**Ex.No: 5**

**COMPARATIVE ANALYSIS OF DIFFERENT TYPES OF PROMPTING PATTERNS AND EXPLAIN WITH VARIOUS TEST SCENARIOS**

**AIM:**

To compare and analyze different types of prompting patterns using multiple test scenarios, and to evaluate their effectiveness in generating accurate, coherent, and contextually appropriate AI responses.

**EXPLANATION:**

Prompting patterns determine how an AI model interprets and responds to a user’s instruction. The *structure, phrasing, and detail* of a prompt directly affect the quality of the generated output.

Different types of prompting patterns include:

1. **Descriptive Prompts** – Request detailed explanations.
2. **Comparative Prompts** – Ask for similarities/differences.
3. **Instruction-Based Prompts** – Provide step-by-step tasks.
4. **Contextual Prompts** – Supply background or role-based information.
5. **Question-Answer Prompts** – Encourage concise, direct answers.
6. **Chain-of-Thought Prompts** – Ask the model to reason step by step.

This experiment compares these patterns across different test scenarios to understand their performance and accuracy.

**ALGORITHM:**

**STEP 1:** Identify the prompting patterns to be compared.  
**STEP 2:** Select 2–3 test scenarios for evaluation.  
**STEP 3:** Apply each prompting pattern to the same scenario.  
**STEP 4:** Observe variations in responses.  
**STEP 5:** Analyze which pattern produces the most relevant and complete output.  
**STEP 6:** Record and compare the results.

**TEST SCENARIOS USED:**

1. **Scenario 1:** Explain the importance of renewable energy.
2. **Scenario 2:** Compare online vs. classroom education.
3. **Scenario 3:** Describe the working of a neural network.

**COMPARATIVE ANALYSIS TABLE**

| **Prompting Pattern** | **Scenario Example** | **Example Prompt** | **Observed Output Summary** |
| --- | --- | --- | --- |
| **1. Descriptive Prompt** | Scenario 1 | “Describe in detail why renewable energy is important for the future.” | Output gives an elaborate explanation with facts and benefits of renewable energy. Useful for reports. |
| **2. Comparative Prompt** | Scenario 2 | “Compare online learning and classroom learning based on interaction, cost, and flexibility.” | Output lists pros and cons of both formats. Very effective for analytical writing. |
| **3. Instruction-Based Prompt** | Scenario 3 | “List the steps involved in training a neural network.” | Output provides a clear sequence of steps — data preparation, forward pass, loss calculation, and backpropagation. Ideal for procedural writing. |
| **4. Contextual Prompt** | Scenario 2 | “As a college student, explain how online learning has changed your study habits.” | Output adopts a personal, experience-based tone. Best for reflective or narrative writing. |
| **5. Question-Answer Prompt** | Scenario 1 | “What is renewable energy? Why is it important?” | Output gives short, direct answers. Good for quizzes or short notes. |
| **6. Chain-of-Thought Prompt** | Scenario 3 | “Explain step by step how a neural network learns to classify images.” | Output includes reasoning for each step (weights, activation, optimization). Excellent for technical explanations. |

**RESULTS AND OBSERVATIONS:**

* **Descriptive** and **Chain-of-Thought prompts** produced the most comprehensive and accurate results.
* **Comparative prompts** were effective for summarization and analytical writing.
* **Contextual prompts** made outputs more personalized and engaging.
* **Instruction-based prompts** gave the best structured and task-oriented outputs.
* Overly general prompts resulted in vague or incomplete answers.

**INFERENCE:**

Each prompting pattern serves a specific purpose:

* Use **Descriptive/Comparative** prompts for reports or essays.
* Use **Instruction-Based** prompts for coding, tasks, and procedures.
* Use **Contextual** prompts for creative or role-based writing.
* Use **Chain-of-Thought** prompts for reasoning and complex analysis.

The experiment shows that **prompt structure and specificity** are crucial in guiding AI-generated content.