



Workshop Task Sheet

Enhancing Energy Economics Research with AI

Date: November 11, 2024

Objective: Practice use-cases to incorporate genAI in your every day work and research.

1 Customize Your ChatGPT

Prompt: Use the following to customize ChatGPT for your work at KAPSARC:

I am looking to customize ChatGPT to support my work at KAPSARC, an energy economics think tank. Could you guide me through a series of targeted questions to help create optimized custom instructions tailored to my needs? Please include example answers for each question to help me refine my responses and develop a precise and effective custom instruction.

2 Chain of Thought (CoT) Prompting

a. **Objective:** Work with a partner. One person manually breaks down the complex problem, while the other uses CoT.

b. **Example:**

- **Complex Problem:** How can we reduce the environmental impact of urban transportation?
- **Manual Breakdown into Sub-Questions:**
 - What are the main sources of environmental impact in urban transportation?
 - How can public transit be optimized to reduce emissions?
 - What role do electric vehicles play in sustainable urban transport?
 - How can policy changes encourage eco-friendly transportation choices?
- **Applying Chain-of-Thought Prompting:**

User: What are the main sources of environmental impact in urban transportation? Let's think through this step by step.
- **Model Response:**

Urban transportation impacts the environment through emissions from vehicles. Personal cars contribute significantly due to their high numbers. Buses and trucks, while fewer, have larger engines that emit more pollutants. Traffic congestion increases idle times, leading to more emissions. Therefore, the main sources are personal vehicles, commercial transport, and congestion-related emissions.

3 Literature Search

Objective

Learn to effectively use ChatGPT for conducting reference searches and constructing a short literature review on energy economics and engineering.

Topics

Focus on one of the following topics relevant to KSA:

- Renewable Energy Integration in Saudi Arabia: Challenges and Opportunities
- Advancements in Carbon Capture and Storage Technologies in KSA
- The Impact of Inflation on Oil Prices and Its Relevance for Saudi Arabia

Instructions

- A. Form Groups:** Participants are divided into three groups, each focusing on one of the topics.
- B. Develop Effective Prompts:** As a group, create prompts for guiding ChatGPT to provide relevant references.
- C. Interact with ChatGPT:** Input prompts, gather information, and ask follow-up questions.
- D. Compile and Verify References:** Organize references and cross-check with reputable sources.
- E. Construct a Literature Review:** Write a concise review (1-2 pages) summarizing key findings and suggesting future research.
- F. Prepare a Group Presentation:** Summarize the literature review, ChatGPT's assistance, and challenges encountered. Aim for a 3-5 minute presentation.

4 Sentiment Analysis

Objective

Perform a sentiment analysis on excerpts from the OPEC 2023 World Oil Outlook, identifying positive, negative, and neutral tones regarding energy demand, climate policy, and investment.

Instructions

- **Extract Key Sentences:** Identify statements on projected oil demand, investment, and climate.
- **Classify Sentiments:** Label each sentence as positive, negative, or neutral.
- **Analyze Sentiment by Theme:** Group sentences by themes (Energy Demand, Investment, Sustainability) and identify overall sentiment.
- **Interpret Results:** Summarize the sentiment for each theme and discuss OPEC's tone on energy transition and market outlook.

Example of Sentiment Classification

Sentence: "Global oil demand is set to reach 116 million barrels a day by 2045, supported by economic growth in developing regions."

Sentiment: Positive

Theme: Energy Demand

Additional Tasks

- **Sentiment Score:** Assign a score (+1 for positive, 0 for neutral, -1 for negative) and calculate an average score for each theme.
- **Visualization:** Create a bar chart showing the sentiment distribution across themes.

5 Analyzing Saudi Aramco's Financial Performance and Forecasting

Objective

Assess Aramco's financial health, forecast performance, and evaluate dividend sustainability based on recent financial reports.

Part A: Financial Statement Analysis

- Calculate the year-over-year change in net income and free cash flow from H1 2023 to H1 2024.
- Discuss trends in net income and cash flow with reference to oil prices, capital expenditures, and dividend distributions.
- **Dividend Sustainability:** Calculate the dividend payout ratio and discuss its implications.

Part B: Forecasting Future Performance

- Project earnings growth considering Aramco's capital investment strategy.
- Calculate expected returns using the CAPM model and evaluate Jensen's Alpha.

Part C: Dividends and Forecasting Scenarios

- Forecast quarterly dividends and conduct a sensitivity analysis based on oil prices.

Discussion Questions

- How does Aramco's performance compare with other major oil companies in terms of volatility and dividend yields?
- What challenges and opportunities do you foresee for Aramco in the next three years?

Prepared for KAPSARC Workshop on ChatGPT Customization and Analytics in Energy Economics.