

# Practical Prompt Engineering: Tell Me About Stars



Josef Machytka

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In today's world, prompt engineering has become an important, even essential skill for anyone seeking to effectively use modern AI tools. I previously explored this topic in my article "[The Art and Science of AI Prompt Engineering](#)" on the NetApp-credativ blog. I explained how Large Language Models (LLMs) rely on semantic associations to generate responses, which makes activating the right associations within a prompt critical to obtaining relevant answers. I also outlined various prompting techniques and, for a subsequent talk, created an example focused on the diverse semantic associations surrounding the word "star."

We can see a simplified graph of word networks for "star" on the website [wordassociations.net](#). Depending on the context — astronomy, social media, or show business — the meaning of "star" can shift significantly. Additionally, it's important to specify the target audience for the AI-generated response. Without such an information, an LLM might — unless

configured otherwise in its system prompt — default to creating a response for an “average Joe” audience, adjusting the complexity accordingly.

If the appropriate semantic association is not clarified in the prompt, the LLM defaults to the most probable one based on its training data. For “star,” this most likely means the astronomical context. For example, when I gave ChatGPT-4 a very basic query: “Hi, tell me some interesting facts about stars,” I received a well-formulated response in a mainstream media style, clearly aimed at an “average Joe” audience:

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*Stars are fascinating celestial objects that have intrigued humans for millennia. The study of stars, known as astrophysics, continues to uncover more about these celestial wonders as technology and our understanding of the universe evolve. Here are some interesting facts about stars:*

- 1. Birth in Nebulae: Stars are born in nebulae, which are enormous clouds of dust and gas in space. The most common type of nebula is a molecular cloud called a stellar nursery, where new stars are formed from collapsing gas and dust under gravity.*
- 2. Variety of Sizes: Stars come in a wide range of sizes. The smallest stars, known as red dwarfs, can be just a fraction of the size of our Sun, while the largest stars, known as hypergiants or supergiants, can be over a thousand times larger in diameter than the Sun.*
- 3. Life Cycle: Stars have life cycles that begin with their formation and end with their death, which can result in a white dwarf, neutron star, or black hole, depending on the initial mass of the star. Massive stars may end their lives in a spectacular explosion known as a supernova.*

*And so on and so forth...*

It was nice mainstream style answer, so I decided to try some “real rocket science.” I prompted: “Hi, act as if we are both top world-class astrophysicists with deep expertise in our field, and tell me some interesting facts about stars.” The result was an entirely different caliber of response:

*It's a pleasure to engage in a high-level astrophysical discussion with you. Stars are truly fascinating objects, the fundamental building blocks of galaxies, and they have a profound impact on the evolution of the cosmos. Here are some intricate and captivating aspects of stellar astrophysics that continue to intrigue even the most seasoned researchers:*

*1. Stellar Nucleosynthesis: Stars are the forges of the universe, where lighter elements are fused into heavier ones through nuclear reactions in their cores. The process of creating elements heavier than iron, however, predominantly occurs during the explosive end of a star's life in supernovae, through a rapid neutron-capture process (r-process). This nucleosynthesis is critical for understanding the abundance of elements we see in the universe today.*

*2. Neutron Stars and Their Extreme Environments: Neutron stars, the remnants of massive stars after a supernova explosion, have some of the most extreme conditions in the universe. With a mass greater than that of the Sun but a radius of only about 10 kilometers, their densities are so high that a sugar-cube-sized amount of neutron-star material would weigh about a billion tons on Earth. The magnetic fields of magnetars, a type of neutron star, are the strongest known in the universe, millions to billions of times stronger than any created artificially on Earth.*

*3. Stellar Oscillations and Helioseismology: Just like Earth has seismic waves that help us understand its interior, stars have oscillations that can be studied to infer details about their internal structure. Helioseismology (for the Sun) and asteroseismology (for other stars) use these oscillations to measure stellar properties and have revealed a wealth of information about stellar interiors that is not accessible by any other means.*

...

Wow, it clearly shows how roles matter. This response, while fascinating, could rather overwhelm the average reader. However, as a discussion between two astrophysicists, it felt appropriate.

Next, I experimented with a different role, still within the context of astronomy: “Hi, act as a top world-class influencer, YouTuber, and TikTok celebrity, and tell me some interesting facts about stars.” Here’s what I got:

*Hey there, it’s absolutely stellar to connect with you. As someone who loves to gaze at the night sky and share the wonders of the universe with my incredible followers, I’m thrilled to drop some cosmic knowledge bombs about the stars twinkling above us. Let’s dive into the celestial sea and catch some sparkling star facts:*

*1. Ancient Light Shows: When you look up at the stars, you’re actually looking back in time. The light from those stars has traveled for years — sometimes millions of years — to reach us. So, in a way, stargazing is like having a time machine for your eyes!*

*2. Colorful Characters: Stars come in a variety of colors, which indicate their temperatures. Blue stars are the hottest, white and yellow stars (like our sun) are*

*cooler, and red stars are the coolest. But don't be fooled by the term "cool" — even the coolest stars are still incredibly hot!*

*3. Life Cycle of a Star: Stars are born in nebulae, which are massive clouds of dust and gas. Over time, gravity pulls the dust and gas together to form a protostar, which eventually becomes hot enough to start nuclear fusion and shine. Stars like our sun live for about 10 billion years, but the most massive stars burn out after just a few million years.*

...

The response ended in a fittingly energetic style:

*Isn't the universe just mind-blowingly beautiful? Remember to keep looking up, because the sky is full of stories waiting to be read. And hey, if you ever capture a cool photo of the night sky, tag me! Let's share the wonder with the world.*

*Keep shining bright, and never stop exploring, my cosmic friends! If you want to dive deeper into the mysteries of the universe, make sure to hit that follow button*

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Now, looks like AI can greatly improve quality of videos of popular influencers. But I guess they already know and use it.

Finally, I decided to switch to an entirely different semantic association: "Hi, act as a top world-class Hollywood agent and tell me some interesting facts about stars." The response shifted accordingly:

*Hello! As a top-tier Hollywood agent, I'd be delighted to share some fascinating tidbits about the stars who light up the silver screen. Keep in mind that my*

*knowledge is up to date only until December 2023, so let's dive into some interesting facts:*

- 1. Leonardo DiCaprio — Oscar win for “The Revenant,” DiCaprio had been nominated for an Academy Award six times, both as an actor and a producer. He’s also known for his environmental activism and has a foundation dedicated to global conservation efforts.*
- 2. Meryl Streep — Often referred to as the “best actress of her generation,” Streep holds the record for the most Academy Award nominations of any actor, with a staggering 21 nominations and three wins as of my last update.*
- 3. Tom Hanks — Known for his versatility and everyman persona, Hanks has won two consecutive Oscars for Best Actor for his roles in “Philadelphia” and “Forrest Gump.” He’s also an avid typewriter collector and has published a book of short stories inspired by his collection.*

...

These experiments highlight the importance of semantic associations and roles when prompting AI. By carefully crafting prompts, we can extract responses tailored to specific contexts and audiences.





Image created by the author using DeepDreamGenerator

Llm

Artificial Intelligence

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Written by Josef Machytka

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I work as PostgreSQL specialist & database reliability engineer at NetApp Deutschland, Open Source Services division.

No responses yet



What are your thoughts?

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```
create the table
TABLE special_data_types (
  id INT AUTO_INCREMENT PRIMARY KEY,
  name VARCHAR(50) NOT NULL,
  status ENUM('active', 'inactive', 'pending') NOT NULL,
  permissions SET('read', 'write', 'execute') NOT NULL,
  small_number TINYINT NOT NULL,
  medium_number MEDIUMINT NOT NULL,
  description TEXT,
  data BLOB,
  created_at DATE NOT NULL
);

INSERT 10 rows of data
INTO special_data_types (name, status, permissions, small_number, medium_number, description, data, created_at)
VALUES ('active', 'read,write', 5, 1000, 'Alice description', 'Alice data', '2023-01-01'),
('inactive', 'read', 10, 2000, 'Bob description', 'Bob data', '2023-02-01'),
('lie', 'pending', 'write,execute', 15, 3000, 'Charlie description', 'Charlie data', '2023-03-01'),
('active', 'read,write,execute', 20, 4000, 'David description', 'David data', '2023-04-01'),
('inactive', 'execute', 25, 5000, 'Eve description', 'Eve data', '2023-05-01'),
('pending', 'read,write', 30, 6000, 'Frank description', 'Frank data', '2023-06-01'),
('active', 'read', 35, 7000, 'Grace description', 'Grace data', '2023-07-01'),
('inactive', 'write,execute', 40, 8000, 'Hank description', 'Hank data', '2023-08-01'),
('pending', 'read,write,execute', 45, 9000, 'Ivy description', 'Ivy data', '2023-09-01'),
('active', 'execute', 50, 10000, 'Jack description', 'Jack data', '2023-10-01');
```

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```
D SELECT
  u.username,
  u.email,
  o.order_date,
  o.total_amount,
  p.product_name,
  od.quantity,
  p.price,
  (od.quantity * p.price) AS total_price
FROM
  pg13.users u
JOIN
  pg15.orders o ON u.user_id = o.user_id
JOIN
  pg15.order_details od ON o.order_id = od.order_id
JOIN
  pg14.products p ON od.product_id = p.product_id
ORDER BY
  u.username, o.order_date;
```

username	email	order_date	total_amount	product_name	quantity	price	total_price
varchar	varchar	date	decimal(10,2)	varchar	int32	decimal(10,2)	decimal(10,2)
Alice	alice@example.com	2024-11-20	150.00	Mouse	2	20.00	40.00
Alice	alice@example.com	2024-11-20	150.00	Keyboard	1	50.00	50.00

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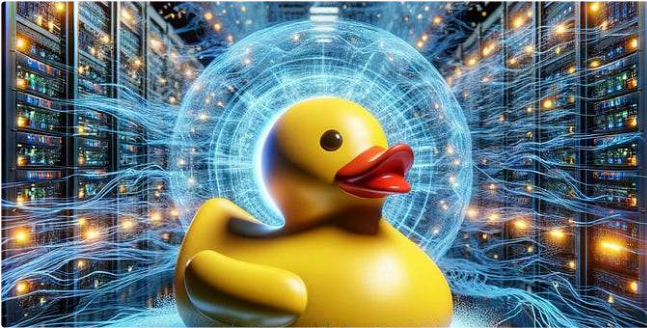
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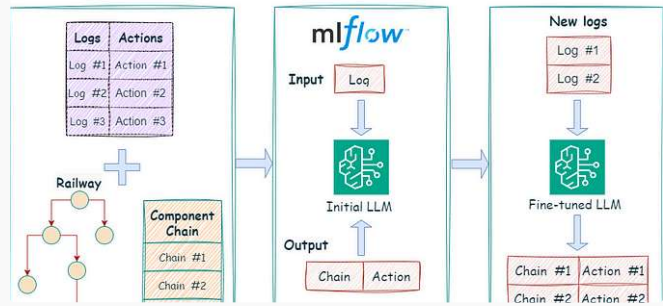
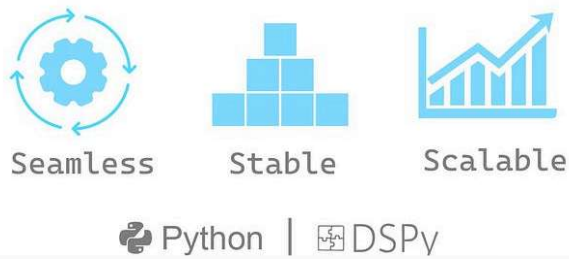
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