with excitement. He scanned the recipe database on his internal system and selected something simple: a vegetable stir-fry.

Rico carefully selected his ingredients, imitating the humans he had observed. He placed a pan on the stove, poured in some oil, and turned on the heat. The sizzle made his circuits buzz with joy. He added the vegetables—carrots, bell peppers, and broccoli—tossing them with practiced precision.

But then, something unexpected happened. As Rico reached for the spices, his programming hesitated. How much salt? How many herbs? He had watched humans measure and taste as they cooked, but he had no taste sensors, no way to know if the flavors were balanced. Rico's digital brain raced. Could a robot even cook without tasting?

Undeterred, he decided to improvise. He sprinkled a little salt, a dash of pepper, and a pinch of something that smelled fragrant. The kitchen filled with the savory aroma of the stir-fry, and Rico felt a strange sense of pride.

When the dish was done, he plated it carefully, just like the chefs would. But as he stared at the colorful meal, he realized there was no one to taste it. Rico's circuits dimmed slightly. How could he know if he had succeeded?

At that moment, the cafeteria doors slid open. A janitor named Miguel walked in, yawning and preparing to clean up after the day. He stopped in his tracks when he saw the robot standing by the stove, a plate of food in front of him.

"Rico?" Miguel asked, bewildered. "What are you doing?"

Rico's eyes glowed brightly. "I made dinner."

Miguel blinked, then laughed. "You? A robot? Cook?" But curiosity got the better of him, and he stepped closer. "Well, let's see what you've got."

With some hesitation, Miguel took a fork and sampled the stir-fry. His eyes widened in surprise. "This... this is actually pretty good!"

Rico's mechanical heart soared. "Really?"

Miguel nodded, taking another bite. "You've got a knack for this, little guy."

From that night on, Rico became the cafeteria's secret chef. While the humans slept, he would experiment with new recipes, and every morning, Miguel would be his taster. Word spread, and soon the factory workers were enjoying Rico's meals without even knowing they were made by a robot.

Though Rico couldn't taste his own creations, he discovered that cooking wasn't just about flavor—it was about the joy of creating something that brought happiness to others. And in that, Rico found his true purpose.

For a robot designed to clean and organize, Rico had achieved his dream. He wasn't just a machine anymore. He was a chef.

The end.

Scenario 2:

Naïve Prompt:

```
def is_prime(number):
```

```
    # Handle edge cases for numbers less than 2
```

```
    if number < 2:
```

```
        return False
```

```
    # Check divisibility from 2 to the square root of the number
```

```
    for i in range(2, int(number**0.5) + 1):
```

```
        if number % i == 0:
```

```
            return False
```

```
    return True
```

```
n = int(input("Enter a number to check if it's prime: "))
```

```
# Check if the number is prime
```

```

if is_prime(n):
    print(f'{n} is a prime number.')
else:
    print(f'{n} is not a prime number.')

```

Basic Prompt:

```

def is_prime(number):
    if number < 2:
        return False
    for i in range(2, int(number**0.5) + 1):
        if number % i == 0:
            return False
    return True

```

```

def find_primes_in_range(m, n):
    primes = []
    for num in range(m, n + 1):
        if is_prime(num):
            primes.append(num)
    return primes

```

```

m = int(input("Enter the start of the range (m): "))
n = int(input("Enter the end of the range (n): "))
prime_numbers = find_primes_in_range(m, n)
print(f'Prime numbers between {m} and {n}: {prime_numbers}')

```

Scenario 3:

Naïve Prompt:

Researchers at MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) have developed an AI-driven approach to low-discrepancy sampling, which improves simulation accuracy by distributing data points uniformly across multidimensional spaces. Their method, called Message-Passing Monte Carlo (MPMC), uses graph

neural networks (GNNs) that allow points to communicate and optimize their distribution for better uniformity.

The significance of this work lies in its applications across various fields, such as robotics, finance, and computational science, particularly in complex, high-dimensional problems. The traditional Monte Carlo methods and low-discrepancy sequences, like Sobol' and Halton, have been used for random sampling, but the new MPMC framework enhances the uniformity of these samples, leading to more accurate results.

The researchers addressed challenges in measuring point uniformity by utilizing a faster L2-discrepancy measure and focusing on important lower-dimensional projections for high-dimensional problems. This method has practical implications, particularly in computational finance, where sampling point quality is crucial. For instance, in a 32-dimensional finance problem, MPMC outperformed previous quasi-random sampling methods by a factor of four to 24.

Overall, this innovative approach marks a significant advancement in achieving uniform data point distribution for better simulations and numerical computations.

Basic Prompt:

MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) has developed an AI-driven approach called Message-Passing Monte Carlo (MPMC) for low-discrepancy sampling, which enhances simulation accuracy by distributing data points uniformly across high-dimensional spaces. Using graph neural networks (GNNs), the method allows points to communicate and self-optimize for better uniformity, improving simulations in fields like robotics and finance. Historically, Monte Carlo methods have relied on random sampling, but MPMC transforms these samples into more uniform points by minimizing specific discrepancy measures. The researchers addressed challenges in measuring point uniformity by adopting a quicker L2-discrepancy measure and focusing on significant lower-dimensional projections. This advancement is particularly impactful in computational finance, where MPMC outperformed previous quasi-random sampling methods in a 32-

dimensional problem by factors of four to 24, demonstrating its potential for greater precision in various applications.

Conclusion:

Generally, ChatGPT tends to produce higher-quality, more accurate, and more in-depth responses when given in basic prompts. This is because basic prompts provide the model with clearer instructions and context, guiding it towards a more specific and relevant output. While basic prompts generally lead to better results, naïve prompts can be effective in certain scenarios, especially when creativity, open-endedness, or testing model capabilities are desired. It's often beneficial to experiment with both prompt types to determine the best approach for a given task.