



AI : Buzzwords to Reality!

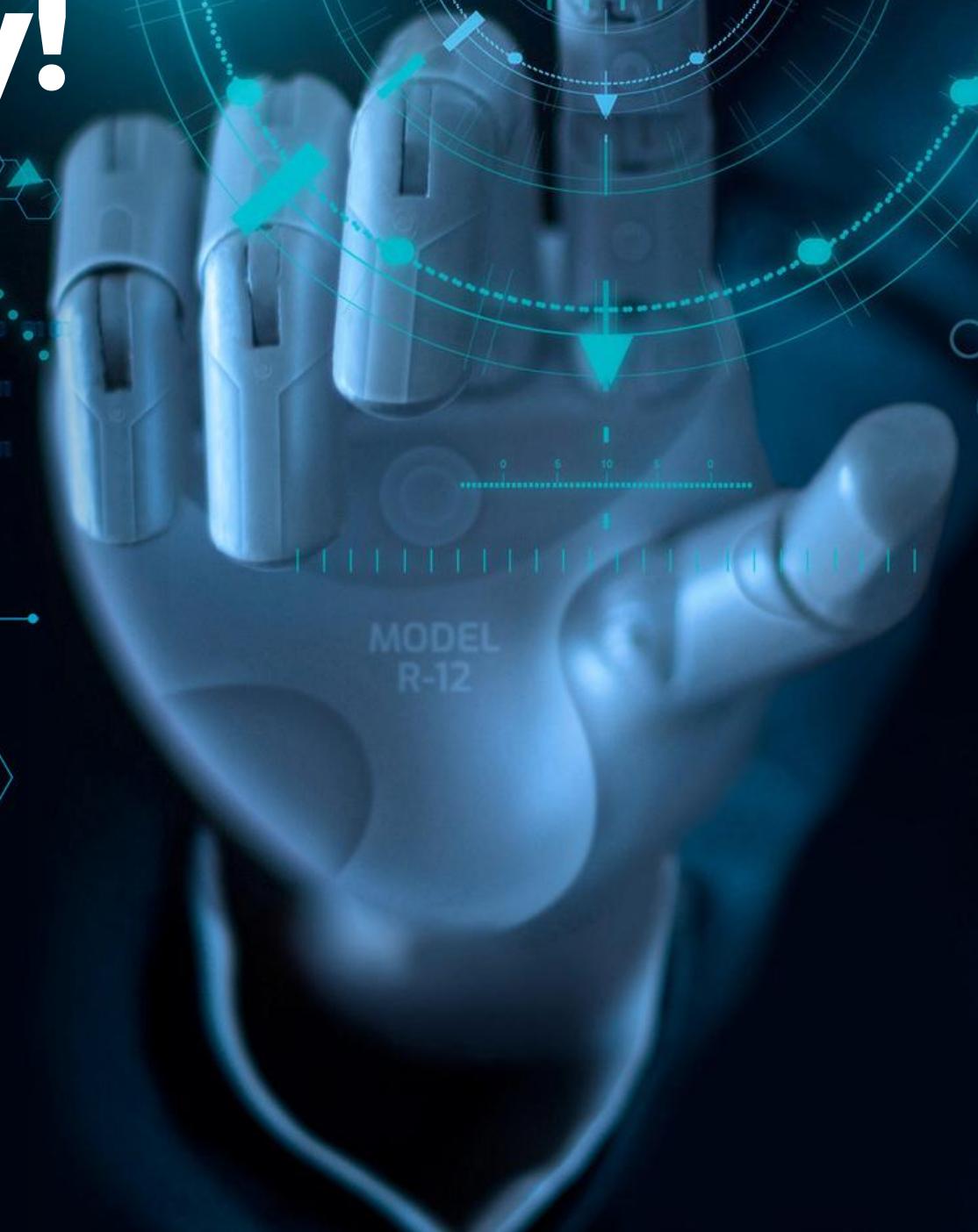
Exploring AI, GenAI, Applications and Trends

Presented By

Sanil Kumar D

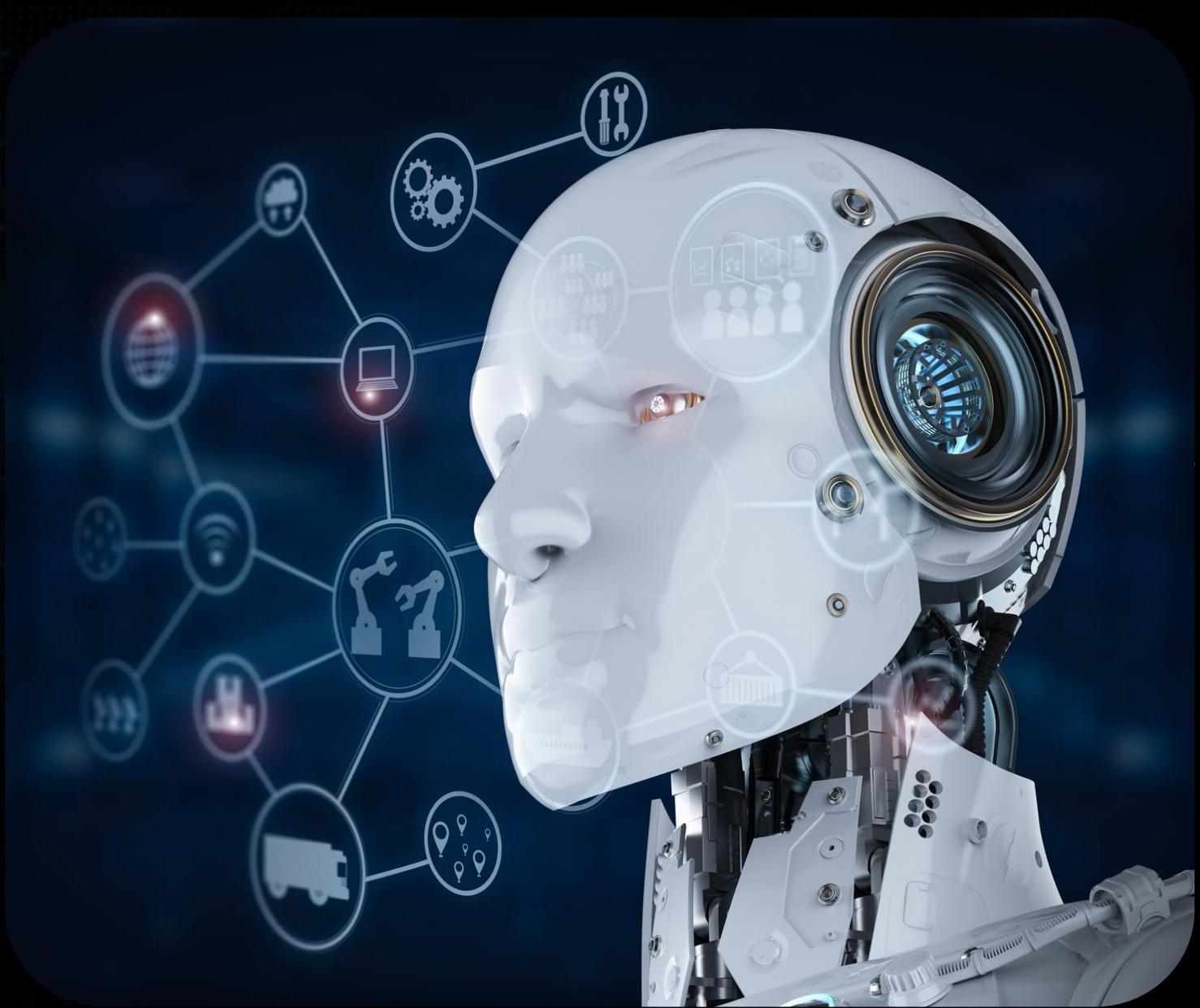
Founder, CEO, Caze Labs

May 2025



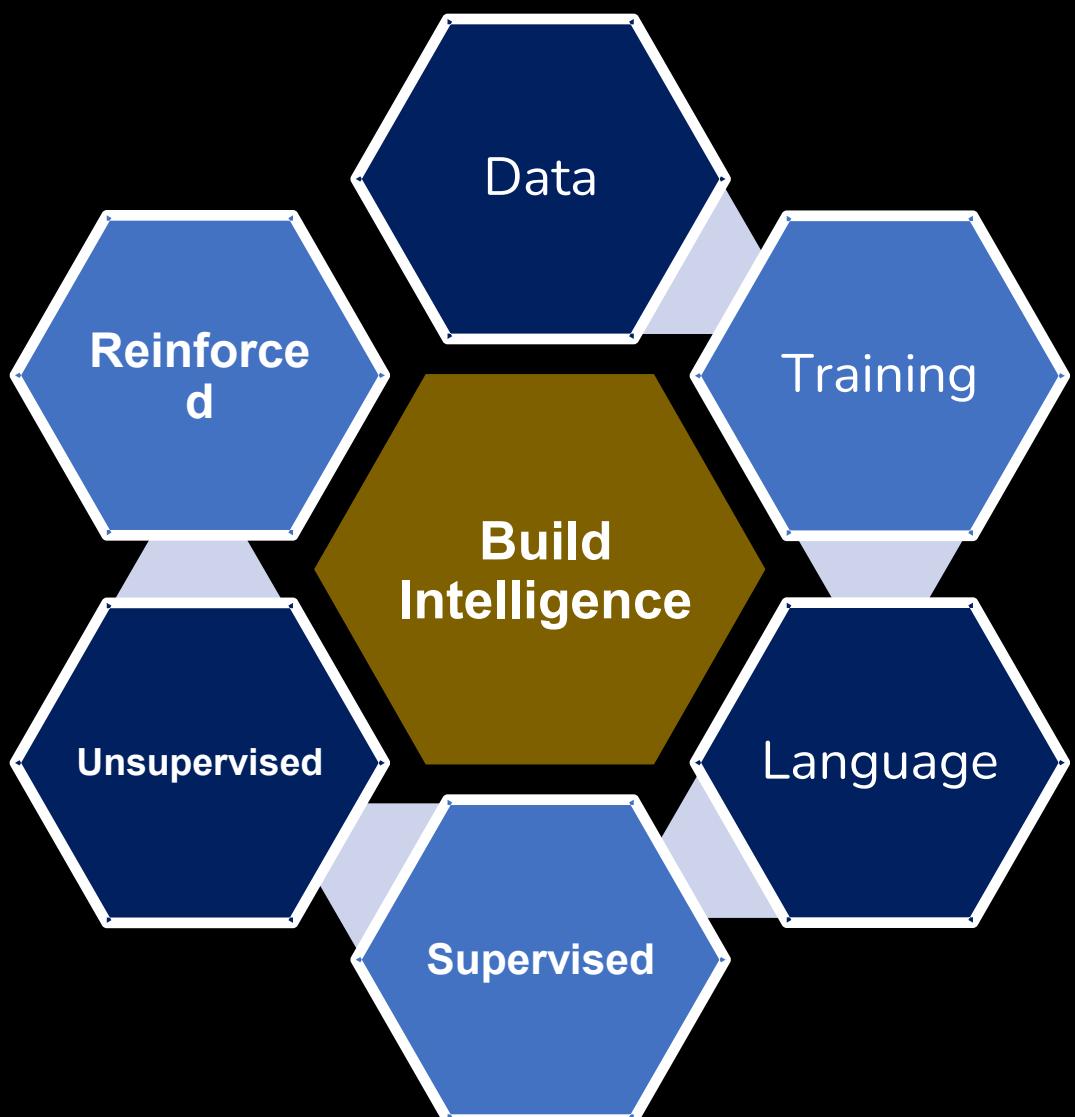
Welcome to the Future!

- 01 Many Buzzwords!
- 02 Are these real?



Heard of these?

ML
NLP
CV



GenAI
LLM
GPT

ML

development of algorithms and statistical models that allow computers to learn from and make predictions or decisions based on data.



Supervised Learning

learns from labelled data

Un-Supervised Learning

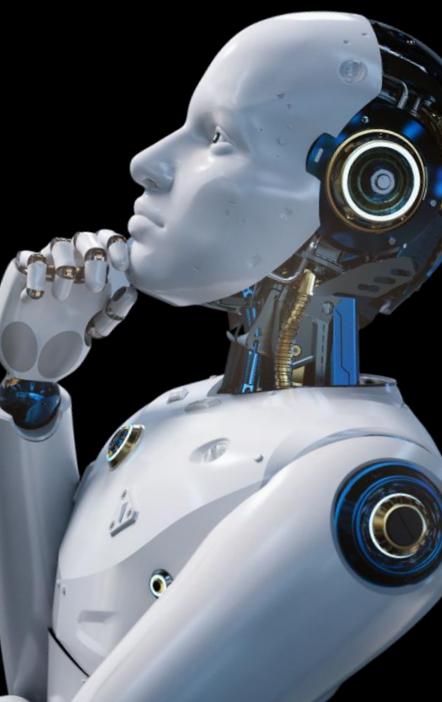
learns from unlabelled data

Reinforced Learning

learns by interacting with an environment and receiving rewards or penalties

Deep Learning

uses neural networks with many layers to handle more complex data



NLP

focuses on the interaction between computers and human language



Text processing

clean, normalize, and structure text data

Syntax / Parsing

grammatical structure

Semantic analysis

meaning behind words, phrases, and sentences

Named Entity Recognition (NER)

Identifying and categorizing entities

Sentiment Analysis

Determining the emotional tone

Machine Translation

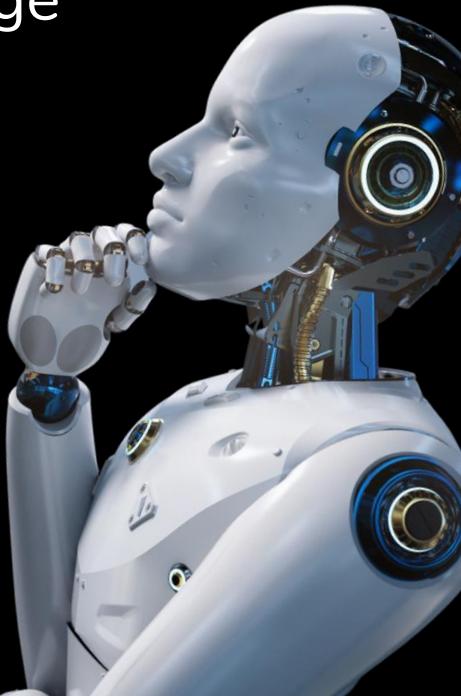
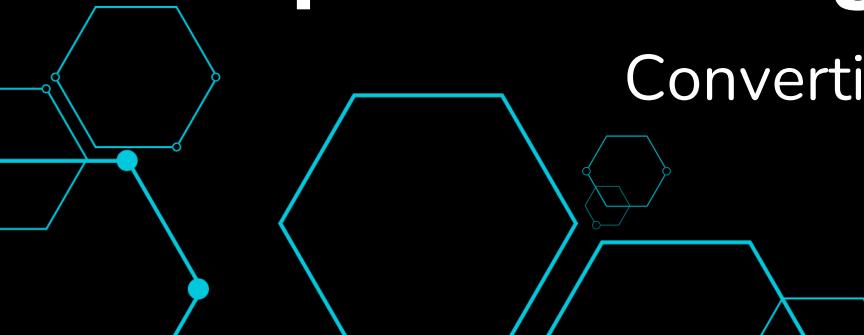
translating text from one language to another

Speech Recognition:

Converting spoken language into text

Question Answering

can answer questions posed in natural language.



CV

enabling machines to interpret and understand visual data from the world, such as images and videos



Image Classification

what objects or scenes are present in image

Image Segmentation

Dividing an image into segments

Optical Character Recognition (OCR)

Converting images of text

Object Detection

Where the objects are present in an image or a video

Facial Recognition

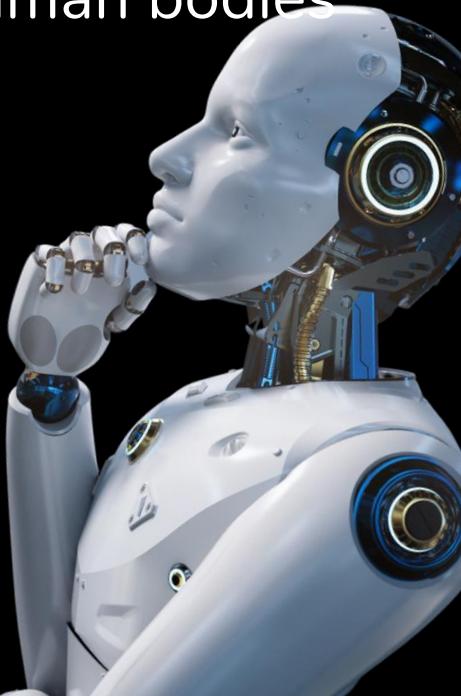
Identifying or verifying individuals

Pose Estimation

Detecting the orientation or posture of human bodies in images or videos

Image Generation

Creating or modifying images using generative models, like GANs



GenAI

artificial intelligence models that can generate new, original content such as text, images, audio, or even video



Generative Adversarial Networks (GANs)

a generator and a discriminator, that work together to create realistic data

Transformer Models

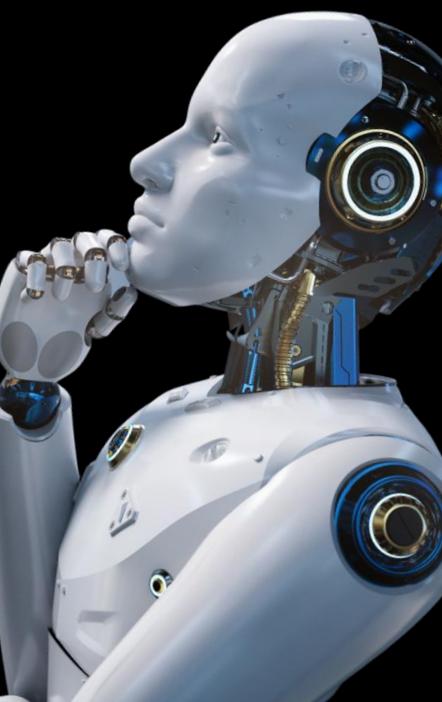
Models like GPT (Generative Pre-trained Transformer) that generate natural language text

Variational Autoencoders (VAEs)

generate new data that is similar to the input data

Diffusion Models

gradually convert noise into high-quality data
Stable Diffusion, DALL-E 3, Imagen (Image and Video), AudioGen, Riffusion, Diffusion LM...many more



Generation of text, image, audio and video...



LLM

Large Language Model is an artificial intelligence model designed to understand, generate, and manipulate human language on a large scale.



Large Scale

trained on massive datasets containing billions of words and phrases

Pre-trained and Fine-tuned

pre-trained on a general corpus; fine-tuned on specific datasets

Transformer Architecture

large sequences of text efficiently and capture complex relationships

Contextual Understanding

understand the context in which words are used, allowing them to generate coherent and contextually relevant responses or content.

GPT a type of large language model (LLM) developed by OpenAI



GenAI Models

Text Gen

GPT, BERT(Generative Pre-trained Transformer),
T5(Text-to-Text Transfer Transformer)

Video gen

DeepMind's Deep Video Prior,
Runway's Gen-1,

Image Gen

DALL-E, Stable Diffusion, BigGAN

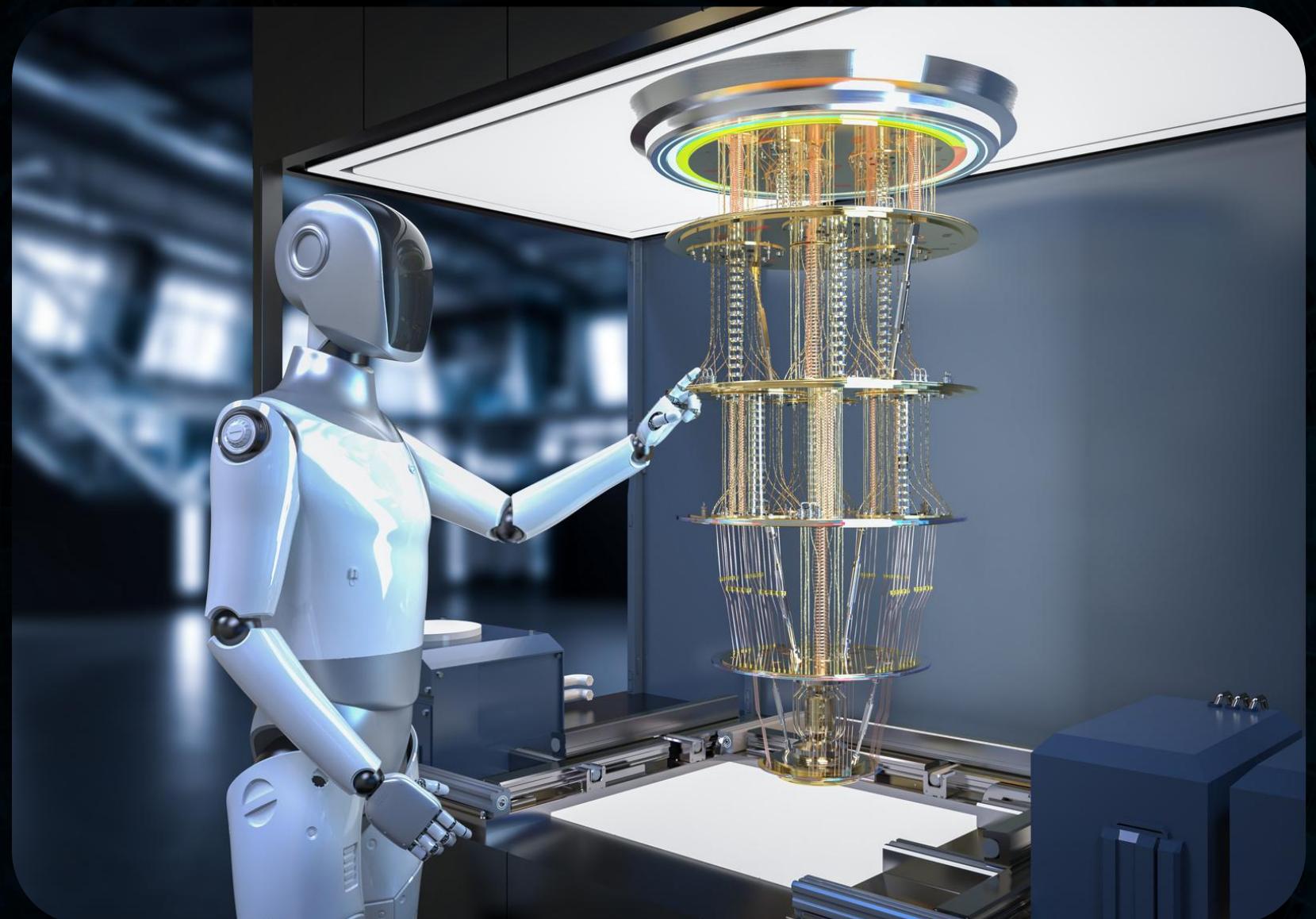
Audio and music

Jukedeck, OpenAI's Jukebox,
WaveNet

Multimodal

CLIP (Contrastive Language–Image
Pretraining), Imagen





Generative AI

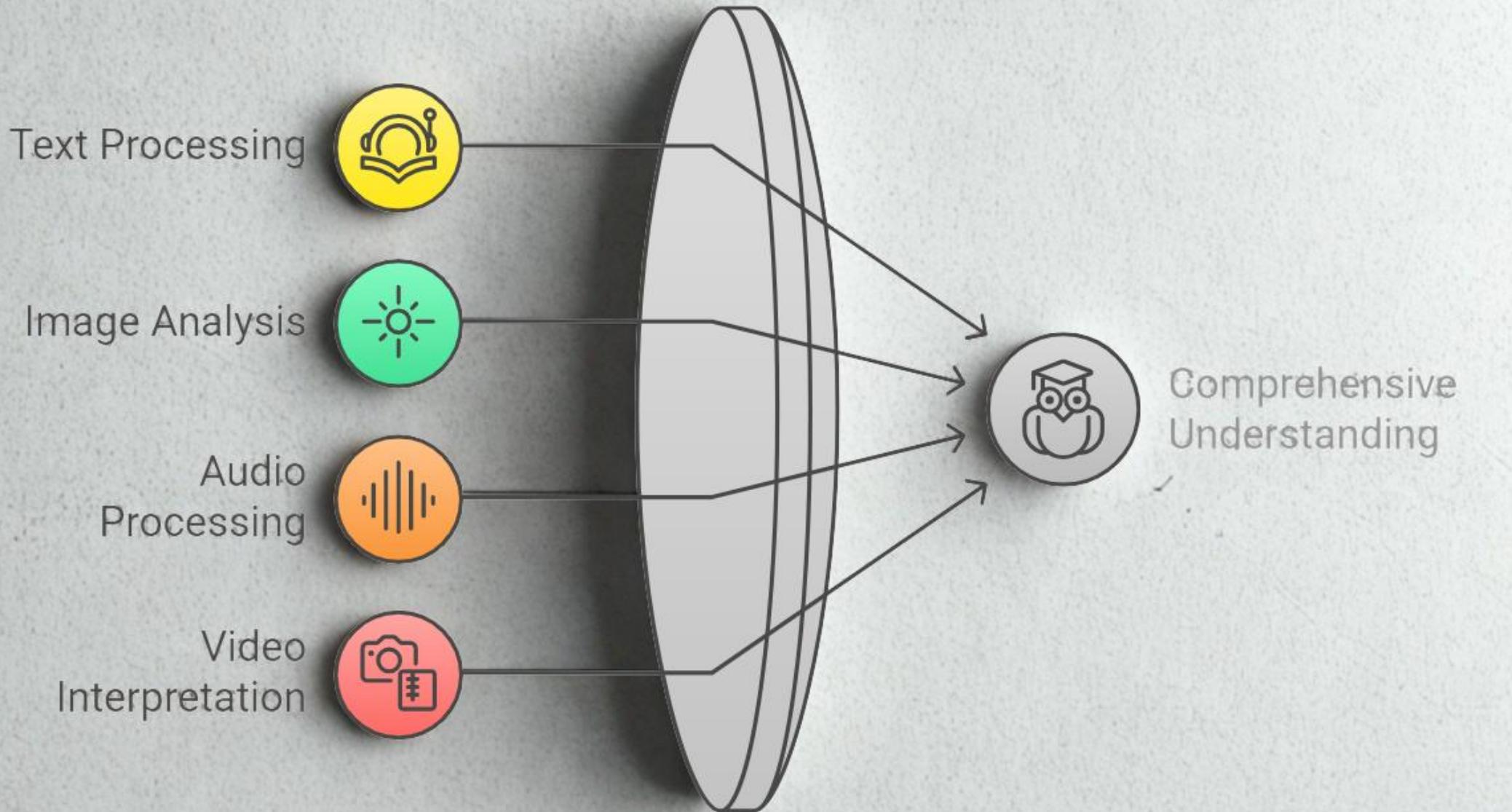
Creativity Unleashed

create new, original content rather than just analyzing or acting on existing data

Enhanced Content Creation

Applications Across Industries

Ethical Challenges

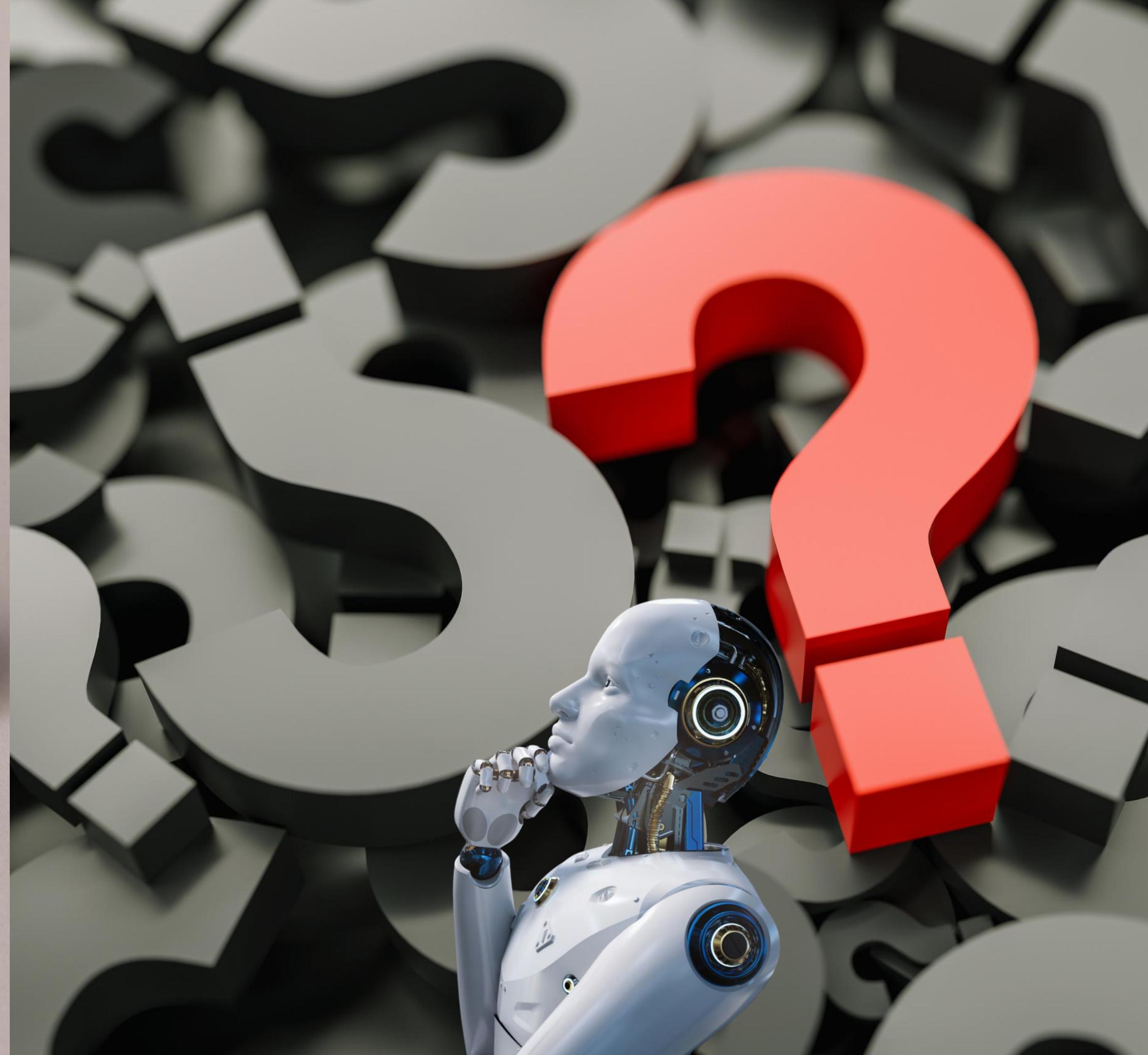


Multimodal

Creativity Unleashed

- ✓ Gains deeper context
- ✓ Enables more natural, human-like
- ✓ Improves accuracy and reliability

MORE
MORE



Foundation Models

Large-scale pre-trained models (e.g., GPT, LLaMA) that can be fine-tuned for specific tasks, offering a general base for many AI applications.

AI Agents

AI systems that autonomously perform tasks by interpreting goals, planning steps, and executing actions using various tools.

Edge AI

AI models deployed on local devices (e.g., smartphones, sensors) for real-time data processing without relying on cloud infrastructure.

Synthetic Data

Artificially generated data used to train or test AI models when real-world data is limited or sensitive.

Few-Shot Learning

A technique where AI models generalize from a small number of training examples, improving performance with limited data.

Prompt Engineering

The practice of designing and optimizing prompts to guide generative AI in producing accurate and useful outputs.

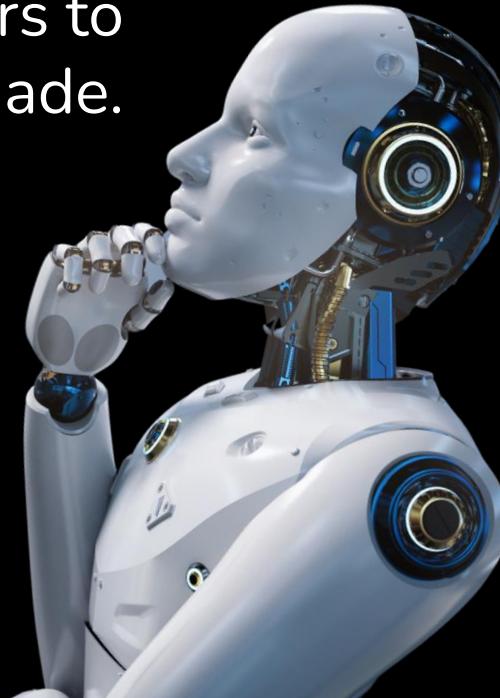
Self-Supervised Learning

A machine learning approach where models learn patterns from data without labeled outputs, useful for pre-training large language models.

AI systems designed to provide transparency and interpretability, enabling users to understand how decisions are made.

Orchestration Frameworks

Tools like LangChain that manage and coordinate complex AI workflows, combining multiple models and services.



Wanna

**M O R E
M O R E**



TRENDS

RAG (Retrieval Augmented Generation)



Additional Information

- Improve accuracy and efficiency
- Relevant answer
- Custom Data

LLM

- AI Data Assistants
- Content Generation
- Improve AI Models

Answer



Open Source Models
(<https://huggingface.co/>)

Embedding Models

Vector DB

Search and Get enhanced context

Chatbot App (+UI)



Prompt+query+enhanced -context ↳ Better Answers

LLM

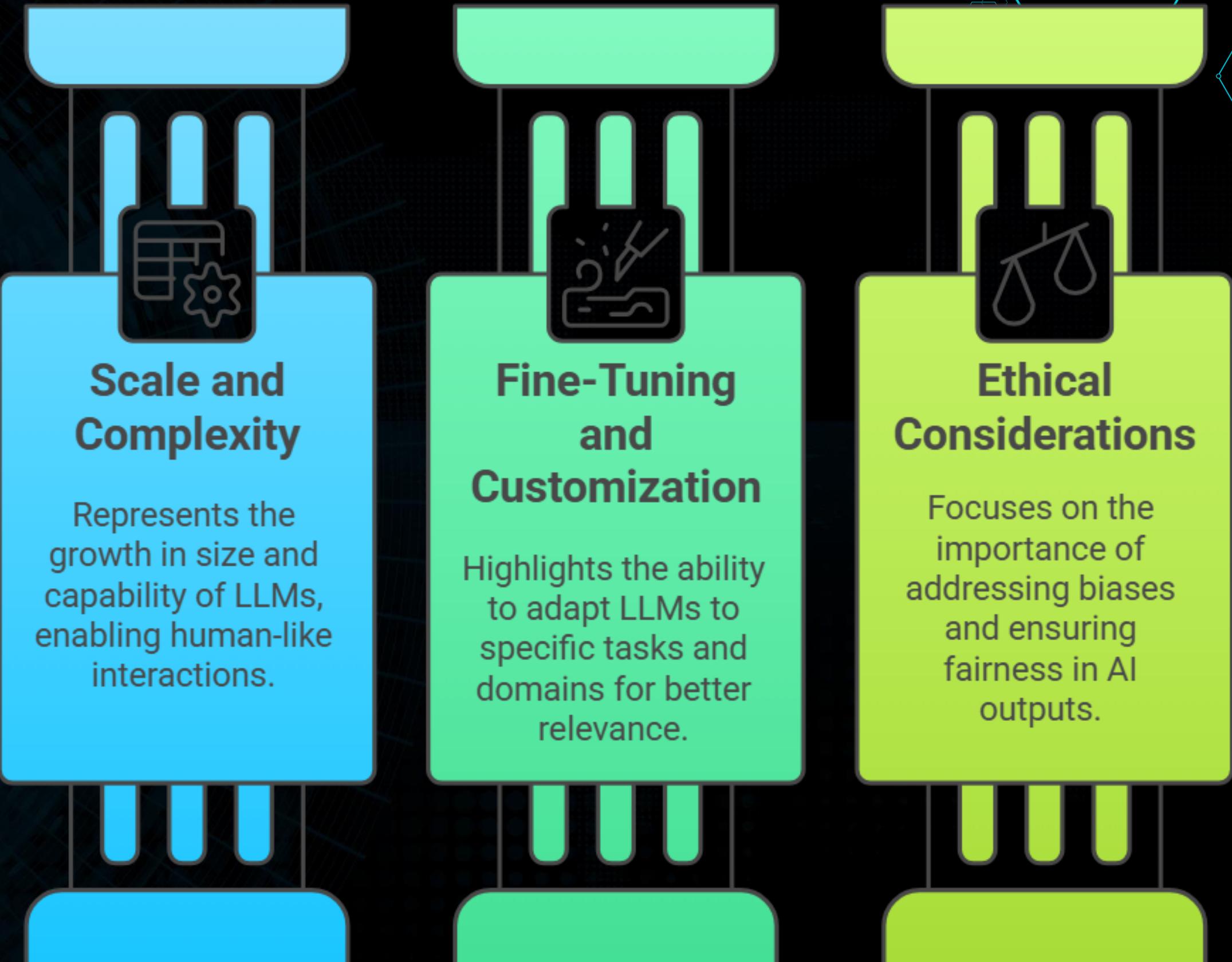
Open Source Local Models
(<https://huggingface.co/>)

Cloud LLM APIs (OpenAI, Gemini, Azure..)

Frameworks/Tools: LangChain, LlamalIndex, FAISS (Facebook AI Similarity Search)

Try : LM Studio (helps to host LLMs) connects to external RAG libs like FAISS

LLMs are getting better!



Agentic AI

Agentic AI refers to artificial intelligence systems designed to operate with a degree of autonomy, enabling them to make decisions and perform tasks without continuous human intervention.

Orchestration | Tools | LLM/Model



Agentic Developments : Interesting Tool Sets

LlamaIndex + LangChain

Combine for building tool-using agents that interact with external APIs.

LlamaIndex + AutoGPT

Use LlamaIndex to give AutoGPT access to local and external knowledge

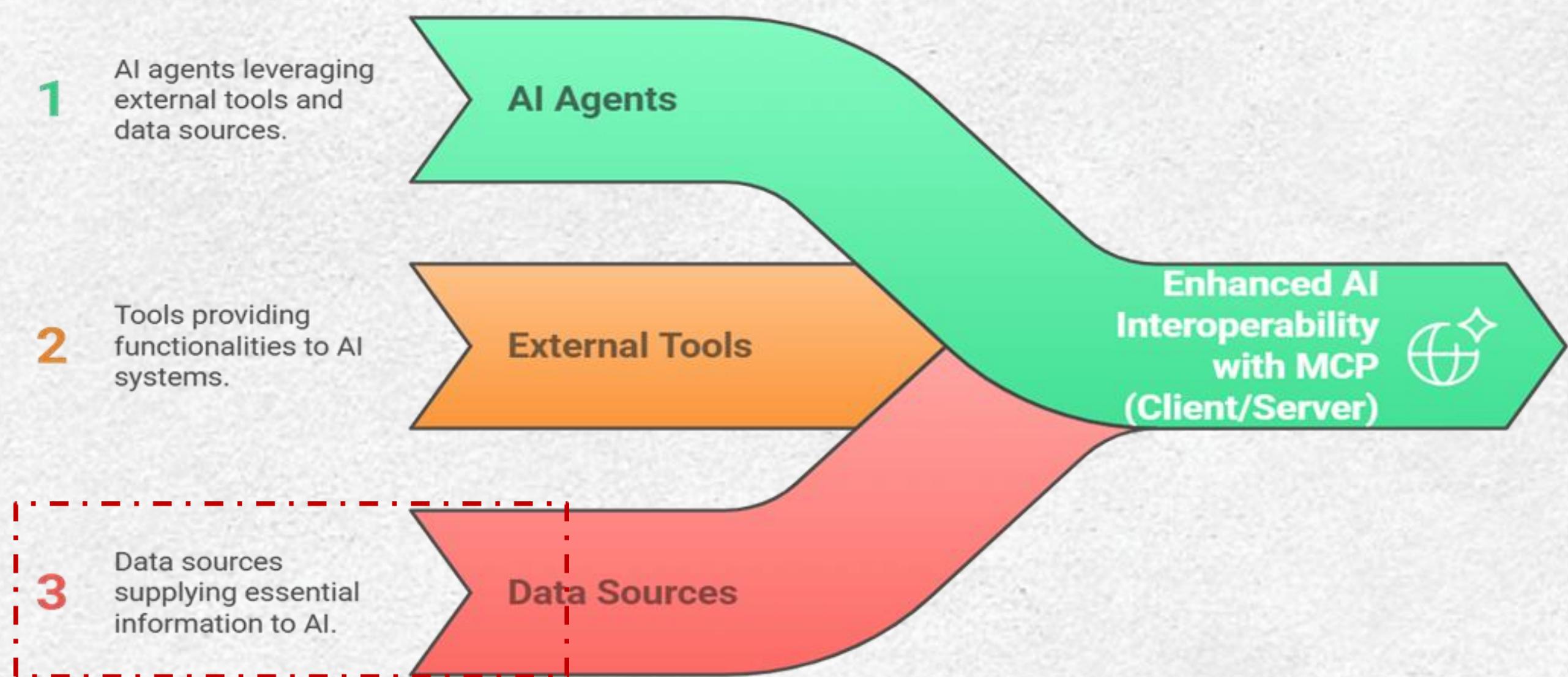
LlamaIndex + OpenDevIn

Enhance AI agents for autonomous coding and software development

Llama Index Libs for interfacing

Component	Purpose	Usage
<code>llama_index.tools</code>	Provides a framework to define and use custom tools for calling external APIs.	Use for REST APIs, GraphQL, or custom API endpoints.
<code>llama_index.agent</code>	Allows creation of multi-modal agents that can dynamically use external services.	Ideal for building Agentic AI workflows using APIs.
<code>llama_index.query_engine</code>	Supports advanced query routing to external data sources.	Connects AI with API-driven knowledge bases.
<code>llama_index.bridge</code>	Facilitates communication with other frameworks like LangChain for more complex API handling.	Combine LlamaIndex with external toolkits.

MCP (Model Context Protocol)



Standardized interface to connect multiple data sources. It provides two-way communication

MCP Explained in detail with all components and working :
<https://composio.dev/blog/what-is-model-context-protocol-mcp-explained/>

Frameworks/Tools: Theia AI/Theia IDE, MCPAgentAI(python SDK), MCP Hub, Semantic Kernel

Try: Simple MCP Server building from scratch using python SDK (<https://composio.dev/blog/mcp-server-step-by-step-guide-to-building-from-scratch/>)

Links to tutorials, documentation, and research papers

1. GeeksforGeeks: [7 Steps to Learn AI From Scratch in 2024](#)
2. GeeksforGeeks: [10 Must Read Machine Learning Research Papers](#)
3. TechRepublic: [The 10 Best AI Courses That Are Worth Taking](#)
4. GeeksforGeeks: [Top 10 AI Tools for Creating Research Papers](#)
5. GitHub: [Must Read Papers for Data Science, ML, and DL](#)
6. Academia Insider: [The Best AI Tools for Research Papers and Academic Research](#)
7. Tech.co: [20 Best Free AI Training Courses for 2024](#)
8. GitHub: [Awesome AI Tutorials and Surveys](#)
9. Texta: [The Ultimate Guide to Starting Your AI and Machine Learning Journey](#)
10. PhDTalks: [Machine Learning Research Papers for Beginners in 2025](#)

Recommended: Tools for building AI Copilots

Tool/Platform	Description	Link
Hugging Face Transformers	Open-source platform for building AI models, including conversational copilots.	Visit Site
LangChain	Open-source framework for building AI copilots using large language models (LLMs) and custom workflows.	Visit Site
LlamaIndex (GPT Index)	Open-source tool for building AI copilots with data integration and natural language search.	Visit Site
OpenAI API (Free Tier)	While OpenAI is not fully open-source, it offers a free tier to experiment with AI copilots.	Visit Site
FastChat (By LMSYS)	Open-source platform to build and deploy chatbots and AI copilots with support for LLaMA and OpenAI APIs.	Visit Site
Rasa	Open-source conversational AI platform for building AI copilots with customizable UI components.	Visit Site
ChromaDB	Open-source AI-native database for building context-aware copilots and AI assistants.	Visit Site
Haystack (deepset.ai)	Open-source framework for building production-ready, UI-integrated AI copilots for search and Q&A.	Visit Site
Auto-GPT	Open-source experimental AI agent that automates complex tasks using LLMs like GPT-4.	Visit Site
Chatbot UI	Open-source chat UI framework for building AI copilots with support for OpenAI and open models.	Visit Site



AI Automation Use Cases



AI Copilots everywhere!

Automation of Repetitive Tasks

Streamlines routine tasks to enhance focus on strategic activities

Real-Time Assistance

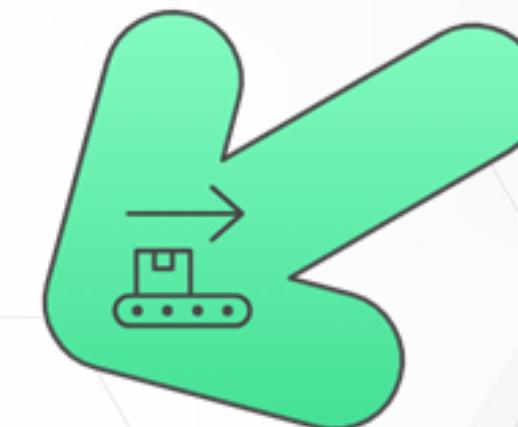
Provides immediate support to streamline workflows and reduce errors

Data Analysis and Insights

Analyzes data to extract actionable insights for informed decision-making

Personalized Experiences

AI adapts to individual preferences for efficiency.



Streamlined Processes

AI optimizes workflows by automating tasks and providing suggestions.

Knowledge Enhancement

Provides access to vast knowledge bases.

Creative Support

Assists with creative tasks and collaboration.

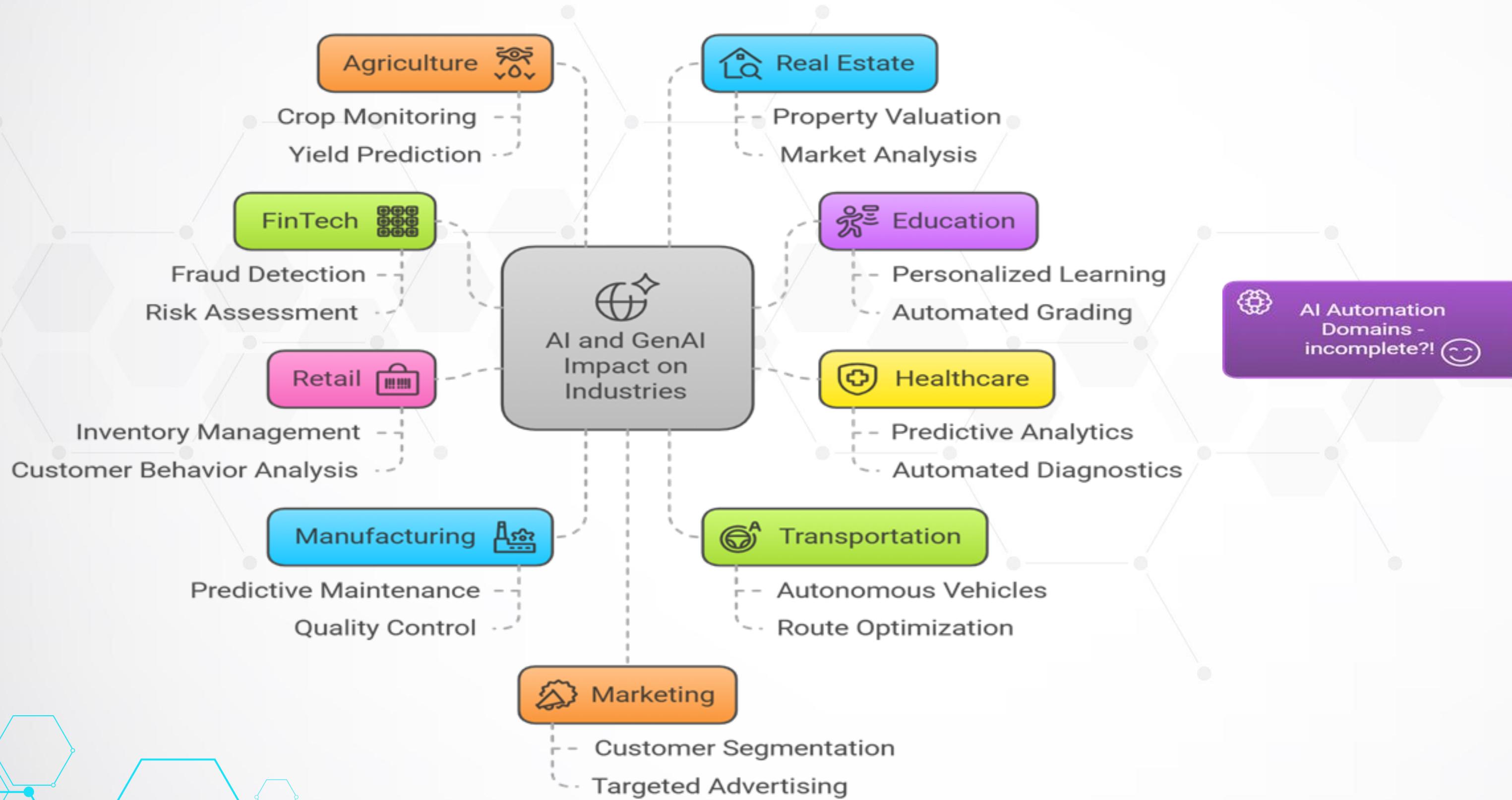
Skill Enhancement

Offers real-time feedback for skill improvement.

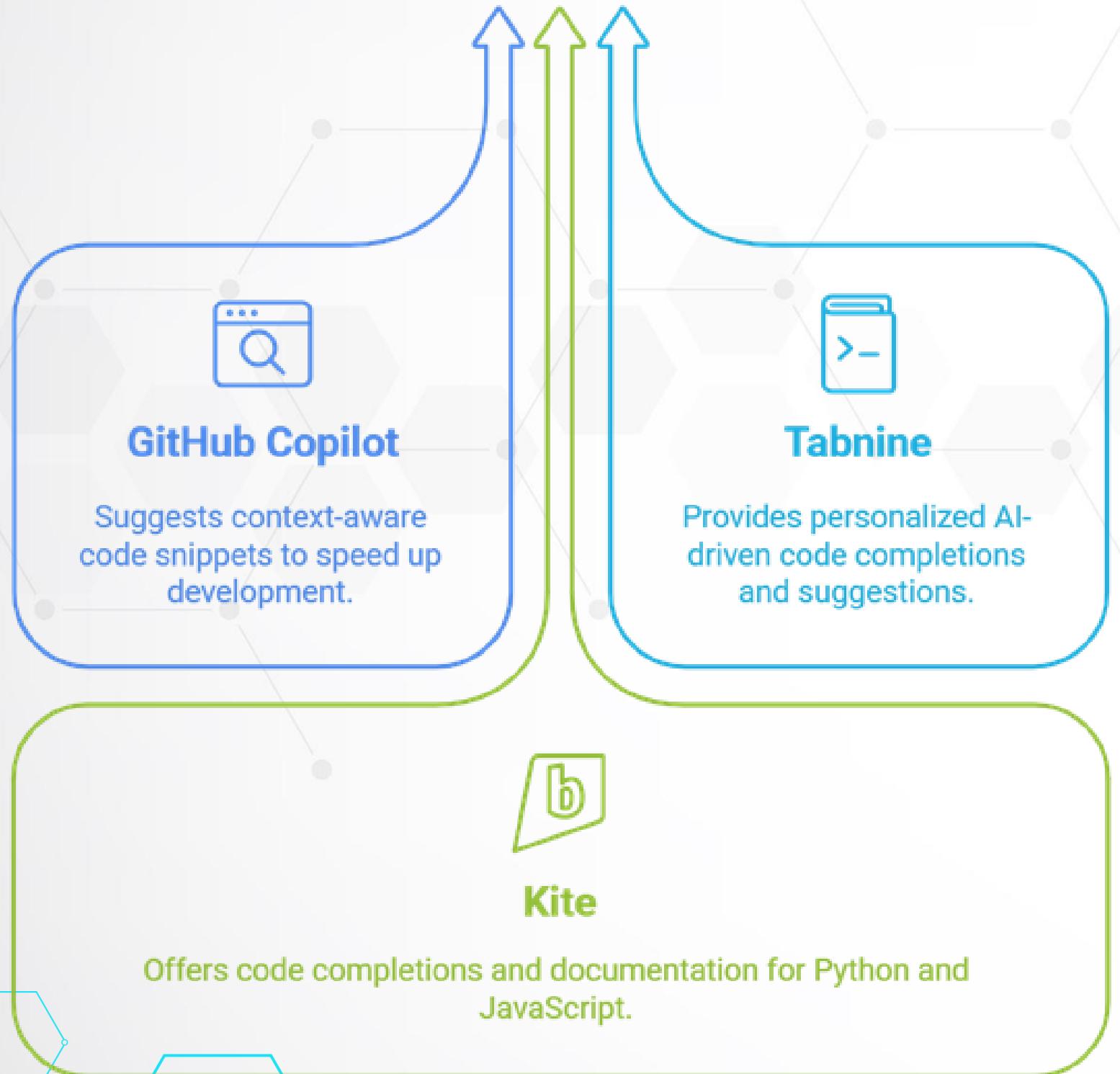
Improved Collaboration

AI facilitates communication and task organization.

Unlimited Use Cases!



Software Development



<https://github.com/features/copilot>

<https://www.tabnine.com/>

<https://open-vsx.org/extension/kiteco/kite>

These are just samples. There are so many!
We are working:
• Security Reviewer and Patching

Healthcare



IBM Watson Health

Analyzes medical data for diagnosis and treatment.



Analyzes medical imaging to improve diagnoses.

Aidoc



Buoy Health

Guides patients through symptoms for care recommendations.



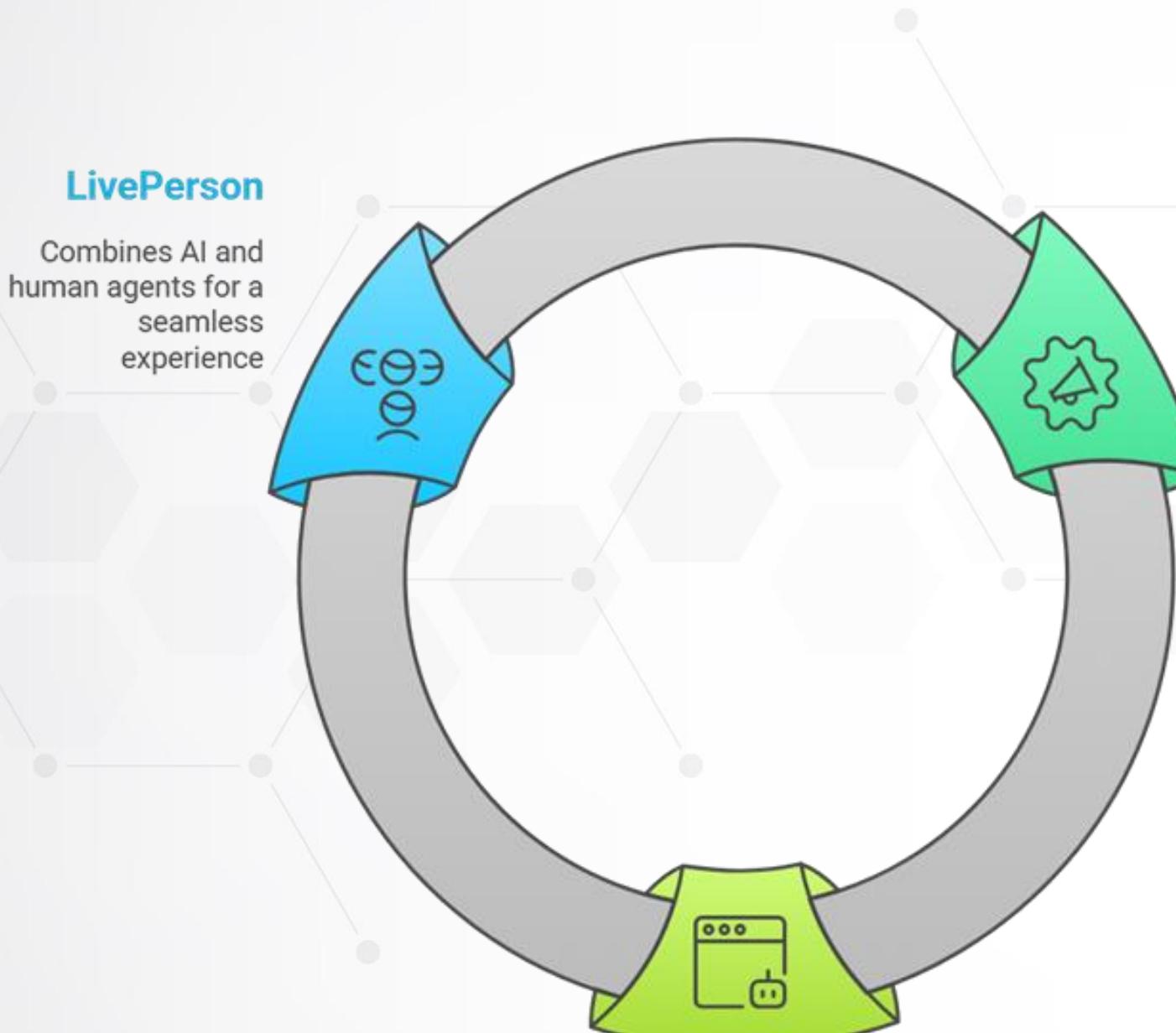
<https://www.ibm.com/industries/healthcare>

<https://www.aidoc.com/>

<https://www.buoyhealth.com/>

These are just samples. There are so many!
We are working on:
•Medical Treatment Procedure Assistant

Customer Care



Zendesk Answer Bot

Automates responses to FAQs, improving satisfaction

<https://www.liveperson.com/>

<https://www.zendesk.com/>

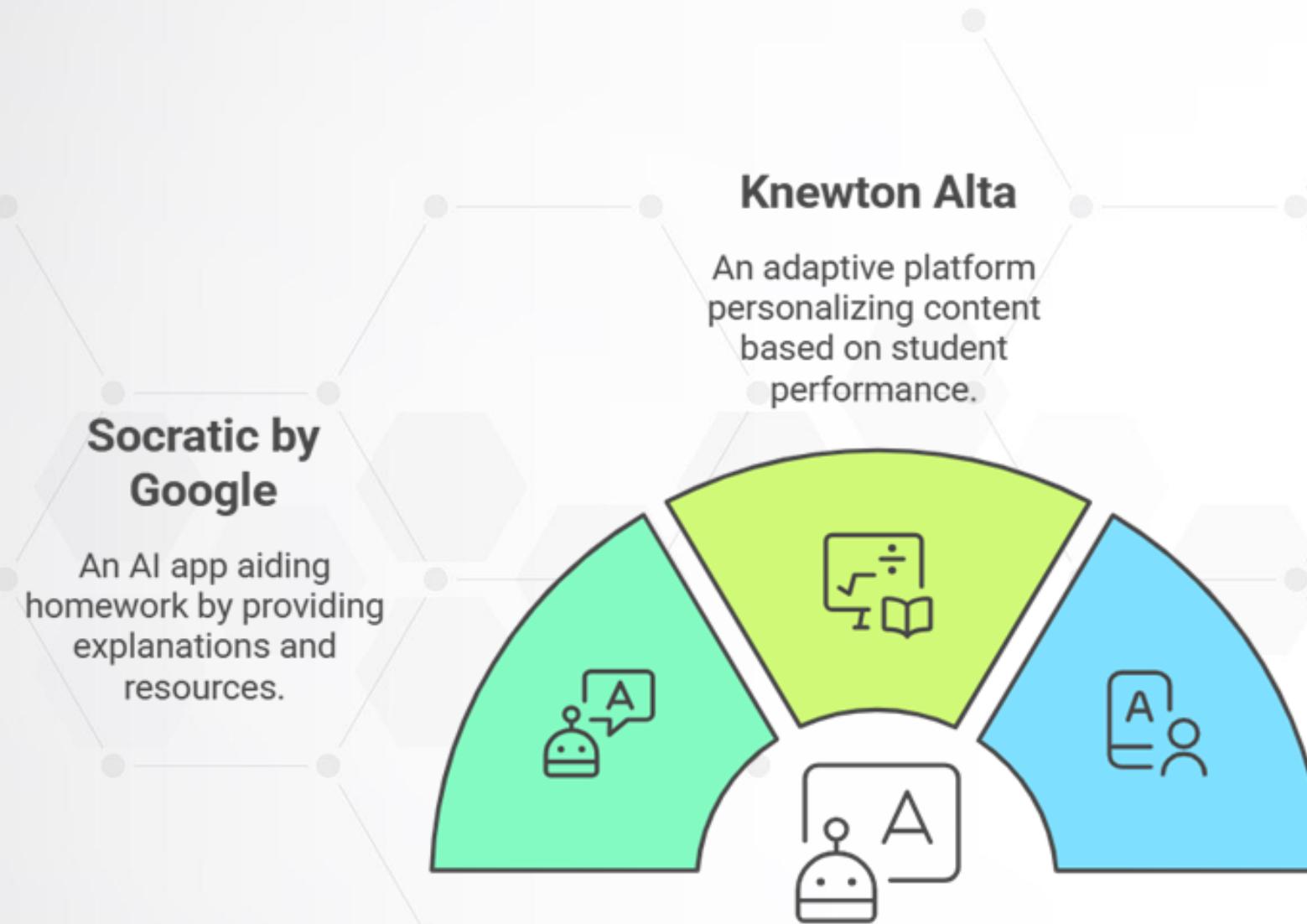
<https://www.ada.cx/>

These are just samples. There are so many!

We are working:

- BizConAI – Automated business connections

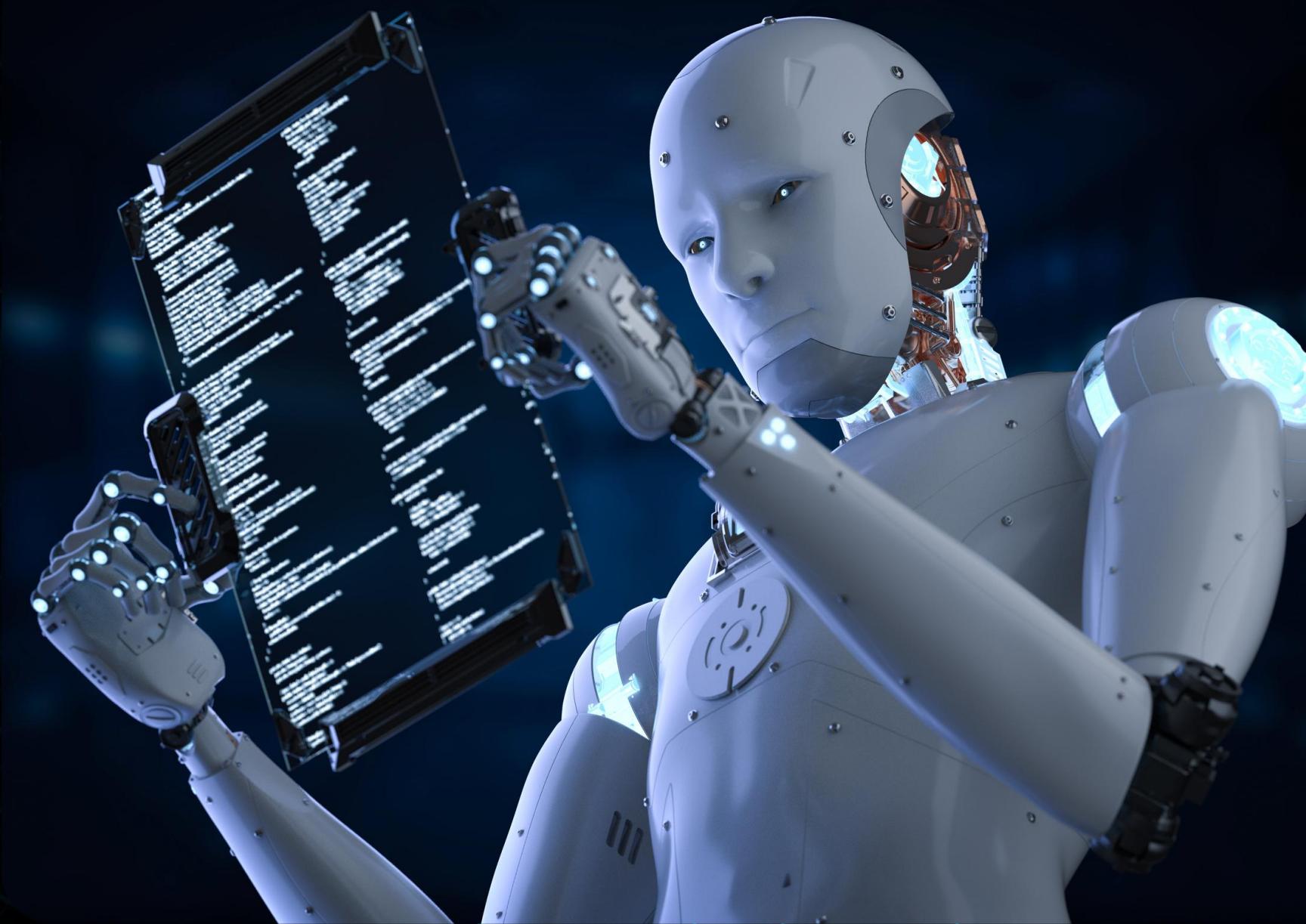
Education



<https://www.wiley.com/en-us/education/alta>
<https://socratic.org/>
<https://www.duolingo.com/>

These are just samples. There are so many!
We are working:
..Data Sense : Making sense from scattered data.
Do you have any use case for us? Or Interested to work with us?

Watch out!



AI for Security

How AI can be utilised for Security Inference and Automation, Assessment, Auditing, Compliance, Threat hunting, detection, respond and remediate

Agentic AI, MCP

Agents for specific tasks, connecting to build AI pipelines for inference, decision making and actions

AI Orchestration & Monitoring

Orchestration and Management of AI deployments. LLM, Agents and more - Monitoring and Actions

AI Performance

AI Performance Benchmarking and Resource optimisation

Security of AI

Ensuring security of AI (Models, APIs, Training and more)

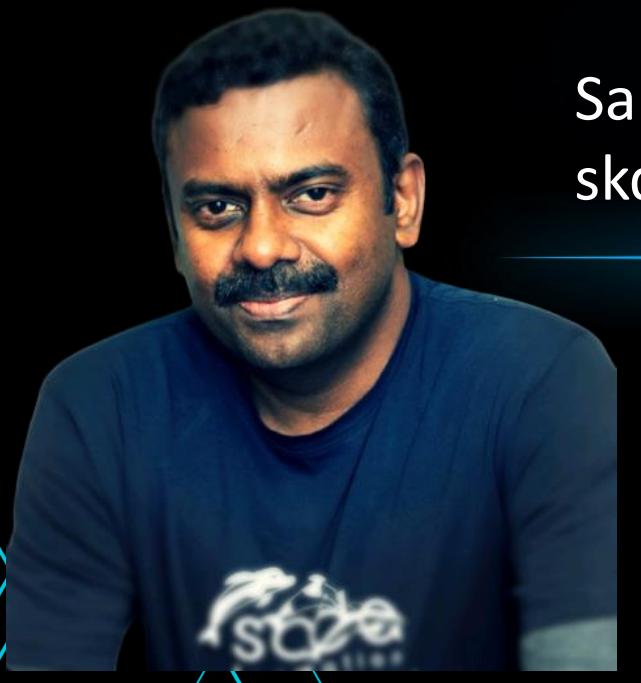
Multimodal GenAI

Support text, image, audio, video and hybrid

AI Cost

AI Cost Management

Thank You



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