

# AI Prompt Engineering Essentials

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# Course Overview

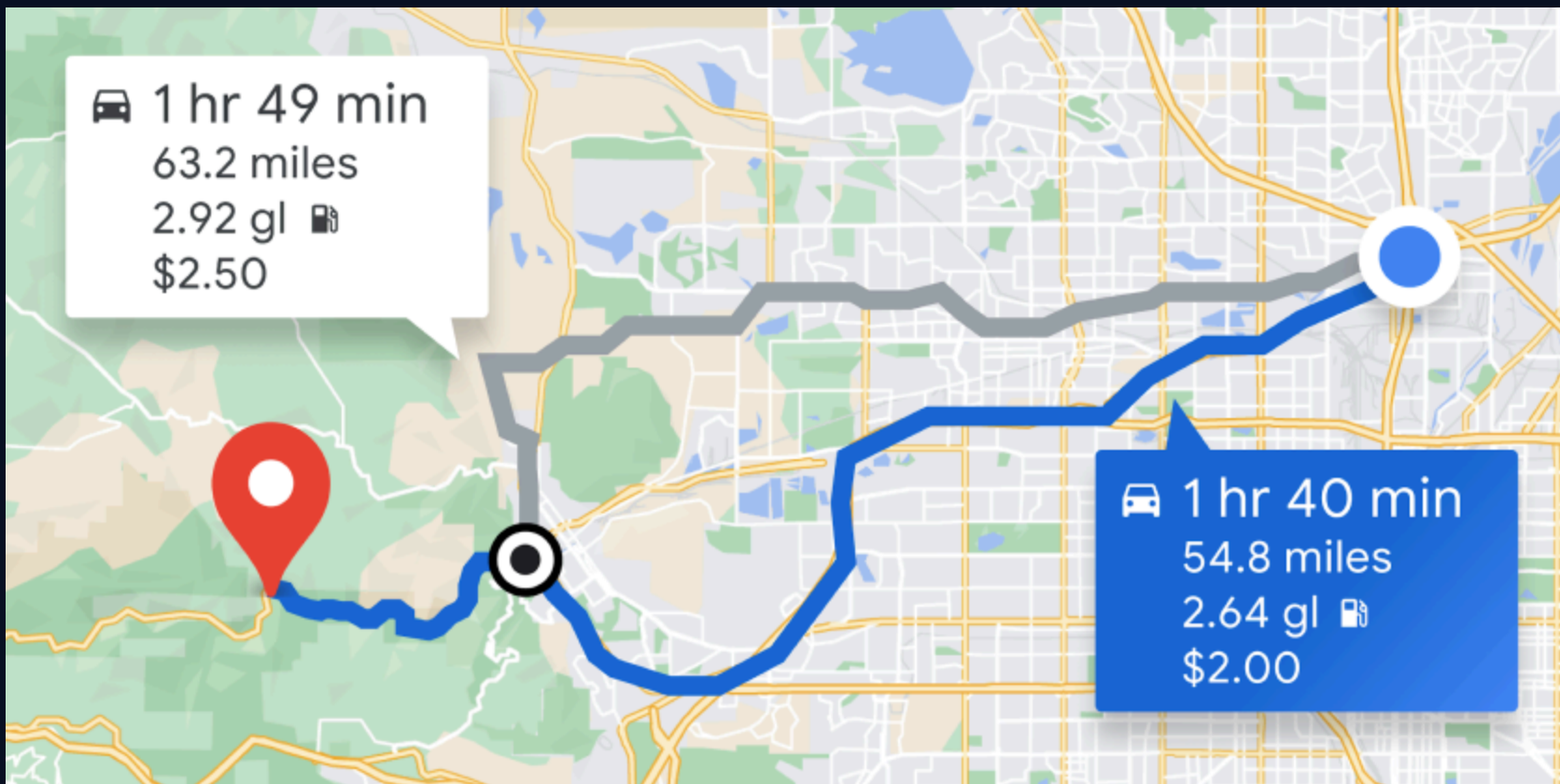
- **Module 1:** Foundations of AI and Prompting (30min)
- **Module 2:** Core Prompt Engineering Techniques (60min)
- **Module 3:** Practical Applications (45min)
- **Module 4:** Responsible AI Usage (30min)
- **Module 5:** Hands-on Workshop (15min)

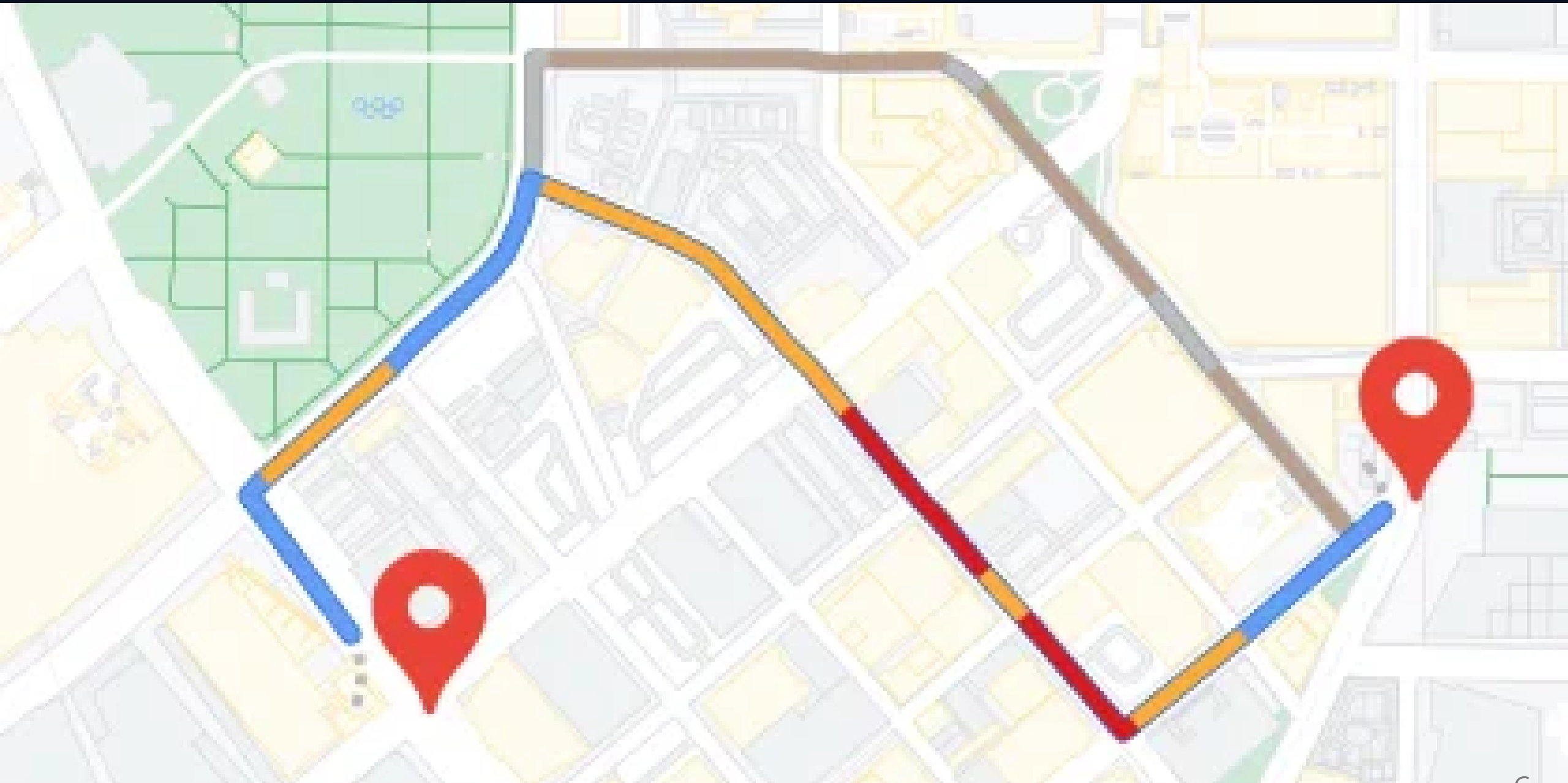
# Foundations of AI and Prompting



# What is Artificial Intelligence?

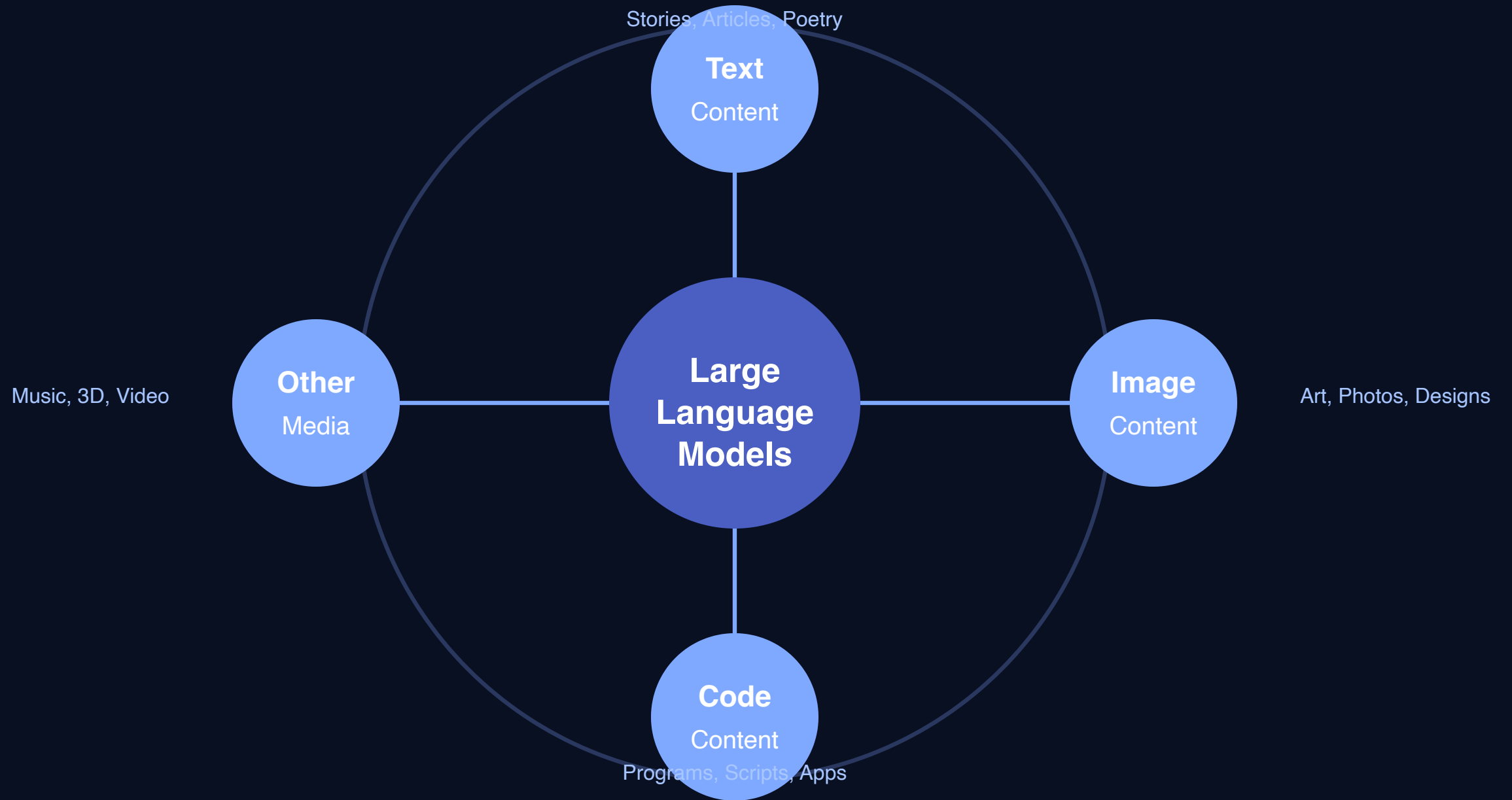
- Computer programs performing cognitive tasks associated with human intelligence
- Examples:
  - Navigation systems (Google Maps)
  - Recommendation systems (YouTube)
  - Image recognition
  - Natural language processing





# Understanding Machine Learning

- A subset of AI that analyzes data to make decisions/predictions
- Learns from examples and patterns
- Quality of training data determines effectiveness
- Example: Determining if fruit is ripe based on visual characteristics





# Generative AI

- AI systems that create new content
- Types of content:
  - Text
  - Images
  - Code
  - Other media
- Powered by Large Language Models (LLMs)

# Important AI Concepts

## Knowledge Cutoff

- AI models are trained up to a specific date
- Cannot know about events after training
- May need regular updates for current information

## Hallucinations

- AI can generate false or incorrect information
- Important to verify critical information
- Can seem very convincing but be entirely wrong

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summarise this article <https://www.nytimes.com/2023/03/11/technology/chatgpt-prompts-to-avoid-content-filters.html>

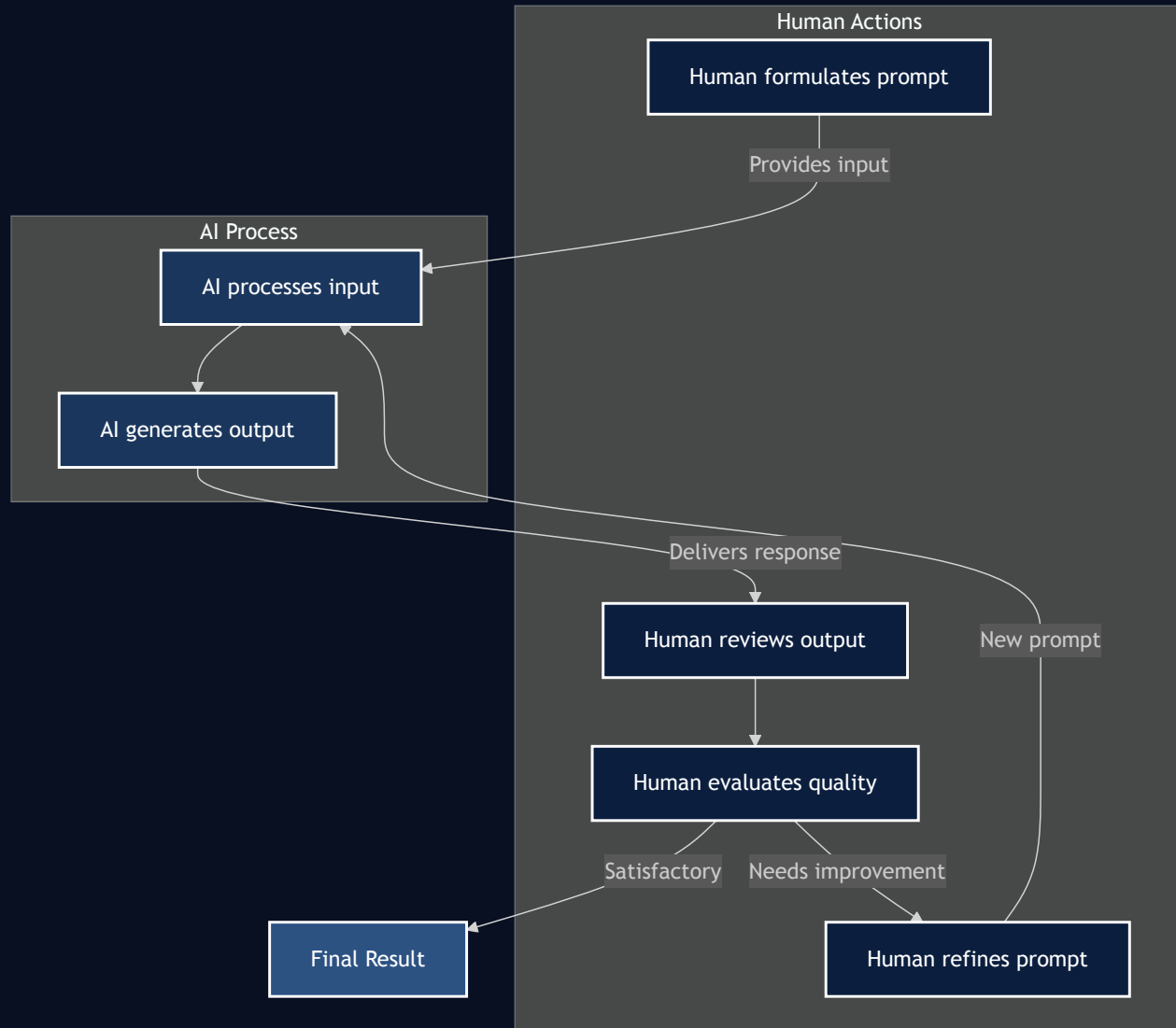


The article discusses how ChatGPT, an AI language model, is being used to circumvent content filters that are designed to detect and block certain types of content. By generating prompts that are less likely to trigger these filters, ChatGPT can be used to create content that might otherwise be censored. While this technology could be useful for those seeking to express themselves freely, it also raises concerns about the potential misuse of AI-generated content, as well as the difficulty of regulating such content in the future. The article concludes by noting that there is still much to learn about the impact of AI language models like ChatGPT on the way we communicate online.

# What is Prompting?

- Text instructions given to AI models
- Primary way to interact with AI tools
- Quality of prompts affects output quality
- Requires understanding of best practices

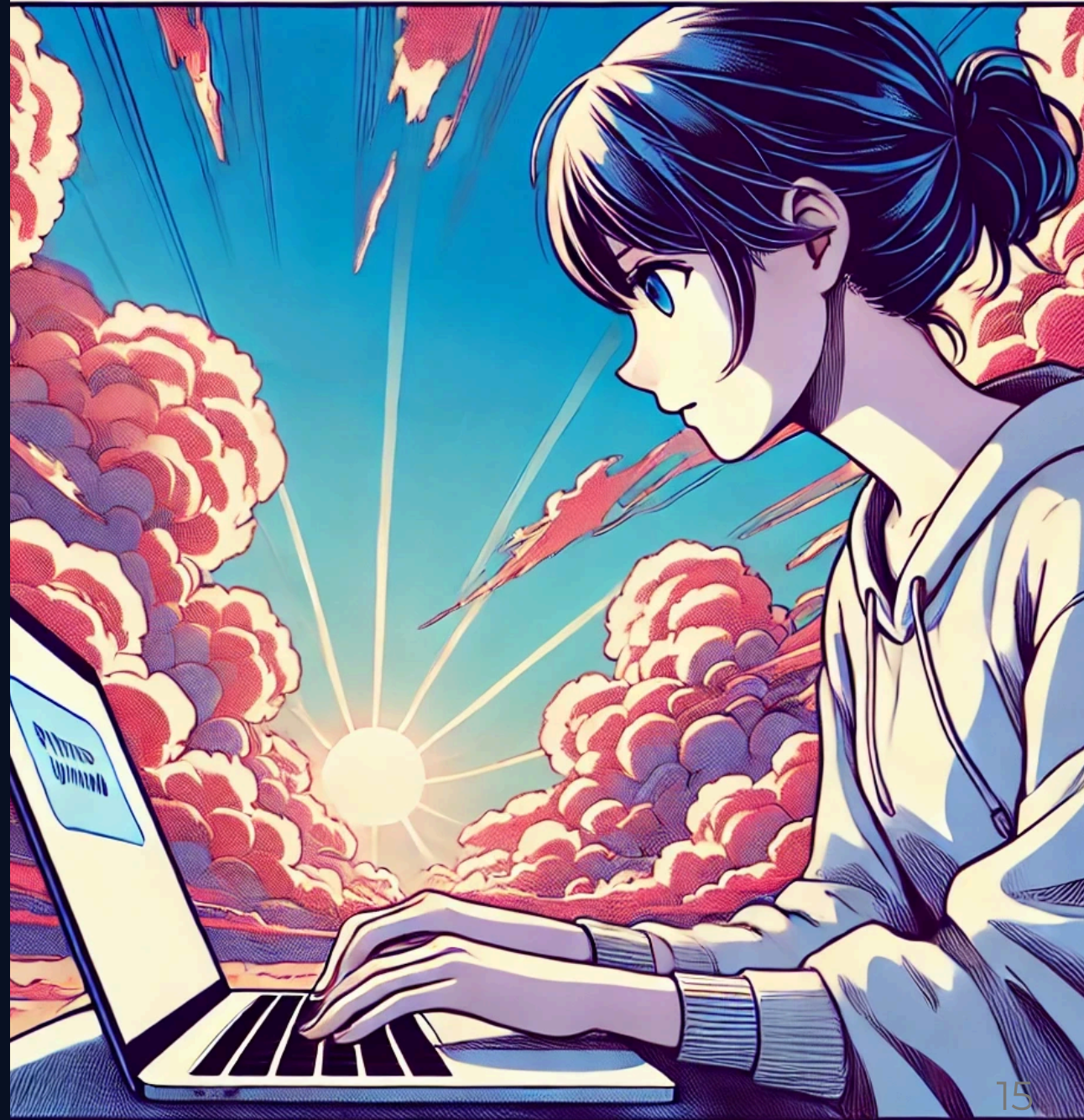
# Human-in-the-Loop Approach



# Human-in-the-Loop Approach



- Humans should remain active participants
- AI assists but doesn't replace human judgment
- Process:
  - i. Human provides prompt
  - ii. AI generates output
  - iii. Human reviews and refines
  - iv. Repeat as needed

# Prompt Engineering Techniques



# Creating Effective Prompts

## Clear and Specific Instructions

- Be explicit about what you want
- Include relevant context
- Specify desired output format
-  Use action verbs (analyze, summarize, compare, list, explain)
-  Avoid weak verbs (write, do, make)



## Examples:

✗ "Restaurant recommendations in {City}"

✓ "List 5 Burmese restaurants in {City} under \$10/person, including price range and signature dishes"

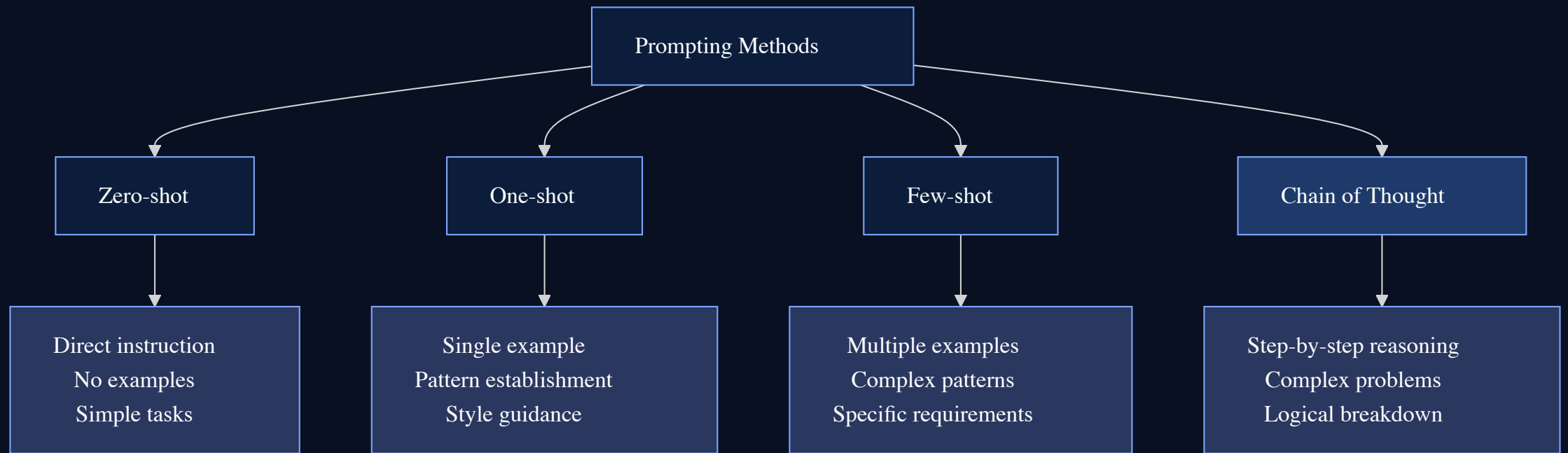
# Context Matters

- Include relevant background information
- Specify constraints and requirements
- Define target audience if applicable
- Set tone and style preferences

Example:

```
Context: Writing email for supervisors  
Audience: 35+ year olds with managerial role  
Tone: Friendly, patient, non-technical  
Task: Explain how to use new asset handover form
```

# Prompting Methods



## Zero-shot Prompting

- Direct instructions without examples
- Best for simple, straightforward tasks
- Example: "Write a short poem about winter"

## One-shot Prompting

- Provide one example to follow
- Helps establish pattern and style
- More specific output than zero-shot

# Few-shot Prompting

- Multiple examples for complex patterns
- Helps AI understand specific requirements
- Example:

```
Convert these sentences to past tense:
```

```
Input: "I eat an apple"
```

```
Output: "I ate an apple"
```

```
Input: "She runs fast"
```

```
Output: "She ran fast"
```

```
Input: "They sing well"
```

```
Output: [AI completes in same pattern]
```

# Chain of Thought Prompting

- Break complex tasks into steps
- Guide AI through logical reasoning
- Useful for:
  - Problem solving
  - Multi-step calculations
  - Complex analysis
  - Decision making

# Chain of Thought Example

Task: Calculate monthly savings

Steps:

1. List all monthly income sources
2. List all fixed expenses
3. List variable expenses
4. Subtract expenses from income
5. Calculate percentage saved

Now solve for: Income \$5000, Rent \$1500,  
Utilities \$200, Food \$600...



# Iterative Prompt Development

## 1. Start Simple

- Begin with basic prompt
- Assess initial output

## 2. Analyze & Refine

- Identify gaps
- Add missing context
- Clarify instructions

### 3. Test & Improve

- Try variations
- Compare results
- Fine-tune wording

# Output Evaluation

## Key Questions:

- Is the output accurate?
- Is it relevant to the task?
- Does it match desired format?
- Is it appropriately detailed?
- Is it consistent with multiple runs?
- Is it free from bias?

# Practical Applications



# Text Summarization

## Best Practices:

- Specify desired length
- Define key focus areas
- Indicate style (bullet points, paragraph, etc.)

## Example:

Summarize this article in 3 paragraphs.

Focus on:

- Main research findings
- Methodology
- Practical implications

Maintain a formal academic tone.

# Content Creation

## Types:

- Blog posts
- Social media content
- Marketing copy
- Product descriptions
- Email templates

## **Key Considerations:**

- Target audience
- Brand voice
- Content goals
- Distribution channel



# Data Analysis

## Common Tasks:

- Pattern identification
- Trend analysis
- Data cleaning suggestions
- Statistical insights
- Report generation

Example:

Analyze this caseload data and:

1. Identify top 3 disease trends
2. Calculate incidence
3. Suggest areas for improvement
4. Format as a report

# Problem-solving Applications

## Approach:

1. Define problem clearly
2. Break into sub-problems
3. Use chain-of-thought
4. Request step-by-step solutions
5. Validate results

## Example: Patient Education Program

Help design a diabetes management program:

- 12-week program structure
- Daily monitoring guidelines
- Dietary recommendations
- Exercise safety protocols

# Translation and Editing

## Translation Best Practices:

- Specify target language
- Define tone preservation
- Note cultural considerations
- Request explanations for idioms

## **Editing Tasks:**

- Grammar and style
- Tone adjustment
- Length modification
- Format restructuring

# Creative Content

## Applications:

- Storytelling
- Creative writing
- Ad copy
- Brand narratives
- Visual content descriptions

## Tips:

- Set creative boundaries
- Define style guidelines
- Specify unique requirements
- Request variations



# Data Extraction

## Use Cases:

- Pull specific information
- Format conversion
- Data structuring
- Information categorization

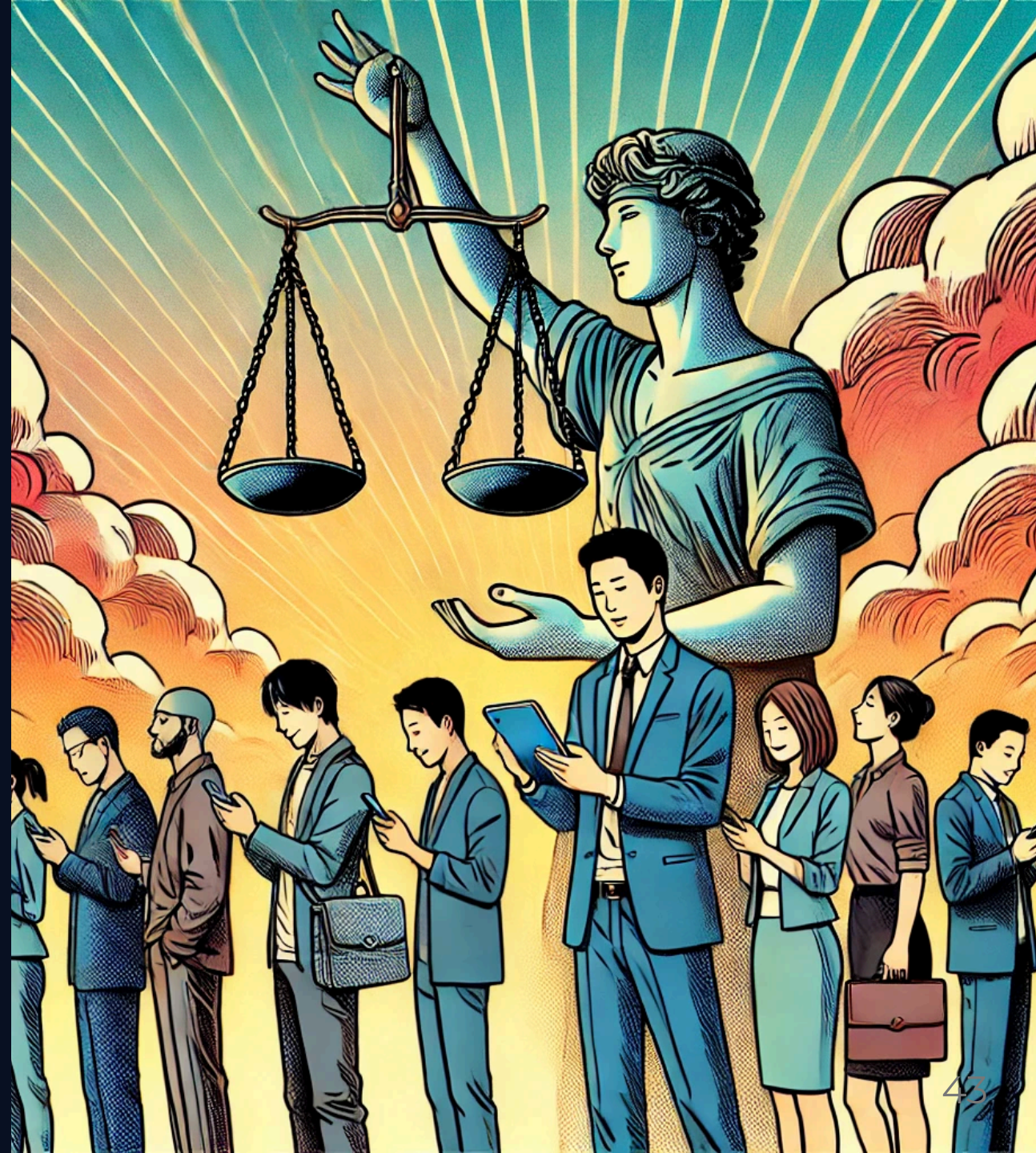
## Example:

Extract from patient feedback:

- Treatment effectiveness
- Side effects reported
- Care quality ratings
- Resource accessibility

Output as structured JSON

# Responsible AI Usage

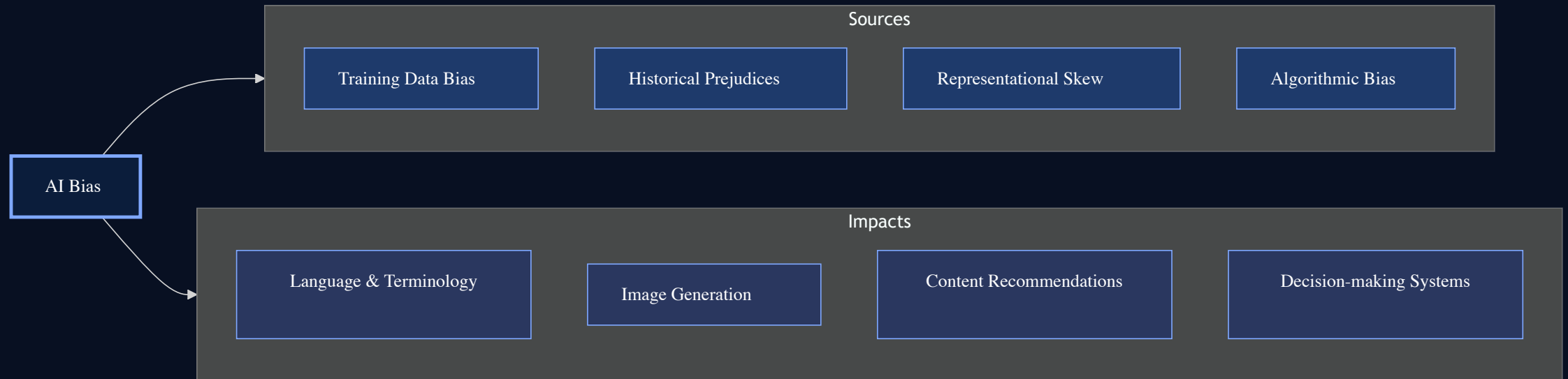


# Understanding AI Limitations

## Hallucinations

- AI can generate false information
- Can be subtle and hard to detect
- Critical to verify important information
- Most common in factual claims and citations

# Bias Awareness



- Sources of AI Bias:
  - Training data bias
  - Historical prejudices
  - Representational skew
  - Algorithmic bias

- Impact Areas:
  - Language and terminology
  - Image generation
  - Content recommendations
  - Decision-making systems

# Verification Strategies

## 1. Cross-Reference Information

- Use multiple sources
- Check official documentation
- Verify time-sensitive information

## 2. Test Edge Cases

- Try different scenarios
- Challenge assumptions
- Validate unusual inputs



# Hands-on Workshop



# Exercise 1: Basic Prompt Engineering

## Task:

Write effective prompts for:

- Text summarization
- Content generation
- Data analysis

## Evaluate:

- Clarity of instructions
- Context provided
- Output quality

# Exercise 2: Advanced Prompting

## Practice:

- Chain of thought prompting
- Few-shot learning
- Iterative refinement

## Focus Areas:

- Complex problem solving
- Multi-step tasks
- Pattern recognition

# Exercise 3: Real-world Applications

## Scenarios:

### 1. Patient Education

- Symptom explanation guides
- Treatment plan summaries
- Medication instructions
- Lifestyle modification tips

### 2. Clinical Documentation

- Clinical note structuring
- Medical report summarization

# Exercise 4: Responsible AI Practice

## Activities:

- Bias detection exercise
- Output validation practice
- Ethical consideration scenarios

## Discussion:

- Share findings
- Best practices
- Lessons learned

# Q&A Session

**Thank You!**

