Master Prompt Engineering

Fundamental LLM Concepts

Operations

Reductive Operations

Take a large amount of text and produce a smaller output. Input is larger than the output.

- **Summarization:** Say the same thing with fewer words.
  - Can use list, notes, executive summary.
- **Distillation:** Purify the underlying principles or facts.
  - Remove all the noise, extract axioms, foundations, etc.
- **Extraction:** Retrieve specific kinds of information.
  - Question answering, listing names, extracting dates, etc.
- **Characterizing:** Describe the content of the text.
  - Describe either the text as a whole, or within the subject.
- **Analyzing:** Find patterns or evaluate against a framework.
  - Structural analysis, rhetorical analysis, etc
- **Evaluation:** Measuring, grading, or judging the content.
  - Grading papers, evaluating against morals
- **Critiquing:** Provide feedback within the context of the text.
  - Provide recommendations for improvement

Transformation Operations

Transmute the input into another format. Input and output are roughly the same size and/or meaning.

- **Reformatting:** Change the presentation only.
  - Prose to screenplay, XML to JSON
- **Refactoring:** Achieve same results with more efficiency.
  - Say the same exact thing, but differently
- **Language Change:** Translate between languages.
  - English to Russian, C++ to Python
- **Restructuring:** Optimize structure for logical flow, etc.
  - Change order, add or remove structure
- **Modification:** Rewrite copy to achieve different intention.
  - Change tone, formality, diplomacy, style, etc
- **Clarification:** Make something more comprehensible.
  - Embellish or more clearly articulate

Generative Operations

Generate a large amount of text from a small set of instructions or data. Input is smaller than the output.

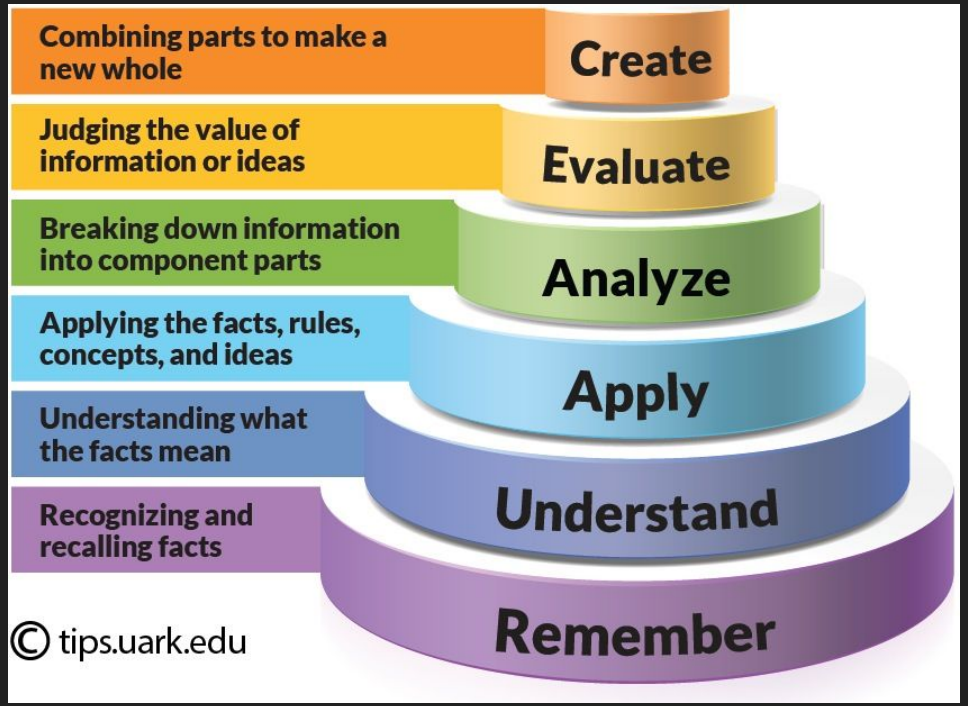
- **Drafting:** Generate a draft of some kind of document.
  - Code, fiction, legal copy, KB, science, storytelling
- **Planning:** Given parameters, come up with plans.
  - Actions, projects, objectives, missions, constraints, context.
- **Brainstorming:** Use imagine to list out possibilities.
  - Ideation, exploration of possibilities, problem solving, hypothesizing
- **Amplification:** Articulate and explicate something further.
  - Expanding and expounding, riffing on stuff

Latent & Emergent

Bloom's Taxonomy

A hierarchical model to classify educational learning objectives into varying complexity and specificity.

- **Remembering:** Recalling facts and concepts.
  - Retrieval and regurgitation
- **Understanding:** Explaining ideas and concepts.
  - Connecting words to meanings.
- **Applying:** Using information in new situations.
  - Functional utility
- **Analyzing:** Drawing connections among ideas.
  - Connecting the dots between concepts.
- **Evaluating:** Justifying a decision or action.
  - Explication and articulation
- **Creating:** Producing new or original work.
  - Generating something that did not previously exist.



Latent Content

Knowledge, facts, concepts, and information that is “embedded” in the model and must be “activated” by correct prompting.

- **Training Data:** Latent content only originates from training data.
- **World Knowledge:** General facts and understanding of the world.
- **Scientific Information:** Embedded data on scientific principles.
- **Cultural Knowledge:** Information on cultures and social norms.
- **Historical Knowledge:** Data on past events and figures.
- **Languages:** Language structures, vocabulary, and syntax.

Emergent Capabilities

Increasingly large models have “emergent” capabilities that are not explicitly in the training data.

- **Theory of Mind:** Understanding the content of minds.
  - It’s read enough Reddit to understand how humans think.
- **Implied Cognition:** Thinking with the right prompting.
  - Ability to “think” required to accurately predict next token.
- **Logical Reasoning:** Inductive and deductive reasoning.
  - Triangulating principles based on observations, etc
- **In-Context Learning:** Use information not in training.
  - Quickly adopt and apply truly novel information

Hallucination = Creativity

Hallucination is the same cognitive behavior as creativity, differing only in recognition of its fictitious nature.

- **Recognition:** The key difference lies in acknowledging the fictitious element.
- **Cognitive Behavior:** Both involve similar mental processes for generating ideas.
- **Fictitious vs Real:** How the output is perceived or utilized.
- **Creative Applications:** Hallucinations can be channeled into artistic or innovative endeavors.
- **Context-Dependent:** The value or risk depends on the context in which it occurs.

Thank you