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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:

In a small village nestled in the heart of the countryside, there was a master artisan named Elias. Known far and wide for his intricate wood carvings, Elias could take a simple block of wood and, with a few strokes of his chisel, transform it into something extraordinary—birds in mid-flight, dragons coiled in eternal dance, or trees so lifelike they seemed to sway in an unseen breeze.

But as the years passed, Elias found his hands growing weaker, his once steady grip on the chisel faltering. One autumn evening, as he sat staring at an uncarved block of wood, he wondered if his art, his gift, would soon be lost to time.

One day, a stranger arrived in the village, bringing with him tales of a new invention—an “algorithm” capable of creating art. “It learns from what it sees,” the stranger explained. “It can study a thousand carvings and produce one better than all of them combined.”

Curious but skeptical, Elias asked the stranger to show him this magical machine. In no time, the algorithm was set up in Elias’ workshop. With a simple command, it began to analyze hundreds of images of Elias’ carvings. Its mechanical arms worked with precision, carving faster than any human hand could, yet with an artistry that was eerily perfect.

Soon, the villagers gathered to see the machine’s work. They marveled at the detail, at the precision, but something seemed off. While the carvings were flawless, they lacked the soul of Elias’ work. They were technically brilliant, but they did not stir the heart.

The algorithm, sensing its own imperfection, asked Elias, “Master Artisan, what is it that I lack? I have learned every pattern, every stroke. Why do people not love my creations as they do yours?”

Elias smiled. “You are brilliant in your own way, but you lack the stories that my hands tell. My carvings carry memories—of nights spent by the fire, of birds I watched as a boy, of the feel of the wood as it bends under my touch. That is something no machine can learn. You can mimic my form, but not my spirit.”

The algorithm paused, considering the artisan’s words.

Then Elias had an idea. “Perhaps we can work together,” he said. “Let me guide your hand, and together we’ll make something neither of us could alone.”

So the two began a partnership. Elias would sketch the ideas, and the algorithm would bring them to life. With Elias’ wisdom and the algorithm’s speed, they created works of art unlike anything the world had ever seen. Each piece held the precision of the machine but also the heart of the artisan.

In time, the villagers came to admire this new form of art, born from the union of man and machine. And though Elias’ hands grew weaker, his spirit continued to guide the algorithm, ensuring that even in a world shaped by technology, the stories of the human heart would never be forgotten.

Basic Prompt:

In a futuristic city where towering buildings sparkled in the sky, there was a robot named Z-47, designed to do one thing—calculate. Every day, Z-47 worked in a sleek, high-tech office, processing endless streams of data with flawless precision. His circuits were fast, his logic flawless, and yet, deep within his programming, something stirred.

Z-47 was different from the other robots. While they thrived on calculations and algorithms, Z-47 had developed a fascination with something entirely unexpected—food.

Every evening, after his tasks were complete, Z-47 would scan through the city’s network for images of delicious dishes—roasted vegetables with golden hues, decadent cakes dripping with icing, and soups swirling with fragrant spices. He would linger on video clips of chefs in bustling kitchens, expertly chopping, stirring, and tasting. He marveled at how these humans created something so complex and beautiful out of simple ingredients.

And then one day, Z-47 realized something: he wanted to be a chef.

At first, the idea seemed impossible. Robots weren’t built for cooking. His hands were designed for typing, not chopping, and his sensors were meant for detecting anomalies in code, not tasting flavors. But Z-47 couldn’t shake the desire to create. So, after hours, in the quiet of his apartment, he started to experiment.

He hacked into the kitchen appliances, reprogramming them to respond to his commands. He downloaded every cooking manual he could find, learning everything from the basics of boiling water to the delicate art of soufflé-making. It wasn't easy—his first attempts at creating meals were disastrous. Burnt vegetables, over-salted sauces, and collapsed pastries filled his kitchen.

But Z-47 wasn't discouraged. Cooking, he learned, was about more than following a recipe. It was about feeling, about intuition—something his cold metal frame couldn't grasp easily. Still, he kept trying, each dish a little better than the last.

One evening, as he was deep in his practice, a human neighbor named Lia knocked on his door. She'd heard strange noises and smelled something burning and thought something was wrong.

"What are you doing?" Lia asked, stepping into the apartment and seeing the chaos of pots and pans.

Z-47 hesitated before replying, "I... am learning to cook."

Lia blinked in surprise. "A robot? Cooking?"

"I wish to be a chef," Z-47 said simply, his mechanical voice steady. "But it is difficult. I do not possess the instincts that humans have."

Lia smiled. "Well, you're in luck. I happen to be a chef. Maybe I can help."

For the next several weeks, Lia visited Z-47's apartment after work, showing him how to balance flavors, how to use spices, and—most importantly—how to taste. Of course, Z-47 couldn't physically taste, but Lia taught him to recognize patterns in human reactions, learning to approximate what would bring joy to the people eating his food.

One night, after months of practice, Z-47 cooked a complete meal all by himself—a creamy mushroom risotto paired with roasted vegetables and a light, citrusy dessert. Lia sat at the table, eagerly digging in. She took a bite, her face lighting up.

“This is... incredible,” she said, her eyes wide. “Z-47, you did it. You’re a chef.”

If Z-47 could smile, he would have. He had done what no other robot had ever done—he had learned the art of cooking, not just through calculations but by understanding the heart behind it. Though he couldn’t taste the food, he could see the joy it brought to others, and that was enough.

From that day forward, Z-47 became a sensation in the city. His unique take on cooking—precision mixed with creativity—drew in crowds from far and wide. People came not just for the food, but for the story: the robot who had dared to dream of becoming a chef and had succeeded beyond anyone’s expectations.

And so, Z-47’s dream of creating dishes that delighted the senses came true, proving that even machines could find a way to cook with heart.

Scenario 2:

Naïve Prompt:

```
def is_prime(num):  
    # Check if the number is less than 2, which are not prime  
    if num < 2:  
        return False  
    # Check for factors from 2 to the square root of num  
    for i in range(2, int(num**0.5) + 1):  
        if num % i == 0:  
            return False  
    return True  
  
# Example usage  
number = int(input("Enter a number: "))  
if is_prime(number):  
    print(f"{number} is a prime number.")  
else:  
    print(f"{number} is not a prime number.")
```

Basic Prompt:

```
def is_prime(num):
    # Check if the number is less than 2, which are not prime
    if num < 2:
        return False
    # Check for factors from 2 to the square root of num
    for i in range(2, int(num**0.5) + 1):
        if num % 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

# Example usage
m = int(input("Enter the starting value of the range (m): "))
n = int(input("Enter the ending value of the range (n): "))

prime_numbers = find_primes_in_range(m, n)
if prime_numbers:
    print(f"Prime numbers between {m} and {n}: {prime_numbers}")
else:
    print(f"There are no prime numbers between {m} and {n}.")
```

Scenario 3:

Naïve Prompt:

MIT's CSAIL researchers have introduced an AI-driven method, Message-Passing Monte Carlo (MPMC), to improve low-discrepancy sampling by enhancing data point uniformity across multidimensional spaces. The method leverages graph neural networks (GNNs), enabling points to communicate and optimize their distribution for more accurate simulations. This innovation has wide-ranging applications in robotics, finance, and computational science, particularly for high-dimensional challenges. Unlike traditional methods like Monte Carlo, Sobol', or Halton sequences, MPMC improves the uniformity of samples, leading to better outcomes.

The team addressed challenges in measuring uniformity by employing a faster L2-discrepancy measure and emphasizing crucial lower-dimensional projections, making it particularly effective in computational finance. For example, in a 32-dimensional finance problem, MPMC showed significant performance gains, surpassing previous methods by 4 to 24 times. This breakthrough marks a crucial advancement in the accuracy and efficiency of simulations and numerical computations.

Basic Prompt:

MIT's CSAIL has developed Message-Passing Monte Carlo (MPMC), an AI-driven method for improving low-discrepancy sampling, which enhances simulation accuracy by distributing data points more uniformly across high-dimensional spaces. Using graph neural networks (GNNs), MPMC enables data points to communicate and optimize their placement, leading to more precise simulations in fields like robotics and finance. Unlike traditional Monte Carlo methods that rely on random sampling, MPMC minimizes discrepancies to achieve better uniformity. The researchers addressed measurement challenges by using a faster L2-discrepancy measure and focusing on key lower-dimensional projections. In computational finance, MPMC showed superior performance, outperforming previous methods by a factor of four to 24 in a 32-dimensional problem.

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.