Title Slide

Chain of Thought (CoT): Chain of Thought (CoT) vs Tree of Thoughts (ToT) Prompting
Tree of Thoughts (ToT): Understanding the structural and strategic differences between two advanced reasoning techniques in AI prompting.

1. Introduction

Chain of Thought (CoT): Chain of Thought (CoT): A prompting method that guides AI to reason step-by-step linearly before producing an answer.
Tree of Thoughts (ToT): Tree of Thoughts (ToT): A prompting method that explores multiple reasoning paths (branches) simultaneously to find the most optimal solution.

2. Core Idea

Chain of Thought (CoT): CoT focuses on a single reasoning path where each step builds upon the previous one.
Tree of Thoughts (ToT): ToT involves branching reasoning paths that can be evaluated and pruned based on logic or performance.

3. Objective

Chain of Thought (CoT): CoT aims to make the model's reasoning process transparent and coherent.
Tree of Thoughts (ToT): ToT aims to enhance reasoning accuracy by exploring multiple solution paths before selecting the best.

4. Structure

Chain of Thought (CoT): CoT: Linear structure – one chain of reasoning from start to finish.
Tree of Thoughts (ToT): ToT: Hierarchical structure – tree of multiple reasoning branches that can merge or diverge.

5. Cognitive Analogy

Chain of Thought (CoT): CoT is like following a single train of thought to reach a conclusion.
Tree of Thoughts (ToT): ToT is like brainstorming multiple ideas, evaluating them, and choosing the best outcome.

6. Example

Chain of Thought (CoT): CoT Example: Solving a math problem step-by-step — each step logically follows the previous one.
Tree of Thoughts (ToT): ToT Example: Exploring different solution strategies (e.g., algebraic vs. geometric) before deciding the most efficient path.

7. Real-World Use Case

Chain of Thought (CoT): CoT: Used in logical reasoning tasks, math problem solving, and structured Q&A.;
Tree of Thoughts (ToT): ToT: Used in planning, decision-making, and problem-solving where multiple possible outcomes exist.

8. Strengths

Chain of Thought (CoT): CoT: Easy to implement, interpretable reasoning, improves reliability for single-path problems.
Tree of Thoughts (ToT): ToT: Handles complex problems, enhances creativity, supports evaluation of multiple reasoning directions.

9. Limitations

Chain of Thought (CoT): CoT: May miss alternative solutions if the single reasoning path is flawed.
Tree of Thoughts (ToT): ToT: Computationally expensive; requires mechanisms to manage and evaluate multiple branches.

10. Summary

Chain of Thought (CoT): CoT: Linear reasoning with focus on step-by-step logic. Real-world use: Math explanations, reasoning tasks.
Tree of Thoughts (ToT): ToT: Branching reasoning that evaluates multiple possibilities. Real-world use: Strategic decision-making, creative problem solving.