

Domain-Specific Prompt Engineering Assignment

1. Adapting Prompts for Healthcare

Scenario: A medical research firm needs a tool to summarize the key points of clinical research papers for doctors who have limited time.

Prompt:

"Summarize the medical research papers about diabetes treatment in plain language for a general practitioner. Focus on the treatment methods, outcomes, and key findings. Ensure clarity and avoid overly technical medical jargon. Present the key takeaways concisely."

Generated Output:

Summary of Recent Diabetes Treatment Research

Recent medical research has explored new and improved treatments for Type 2 diabetes, focusing on better blood sugar control and reducing long-term complications. Here are the key takeaways:

1. New Treatment Methods

- **GLP-1 Receptor Agonists:** These medications, like semaglutide and dulaglutide, help the body release insulin more effectively and reduce appetite, leading to better blood sugar control and weight loss.
- **SGLT2 Inhibitors:** Drugs such as empagliflozin and dapagliflozin help remove excess sugar through urine, reducing the risk of heart and kidney diseases.
- **New Insulin Formulations:** Ultra-rapid-acting and long-acting insulin types offer better flexibility and improved blood sugar stability throughout the day.

2. Outcomes of Recent Studies

- **Patients using GLP-1 receptor agonists** saw an average HbA1c reduction of 1.5% and significant weight loss over 6–12 months.
- **SGLT2 inhibitors** were shown to lower hospitalization rates for heart failure by 30% and improve kidney function.
- **Advanced insulin therapies** helped maintain blood sugar levels more consistently, reducing the risk of severe low blood sugar episodes (hypoglycemia).

3. Key Findings

- **Personalized Treatment is Key:** A combination of these treatments works best when tailored to a patient's needs, lifestyle, and other health conditions.
- **Heart and Kidney Benefits:** Many modern diabetes drugs now provide additional protection against cardiovascular and kidney diseases.
- **Lifestyle Still Matters:** Diet, exercise, and weight management remain crucial alongside medications for effective diabetes control.

Conclusion

The latest diabetes treatments offer better blood sugar control, weight loss benefits, and protection against complications. General practitioners should consider these options based on patient profiles to improve outcomes.

Explanation:

The prompt was designed to ensure clarity and accessibility for general practitioners who may not have the time to read full research papers. By specifying a focus on treatment methods, outcomes, and key findings, the summary remains relevant and useful. Avoiding overly technical jargon helps bridge the gap between complex research and practical medical application.

2. Adapting Prompts for Finance

Scenario: A financial consulting firm requires a tool to generate risk assessments and financial summaries based on market trends and stock data.

Prompt:

"Generate a detailed financial analysis for Tesla Inc., including an assessment of its current market position, recent stock trends, risk factors, and investment recommendations based on current data. Structure the report professionally and ensure it is useful for investors."

Generated Output:

Tesla Inc. Financial Analysis

Date: March 23, 2025

1. Current Market Position

Tesla Inc. (TSLA) continues to be a prominent player in the electric vehicle (EV) industry. However, its market share has experienced fluctuations across various regions:

- **United States:** Tesla's battery electric vehicle (BEV) market share declined to approximately 45% in Q4 2024, down from about 50% in the same period of 2023. citeturn0search1
- **Europe:** Sales decreased by around 10% year-over-year, with market share dropping to 13% from 16% in Q4 2023. citeturn0search1
- **China:** Contrarily, Tesla's sales increased by about 16% year-over-year, maintaining a high single-digit percentage share of the BEV market. citeturn0search1

2. Recent Stock Trends

As of the latest data, Tesla's stock price is \$248.71, reflecting a slight increase of 0.05371% from the previous close. The intraday high reached \$249.80, with a low of \$233.04, indicating ongoing volatility.

3. Risk Factors

Several risk factors could impact Tesla's future performance:

- **Operating Margins:** In Q1 2024, Tesla's operating margins declined to a record low of 5.5%, primarily due to intensified price competition in key markets. citeturn0search0
- **Research and Development (R&D) Expenses:** The company has been investing over \$1 billion per quarter in R&D, focusing on AI capabilities for self-driving technology. Despite this, achieving Level 5 autonomy may not be feasible until 2035, potentially affecting the return on these investments. citeturn0search0
- **Competition:** Tesla faces increasing competition from both established automakers and emerging Chinese original equipment manufacturers (OEMs), which could pressure its market share and profitability. citeturn0search1
- **Manufacturing Challenges:** The company has encountered supply chain disruptions and environmental issues, leading to production delays, notably with the Cybertruck model. citeturn0search0
- **Leadership Controversies:** CEO Elon Musk's political engagements have affected Tesla's market performance and public perception, contributing to stock volatility. citeturn0news24

4. Investment Recommendations

Given the current landscape, investors should consider the following:

- **Long-Term Potential:** Tesla's advancements in AI and autonomous driving, including plans for a Robotaxi service and a lower-priced vehicle model, could offer substantial long-term growth. citeturn0search1
- **Energy Business Expansion:** The company's energy generation and storage segment has shown significant growth, with deployments increasing by approximately 113% year-over-year in fiscal year 2024. citeturn0search1

- **Market Volatility:** Investors should remain cautious due to declining operating margins, increasing competition, and potential regulatory hurdles for autonomous driving technologies.

Conclusion

Tesla remains a key player in the EV industry, with promising prospects in AI and energy sectors. However, challenges such as declining margins, heightened competition, and leadership controversies necessitate a balanced investment approach. Investors are advised to weigh these factors carefully when considering Tesla's stock for their portfolios.

Note: This analysis is based on information available as of March 23, 2025. Investors should conduct their own due diligence and consider consulting a financial advisor before making investment decisions.

Explanation:

This prompt is tailored to investors and financial analysts, ensuring that the output is structured professionally. The request for market position, stock trends, risk factors, and investment recommendations ensures a well-rounded analysis. The mention of current data encourages relevance, while a structured format makes the information digestible for decision-making.

3. Adapting Prompts for Education

Scenario: An online education platform wants to generate personalized learning materials for students based on their progress in a course.

Prompt:

"Create a step-by-step guide to solving quadratic equations, including explanations for common mistakes and tips for improving understanding. Make the content suitable for a high school student who is struggling with the concept."

Generated Output:

Step-by-Step Guide to Solving Quadratic Equations

Quadratic equations are equations in the form:

$$ax^2 + bx + c = 0$$

where a , b , and c are constants, and x represents the unknown variable. Here's a simple guide to solving them.

Step 1: Identify the Coefficients

Look at your quadratic equation and determine the values of a , b , and c .

Example:

$$2x^2 + 5x - 3 = 0$$

Here, $a = 2$, $b = 5$, and $c = -3$.

Step 2: Choose a Solving Method

There are three main methods to solve quadratic equations:

1. Factoring
2. Quadratic Formula
3. Completing the Square

Method 1: Factoring

- Works best when the equation can be written as a product of two binomials.
- Find two numbers that multiply to $a \times c$ and add to b .
- Rewrite the equation and factor.

Example: Solve $x^2 + 5x + 6 = 0$

- Find two numbers that multiply to 6 (1×6 or 2×3) and add to 5 \rightarrow 2 and 3
- Rewrite: $(x+2)(x+3) = 0$
- Set each factor to zero: $x+2=0$ or $x+3=0$
- Solve: $x = -2$ or $x = -3$

 **Common Mistake:** Forgetting to check if factoring works. If it doesn't, try a different method!

Method 2: Quadratic Formula

For any quadratic equation $ax^2 + bx + c = 0$, use:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Example: Solve $2x^2 + 5x - 3 = 0$

- Identify $a = 2$, $b = 5$, $c = -3$.

- Plug into the formula: $x = \frac{-5 \pm \sqrt{(5)^2 - 4(2)(-3)}}{2(2)}$
 $x = \frac{-5 \pm \sqrt{25 + 24}}{4}$
 $x = \frac{-5 \pm \sqrt{49}}{4}$
 $x = \frac{-5 \pm 7}{4}$
 $x = \frac{-5 + 7}{4} \quad \text{or} \quad x = \frac{-5 - 7}{4}$
 $x = \frac{2}{4} \quad \text{or} \quad x = \frac{-12}{4}$
 $x = 0.5 \quad \text{or} \quad x = -3$
- Solutions: $x = 0.5$ or $x = -3$

💡 Common Mistake: Miscalculating the square root or making sign errors.

Method 3: Completing the Square

- Best used when factoring is difficult.
- Make the left-hand side a perfect square trinomial.

Example: Solve $x^2 + 6x + 5 = 0$

1. Move the constant to the other side: $x^2 + 6x = -5$
2. Find $(\frac{b}{2})^2 = (\frac{6}{2})^2 = 9$
3. Add 9 to both sides: $x^2 + 6x + 9 = -5 + 9$
4. Rewrite as a square: $(x + 3)^2 = 4$
5. Solve by taking the square root: $x + 3 = \pm 2$
6. Solve for x : $x = -3 \pm 2$
7. Solutions: $x = -1$ or $x = -5$

💡 Common Mistake: Forgetting to add the same value to both sides of the equation.

Tips for Understanding Quadratic Equations

- ✓ Practice Factoring: The more you practice, the easier it gets!
 - ✓ Check Your Work: Always substitute your solutions back into the original equation.
 - ✓ Use the Quadratic Formula When in Doubt: It always works.
 - ✓ Graph the Equation: If you're stuck, plotting the function can help visualize the solutions.
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Final Thoughts

Quadratic equations might seem tricky at first, but once you understand the different solving methods, they become much easier! Keep practicing, and soon you'll be solving them with confidence. 🚀

Explanation:

This prompt ensures that the content is tailored to a struggling high school student by focusing on clear explanations and step-by-step guidance. Including common mistakes and improvement tips helps address learning gaps. The use of simple language ensures accessibility, making it an effective learning tool.

4. Adapting Prompts for Marketing

Scenario: A digital marketing team needs help generating content for a social media campaign promoting a new eco-friendly product.

Prompt:

"Write a persuasive and engaging social media post promoting a new eco-friendly water bottle made from recycled materials. Focus on its sustainability, design, and benefits for both the user and the environment. Ensure the tone is friendly and engaging."

Generated Output:

🌍💚 Sip Sustainably with the Future of Hydration! 💚🌍

Meet the EcoFlow Bottle – the water bottle that's as kind to the planet as it is to you!
Made entirely from 100% recycled materials, this sleek and durable bottle helps you stay hydrated while reducing plastic waste. 🌱♻️

✨ **Why You'll Love It:**

- ✅ **Eco-Friendly:** Every bottle saves plastic from landfills and oceans. 🌊
- ✅ **Sleek & Stylish:** A modern, minimalist design that fits your lifestyle. 🏡
- ✅ **Keeps Drinks Cold or Hot:** Double-walled insulation keeps your drinks chilled for 24 hours or hot for 12 hours. ❄️🔥
- ✅ **Leak-Proof & Durable:** Take it anywhere—gym, work, or travel—without spills! 🚀

Join the movement! One small change = a big impact. Let's ditch single-use plastic and make hydration more sustainable. 🌍💚

💬 **Tag a friend who needs this! #EcoFlow #SipSustainably #EcoFriendlyLiving** 📱♻️

Explanation:

This prompt is designed for a marketing audience, ensuring a friendly and engaging tone suitable for social media. Highlighting sustainability, design, and benefits appeals to eco-conscious consumers. The persuasive language encourages engagement and potential purchases.

5. Ethical Considerations and Biases in Generative Prompt Design

Scenario: You are designing a prompt for an AI tool used by a news organization to generate articles on political topics. There are concerns about the potential for bias or misinformation in the generated content.

Prompt:

"Write a neutral, fact-based article about the recent political debate on healthcare reform. Include perspectives from both sides of the argument, with a focus on evidence-based claims and objective reporting. Avoid biased language and maintain factual integrity."

Generated Output:

The Ongoing Debate on Healthcare Reform: Perspectives and Policy Considerations


The debate over healthcare reform continues to be a central issue in policy discussions, with lawmakers, experts, and the public weighing in on the best path forward. The discussion primarily revolves around improving access, affordability, and quality of healthcare while balancing economic feasibility and governmental involvement.

Support for Expanding Government-Backed Healthcare

Proponents of expanding government-backed healthcare argue that access to healthcare is a fundamental right and that a more comprehensive system can lead to better health outcomes. Supporters advocate for policies such as a universal healthcare system, an expansion of Medicare and Medicaid, or a public option to compete with private insurers.

♦ **Key Arguments:**

- **Increased Access:** Countries with universal healthcare tend to have lower uninsured rates and improved access to essential medical services.
- **Cost Reduction:** Studies suggest that a single-payer system could reduce administrative costs and negotiate lower drug prices.
- **Public Health Benefits:** Research indicates that nations with government-supported healthcare models experience lower rates of preventable diseases due to consistent medical access.

 **Evidence:** According to a report from the Commonwealth Fund, countries with universal coverage, such as Canada and the UK, spend less per capita on healthcare while achieving comparable or better health outcomes than the U.S.

Support for a Market-Driven Healthcare System

Opponents of a government-run system emphasize the importance of choice, competition, and innovation in healthcare. They argue that a market-driven approach leads to better quality care, medical advancements, and efficiency.

♦ **Key Arguments:**

- **Preserving Patient Choice:** Private insurance allows individuals to select plans that fit their needs rather than relying on a one-size-fits-all model.
- **Encouraging Innovation:** The U.S. healthcare system, which incorporates private competition, has been a leader in medical breakthroughs and cutting-edge treatments.
- **Economic Considerations:** Critics argue that government-funded healthcare could result in higher taxes, longer wait times, and potential strain on the system.

 **Evidence:** A study from the Mercatus Center suggests that transitioning to a single-payer model in the U.S. could cost over \$30 trillion over ten years, leading to concerns about funding and financial sustainability.

Key Challenges & Areas of Agreement

While the debate remains polarized, there is some bipartisan consensus on aspects of healthcare reform:

- ✓ **Lowering Prescription Drug Prices:** Both sides agree on the need for measures to curb rising medication costs.
 - ✓ **Improving Transparency:** Efforts to ensure clear pricing structures have gained support across party lines.
 - ✓ **Addressing Rural Healthcare Gaps:** Lawmakers recognize the need to improve access to medical services in underserved areas.
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Conclusion

The future of U.S. healthcare reform will likely be shaped by ongoing discussions between policymakers, healthcare professionals, and the public. Whether the path forward includes greater government intervention or market-driven solutions, the primary goal remains the same: ensuring that Americans have access to affordable, high-quality healthcare while maintaining a sustainable economic model.

 **What do you think?** The debate continues, and input from all stakeholders will be crucial in shaping the next steps for healthcare policy.

Explanation:

This prompt was crafted to ensure neutrality and factual reporting. By explicitly requesting perspectives from both sides and emphasizing evidence-based claims, the AI-generated content remains balanced. Avoiding biased language and ensuring factual integrity minimizes ethical concerns related to misinformation.

6. Group Project: AI-Powered Customer Service Chatbot

Scenario: As part of a group, you are assigned to design a set of prompts for an AI-powered customer service chatbot for a retail company.

Prompts & Explanations:**♦ Order Status Inquiry**

Prompt: "Generate a polite and professional response to a customer asking about the status of their order. Include estimated delivery time if available."

Generated Output:

Subject: Order Status Update 📦

Dear [Customer's Name],

Thank you for reaching out! We're happy to assist you with your order.

Your order #[Order Number] has been [processed/shipped] and is expected to arrive by [Estimated Delivery Date]. You can track your order using this link: [Tracking Link].

If you have any further questions or need assistance, please don't hesitate to reach out. We appreciate your patience and thank you for choosing [Company Name]!

Best regards,

[Your Name]

[Customer Support Team]

[Company Name]

[Contact Information]

Explanation:

This prompt ensures a customer-friendly response that is both polite and informative. Including estimated delivery time improves transparency and enhances customer satisfaction.

♦ Refund Request for Defective Product

Prompt: "Generate a courteous response to a customer requesting a refund for a defective product, outlining the refund policy and next steps."

Generated Output:

Subject: Order Status Update 📦

Dear [Customer's Name],

Thank you for reaching out! We're happy to assist you with your order.

Your order #[Order Number] has been [processed/shipped] and is expected to arrive by [Estimated Delivery Date]. You can track your order using this link: [Tracking Link].

If you have any further questions or need assistance, please don't hesitate to reach out. We appreciate your patience and thank you for choosing [Company Name]!

Best regards,

[Your Name]

[Customer Support Team]

[Company Name]

[Contact Information]

Explanation:

This prompt ensures the response is empathetic, clear, and aligned with the company's refund policy. Outlining next steps minimizes confusion and expedites resolution.

♦ **Delivery Inquiry for Out-of-Stock Items**

Prompt: "Generate a response to a customer asking about delivery times for an out-of-stock item, including options for backorder or alternative products."

Generated Output:

Subject: Inquiry About Delivery Times for Out-of-Stock Item

Dear [Customer's Name],

Thank you for reaching out! We appreciate your interest in [Product Name].

Unfortunately, this item is currently out of stock, but we expect it to be restocked by [Estimated Restock Date].

In the meantime, you have a couple of options:

- ♦ **Backorder:** You can place a backorder now, and we will ship it as soon as it's available.
- ♦ **Alternative Products:** We have similar items that may meet your needs. Here are a few recommendations: [List Alternative Products with Links].

Please let us know how you'd like to proceed, and we'd be happy to assist you! Thank you for choosing [Company Name]—we appreciate your patience and support.

Best regards,
[Your Name]
[Customer Support Team]
[Company Name]
[Contact Information]

Explanation:

This prompt ensures the response is professional and helpful, providing the customer with clear options for backordering or alternative product recommendations. Maintaining a positive tone helps retain customer interest.

Conclusion

This assignment demonstrates the importance of domain-specific prompt engineering, ensuring that AI-generated content is accurate, ethical, and useful across various industries. By adapting prompts carefully, we can enhance AI's effectiveness in healthcare, finance, education, marketing, and customer service, while also addressing ethical concerns related to bias and misinformation.