

INTRODUCTION TO **GENERATIVE AI**

The Engineer's Toolkit: Concepts,
Architectures, and Applications

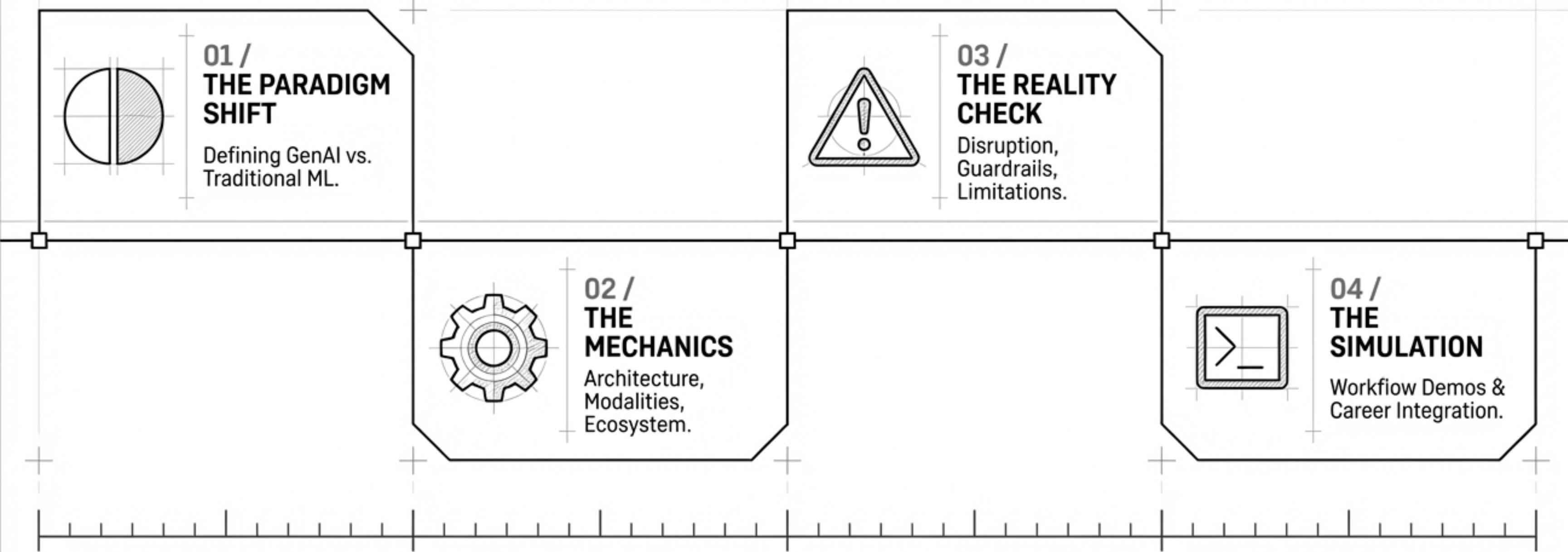
PRESENTED BY

Anshul

AIML Trainer, Skilloceans



SESSION ARCHITECTURE



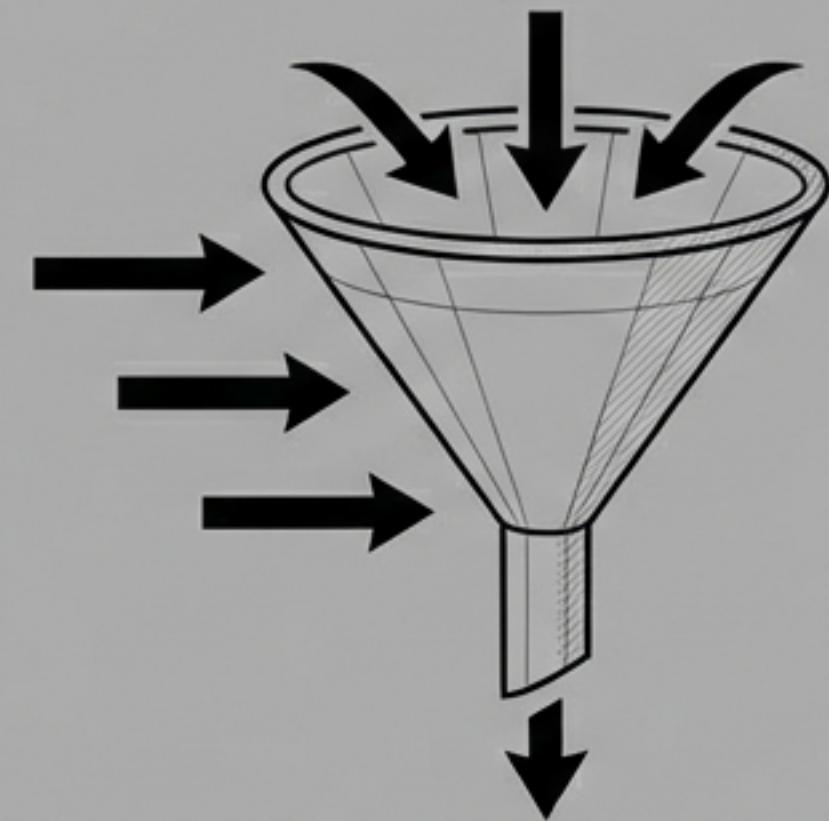
OBJECTIVE: FROM THEORY TO APPLICATION

THE PARADIGM SHIFT: FROM ANALYSIS TO SYNTHESIS

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TRADITIONAL AI

Analysis & Prediction

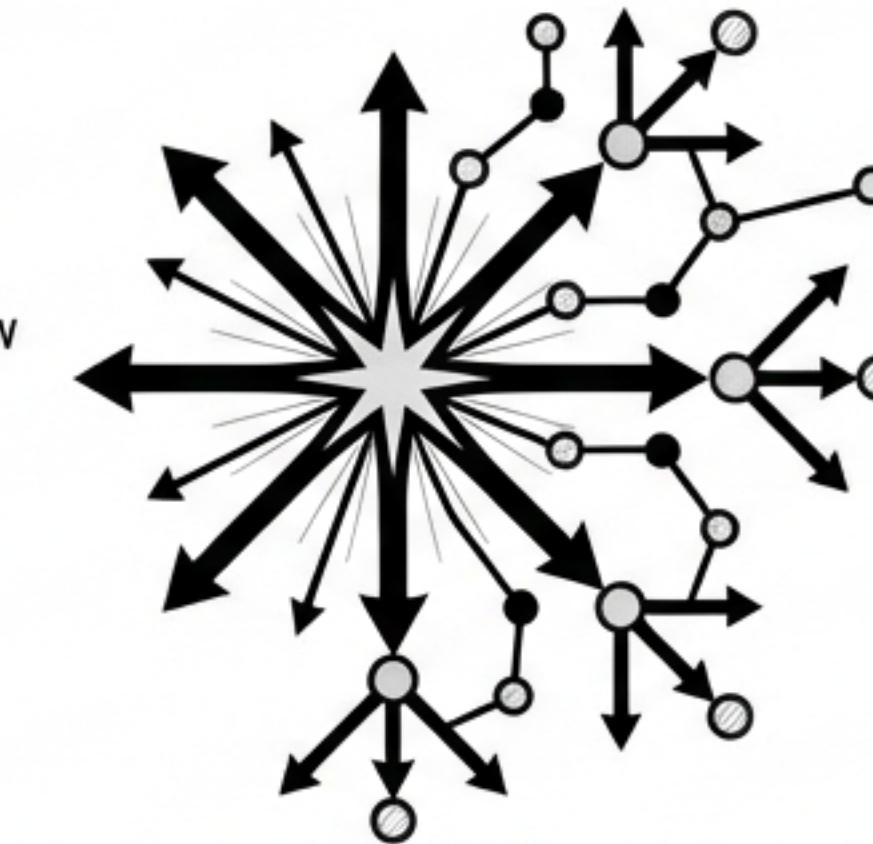


Pattern recognition,
classification, and
forecasting existing
data.

THE CRITIC

GENERATIVE AI

Creation & Synthesis

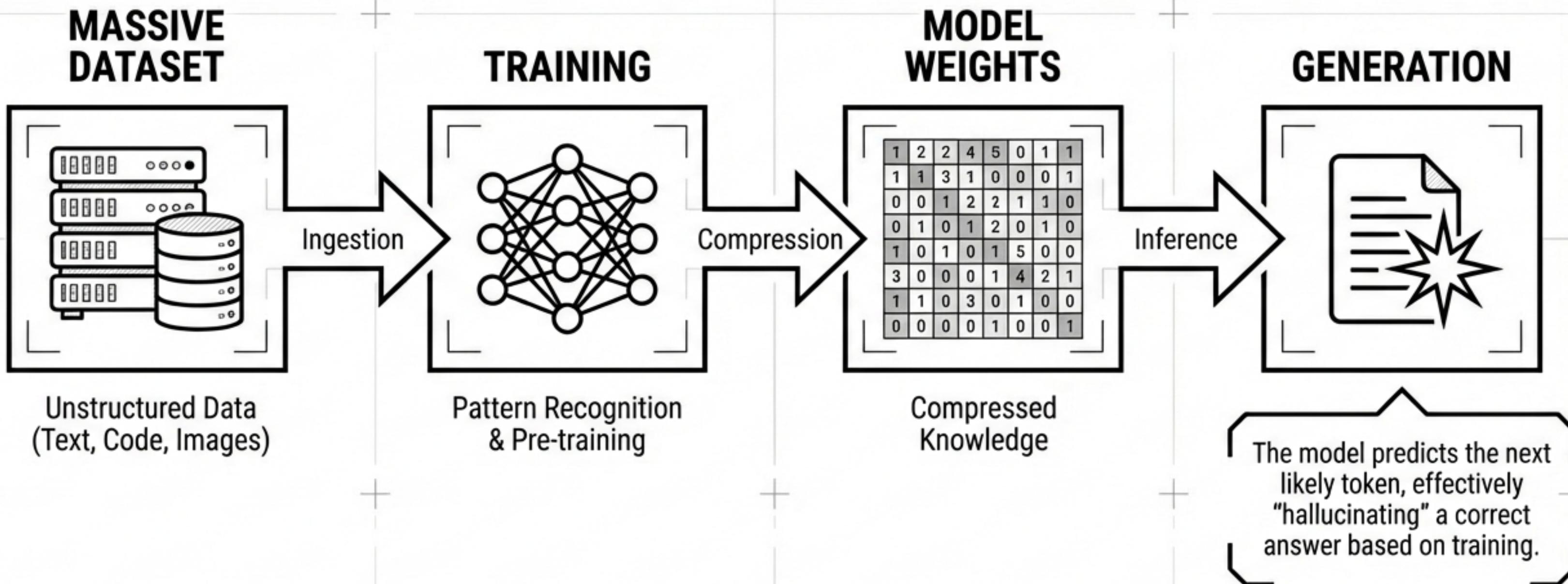


Generating net-new
artifacts based on
learned patterns.

THE CREATOR

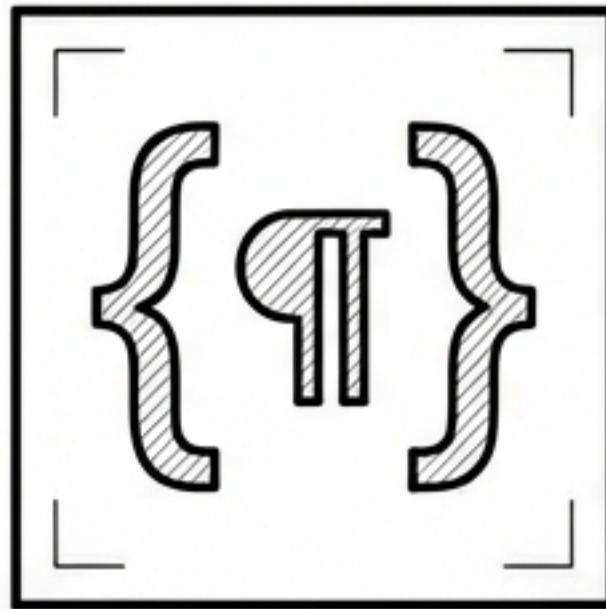
Generative AI doesn't just analyze the past; it creates net-new artifacts based on learned patterns.

SYSTEM ARCHITECTURE: UNDER THE HOOD



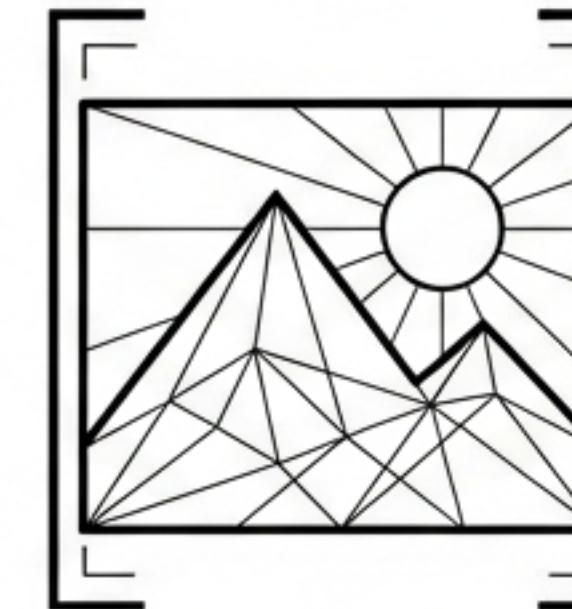
OBJECTIVE: FROM THEORY TO APPLICATION

THE CAPABILITY MATRIX: MODALITIES & OUTPUT



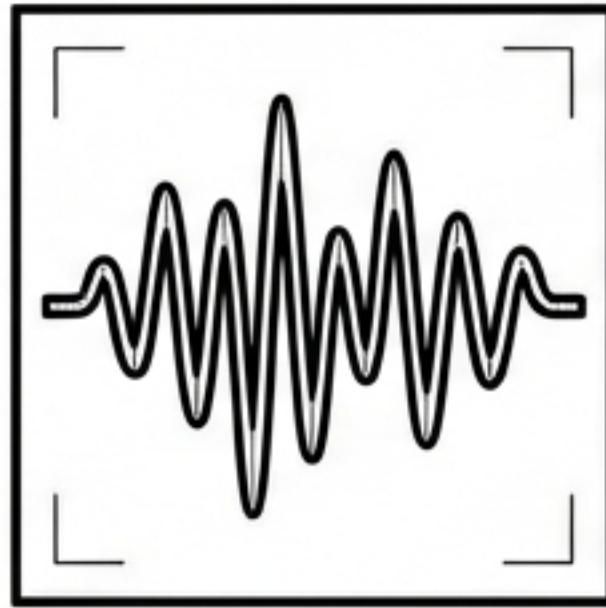
TEXT

- Summarization
- Coding
- Creative Writing



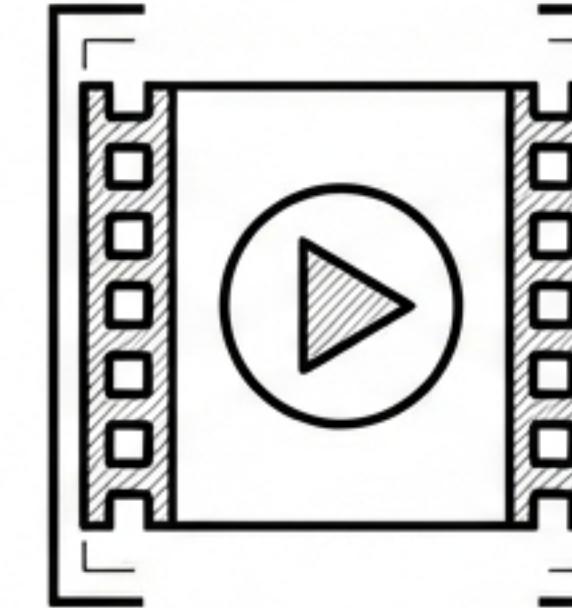
IMAGE

- Product Design
- Art
- Marketing Assets



AUDIO

- Voice Cloning
- Music Generation
- Dubbing



VIDEO

- Text-to-Video
- Animation

ENGINEERING UTILITY: TEXT & CODE GENERATION

CODING ASSISTANTS

- Writing boilerplate code, refactoring legacy scripts, debugging complex errors.

DOCUMENTATION

- Auto-generating technical docs from code comments.

CONTENT

- Drafting emails, summarizing technical papers, intelligent chatbots.

```
# Example Python Code
def optimized_search(data, target):
    # Use a set for O(1) average lookups
    data_set = set(data)
    if target in data_set:
        return True
    return False

# Data processing pipeline
processed_data = [x * 2 for x in range(1000)]
result = optimized_search(processed_data, 500)
print(f"Found: {result}")
```

INSIGHT: GenAI acts as a force multiplier for developers, shifting focus from syntax to logic.

RAPID PROTOTYPING: IMAGE & MEDIA GENERATION



Design

- Creating UI/UX concepts instantly.

Marketing

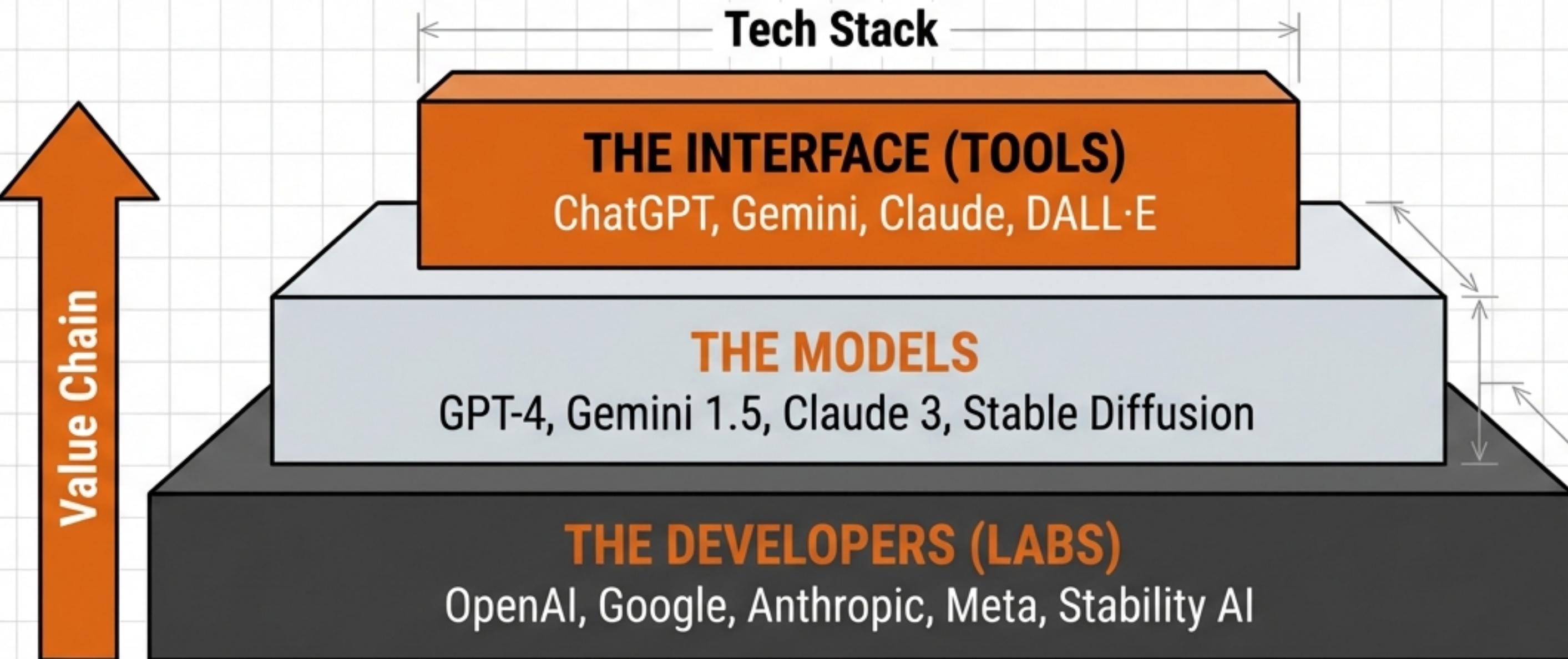
- Generating ad creative without photoshoots.

Product

- Visualizing 3D concepts.

INSIGHT: Reduces 'Time-to-Visual' from days to seconds, allowing for rapid iteration.

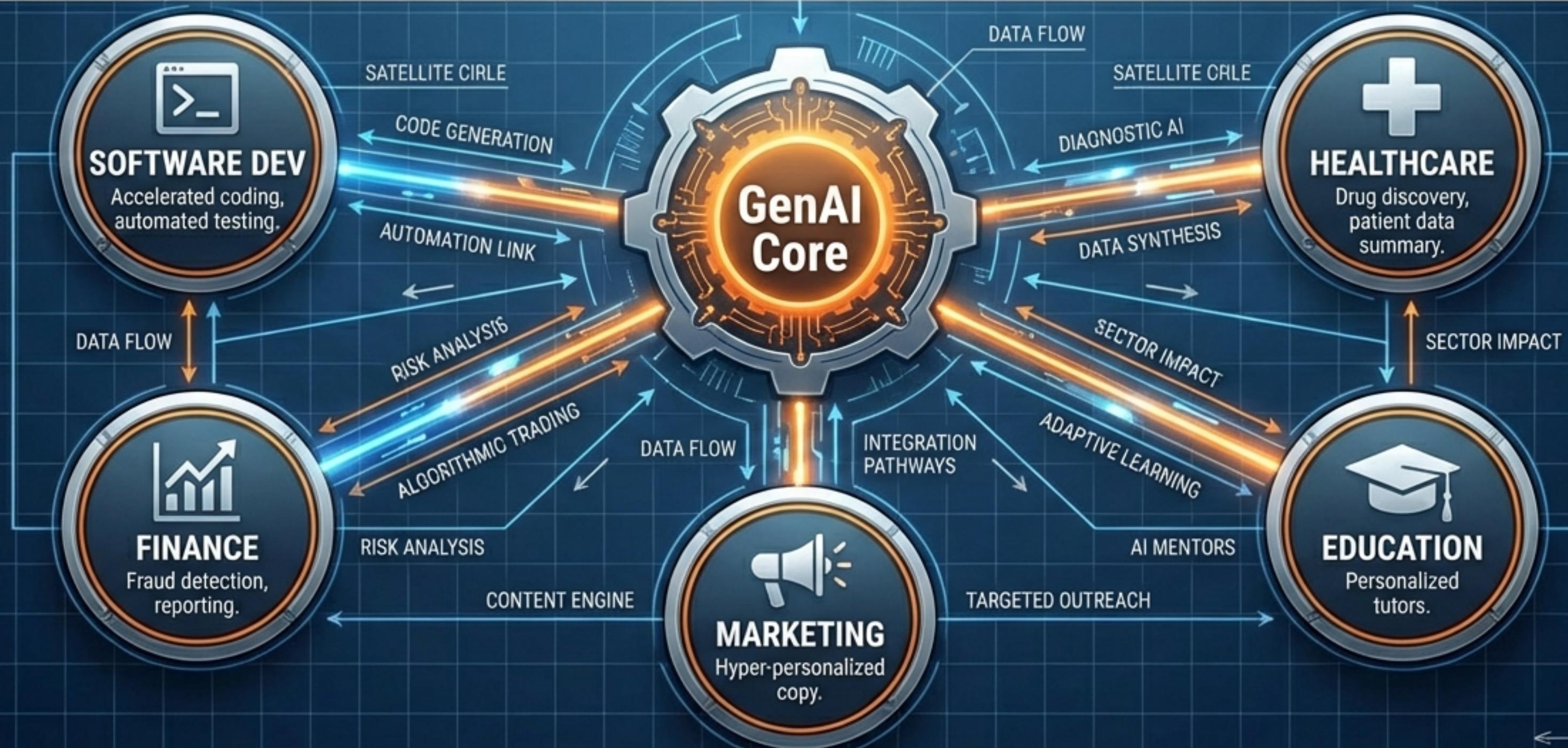
THE GENERATIVE AI ECOSYSTEM



Note: Users interact with the Interface, which calls the Model, built by the Developer.

INSIGHT: GenAI acts as a force multiplier for developers, shifting focus from syntax to logic.

INDUSTRY DISRUPTION & USE CASES

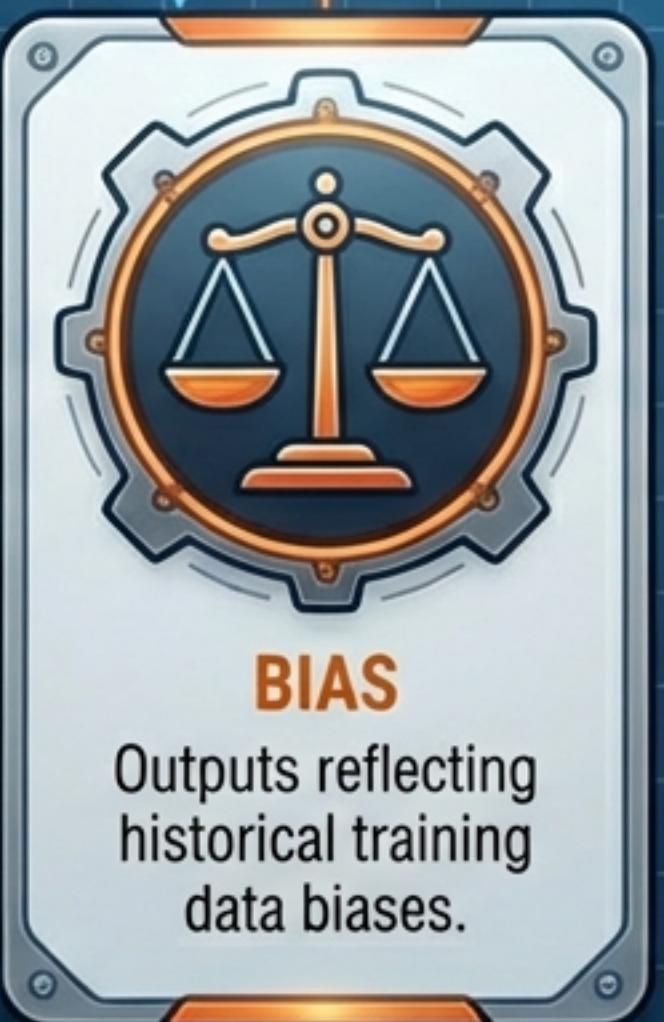


GenAI is moving from experimental features to core infrastructure across all major sectors.

16:9

ENGINEERING GUARDRAILS: ETHICS & LIMITATIONS

16:9



TAKEAWAY: Responsible AI engineering requires treating these risks as system variables to be monitored and mitigated.

SIMULATION: THE LOGIC ENGINE (ChatGPT/Claude)

The image depicts a futuristic simulation interface with a blue and orange color scheme. In the center is a window titled "TASK" containing a speech bubble with the instruction: "Analyze this Python script for inefficiency and suggest a refactored version with comments." To the left of the window is a sidebar with icons for home, search, and other functions. Below the sidebar is a code editor window showing a refactored Python script. The script uses list comprehension and an if statement to process a list. At the bottom of the code editor is an example usage section. The background features a grid pattern with various blue lines and arrows, suggesting a complex system or simulation environment.

```
# Refactored Python Script
def optimize_data(data_list):
    """
    Refactored function for better efficiency.
    - Uses list comprehension for faster processing.
    - Removes redundant loop.
    """
    # EFFICIENT PROCESSING
    optimized_result = [item * 2 for item in data_list if item > 10]

    return optimized_result

# Example usage:
# data = [5, 12, 8, 20, 3]
# result = optimize_data(data)
# print(result) # Output: [24, 40]
```

Effective Prompting: Define the Role, Task, and Output Format.

SIMULATION: THE CREATIVE ENGINE (DALL·E/Gemini)



Prompt: "A futuristic car."

ITERATION &
PARAMETERS



Refined Prompt: "A cyberpunk electric vehicle concept, neon lighting, matte black finish, rain-slicked city background, photorealistic 8k."

Specificity and style descriptors dramatically alter the output quality.

16:9

INTEGRATED WORKFLOW: THE AI STACK

16:9



THE FEEDBACK LOOP



Real-world efficiency comes from chaining specialized tools together.

THE CAREER ROADMAP

SKILLS

Prompt Engineering

Model Fine-Tuning

Data Curation

API Integration

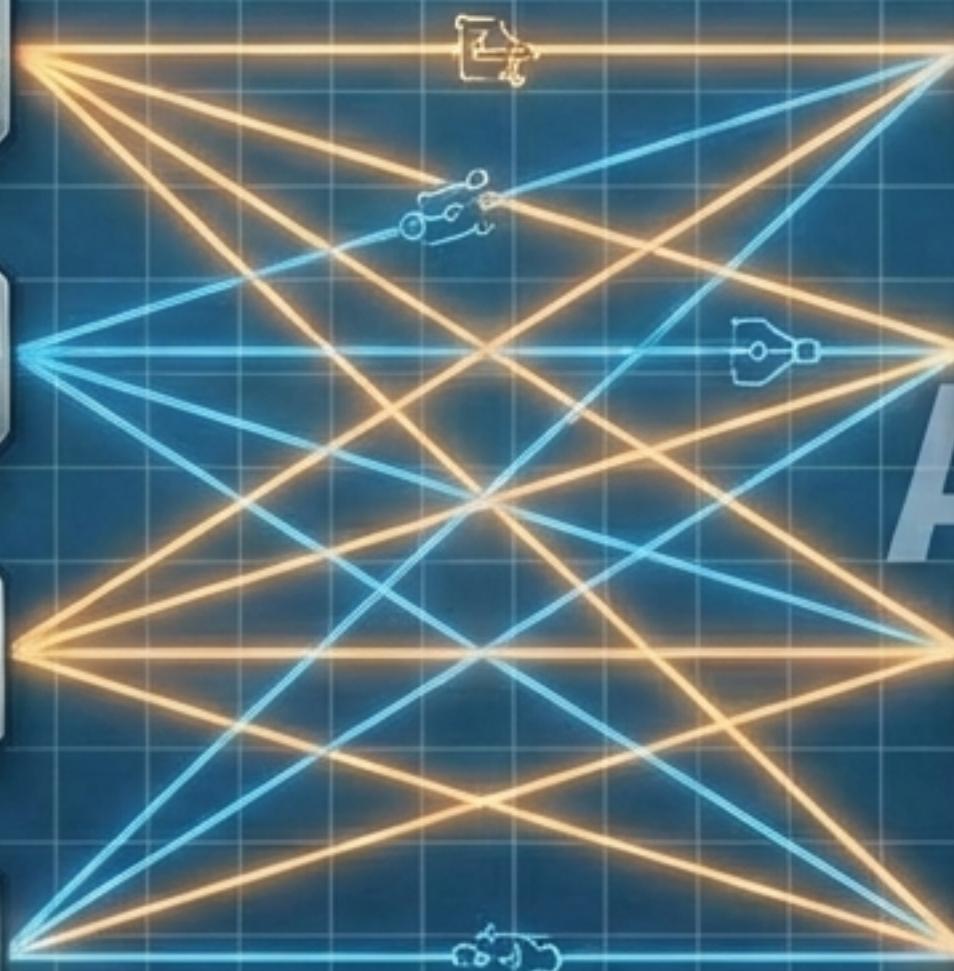
ROLES

AI Product Manager

ML Engineer

Data Scientist

AI Application Engineer



The evolution of AI engineering requires a blend of specialized skills.

THE ENGINEER'S CHECKLIST

- CONCEPT:** GenAI creates new data; it doesn't just analyze old data.
- TOOLS:** Master the 'Big Three' interfaces (ChatGPT, Claude, Gemini).
- RISK:** Always verify code and facts (Human-in-the-loop).
- FUTURE:** Focus on integration and chaining tools.

"Mastering Generative AI is about moving from a consumer of technology to a co-creator."