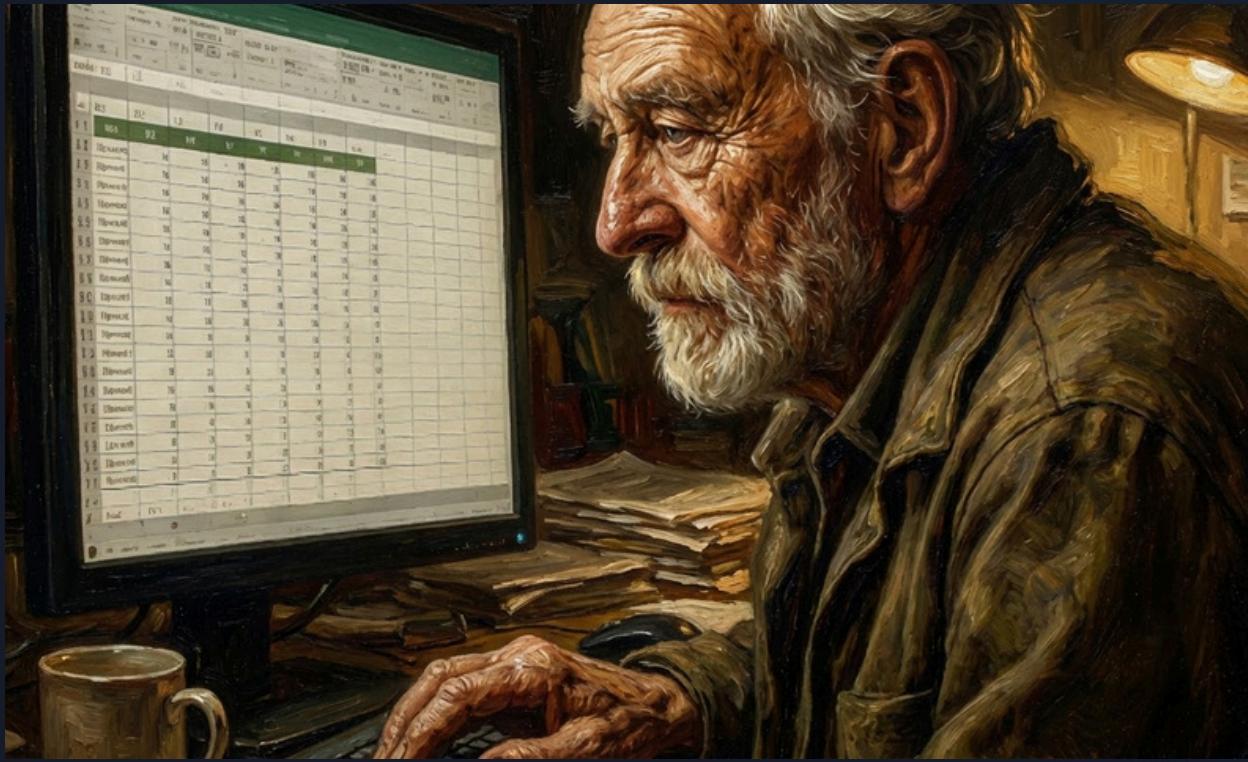


# TRENDS & IMPACT IN OUR PROFESSION

Artificial Intelligence & Data Science

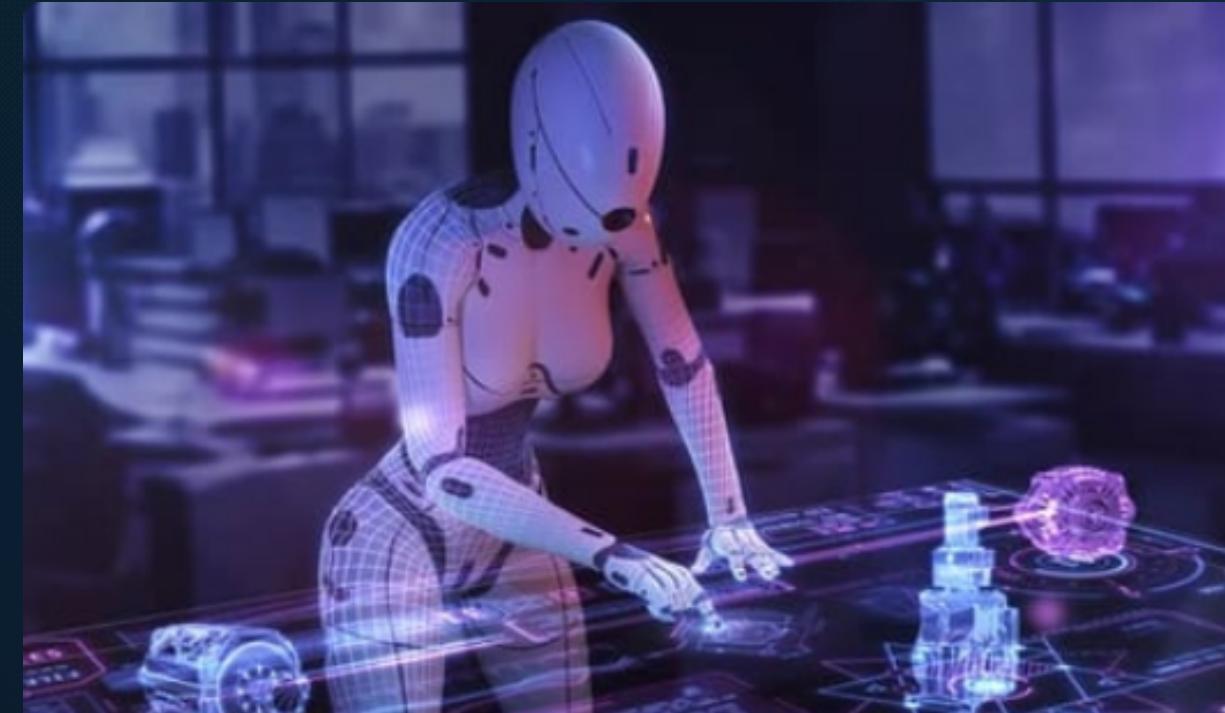
Presented By: Abishek S & Muhilan V

# The Paradigm Shift



## Era 1.0: Analysis (2012-2022)

- ✓ Focus: Descriptive Analytics
- ✓ Architecture: CNNs, RNNs, LSTMs
- ✓ Output: Probabilities & Classifications



## Era 2.0: Generation (2023+)

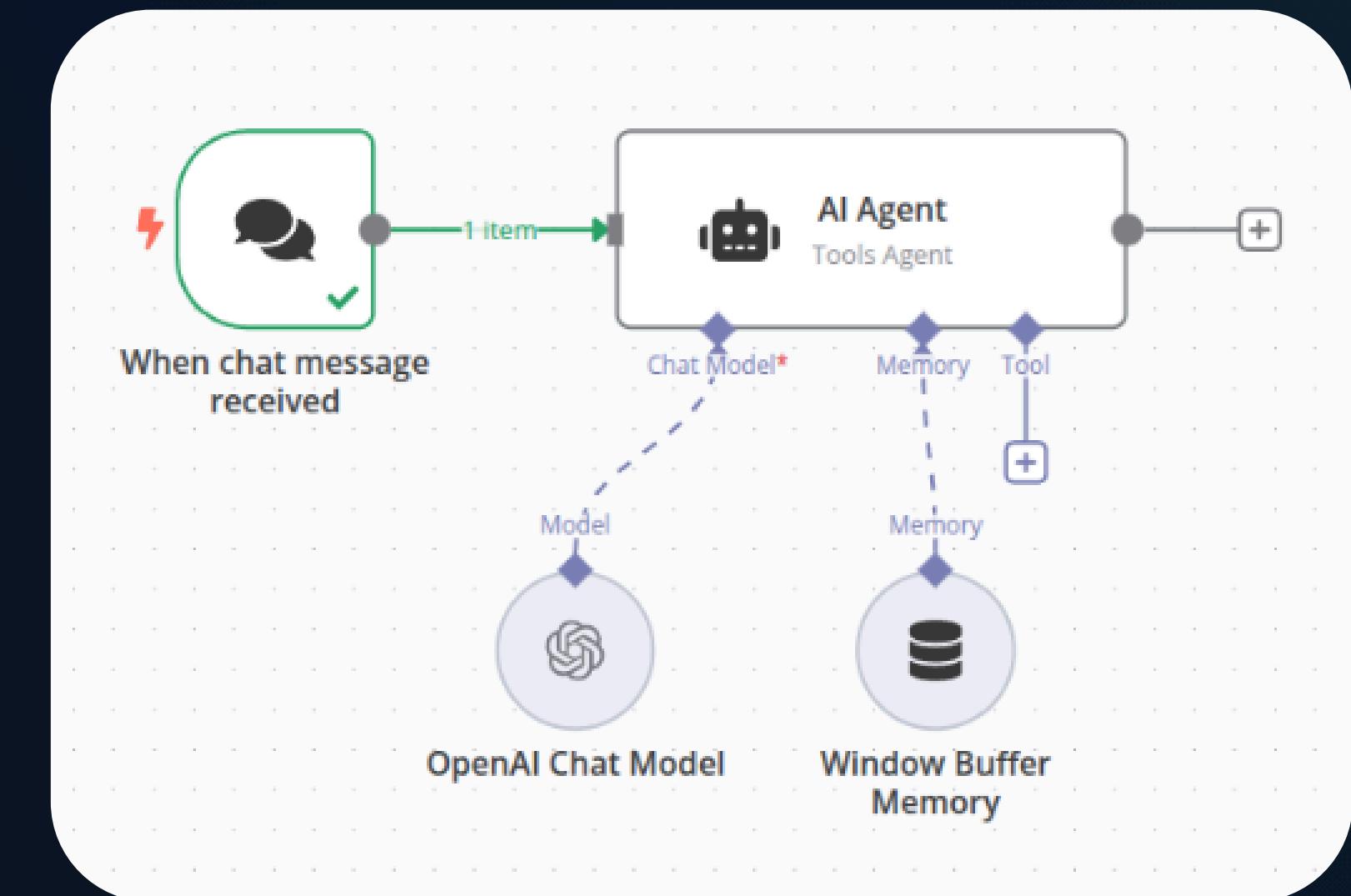
- ✓ Focus: Content Creation & Action
- ✓ Architecture: Transformers & Diffusion
- ✓ Output: Text, Code, Video, Structures

# #1: The Rise of Agents

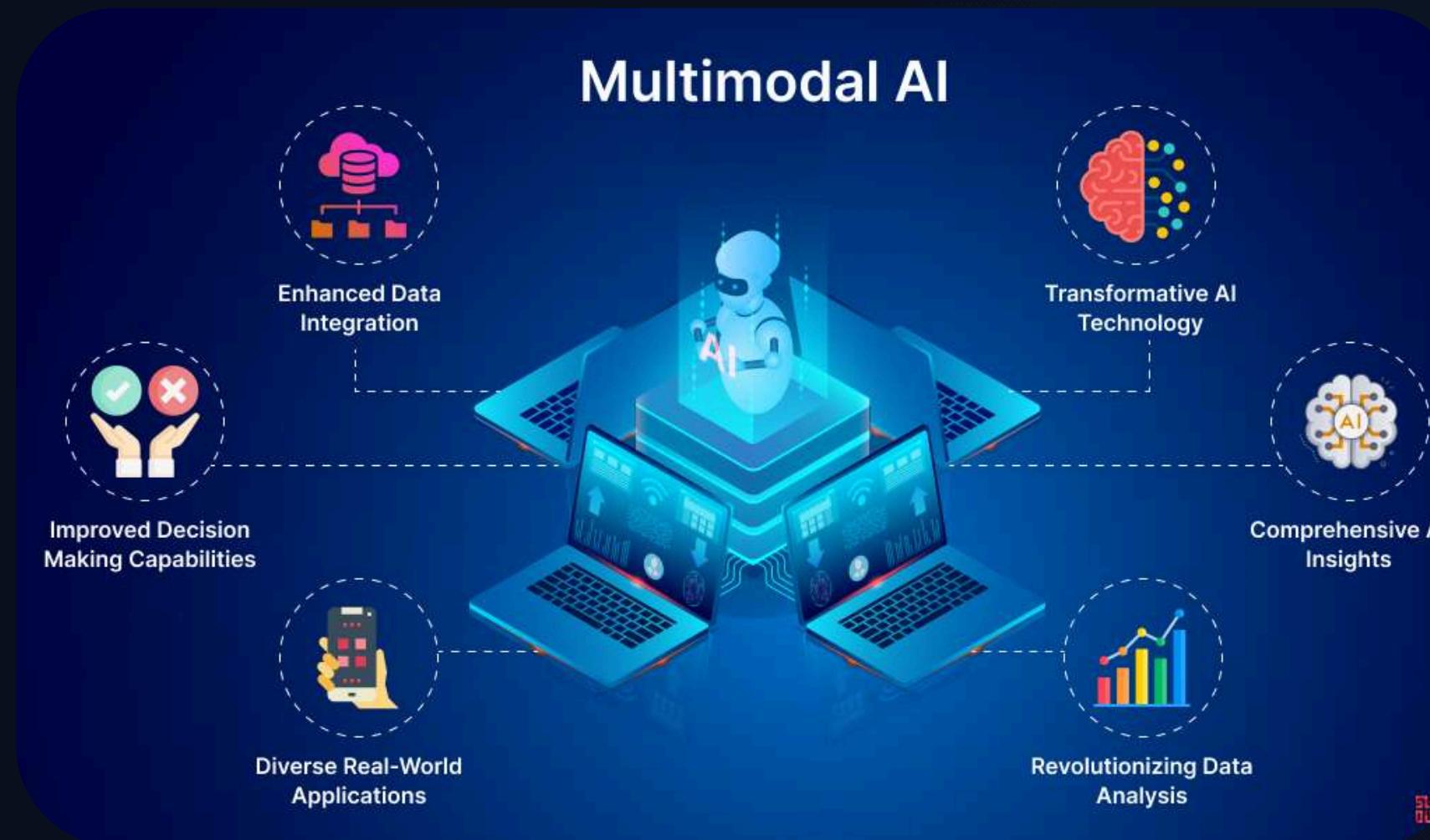
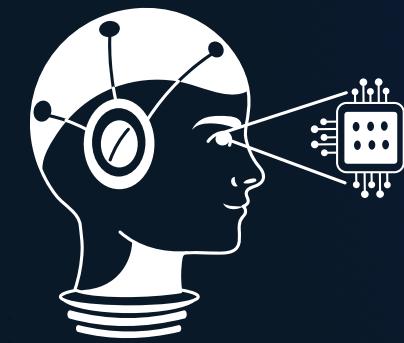


Moving from "Chatbots" to "Do-bots"  
(Large Action Models).

- ✓ **Autonomous Debugging:** Agents write code, read error logs, and self-correct.
- ✓ **Tool Use:** Agents use Browsers and APIs (Stripe, Slack, Jira).
- ✓ **Planning:** Breaking high-level goals into 50+ executable steps.



# #2: Native Multimodality

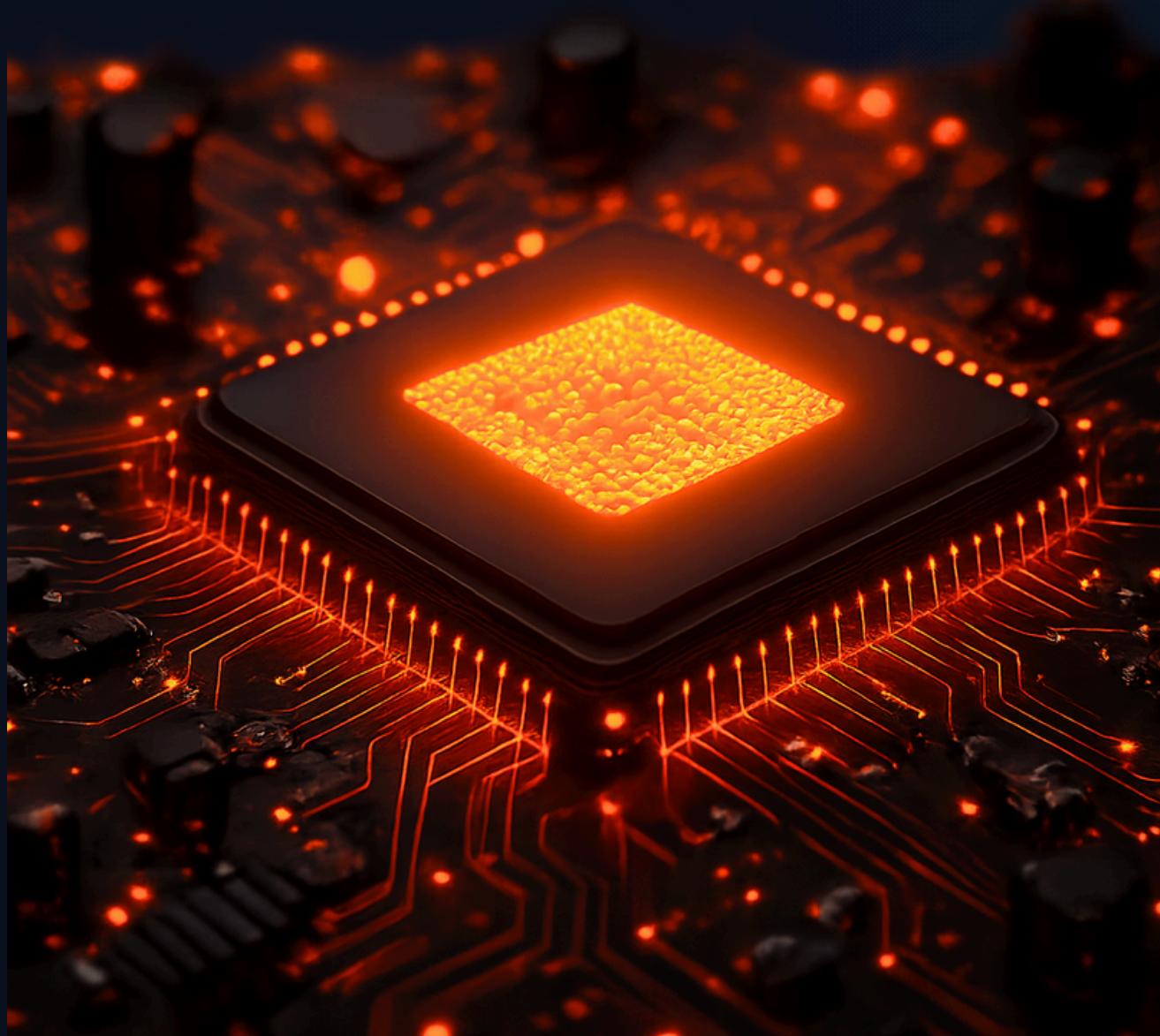


The end of text-only models. AI now sees and hears.

- ✓ **Video Understanding:** Analyzing security footage or medical scans in real-time.
- ✓ **Audio-to-Code:** Describing a function verbally and getting python code.
- ✓ **Unified Training:** Training on pixel + text tokens simultaneously (Gemini 1.5, GPT-4o).

# Trend #3: Edge AI & TinyML

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Processing data locally to solve the “cloud bottleneck”.

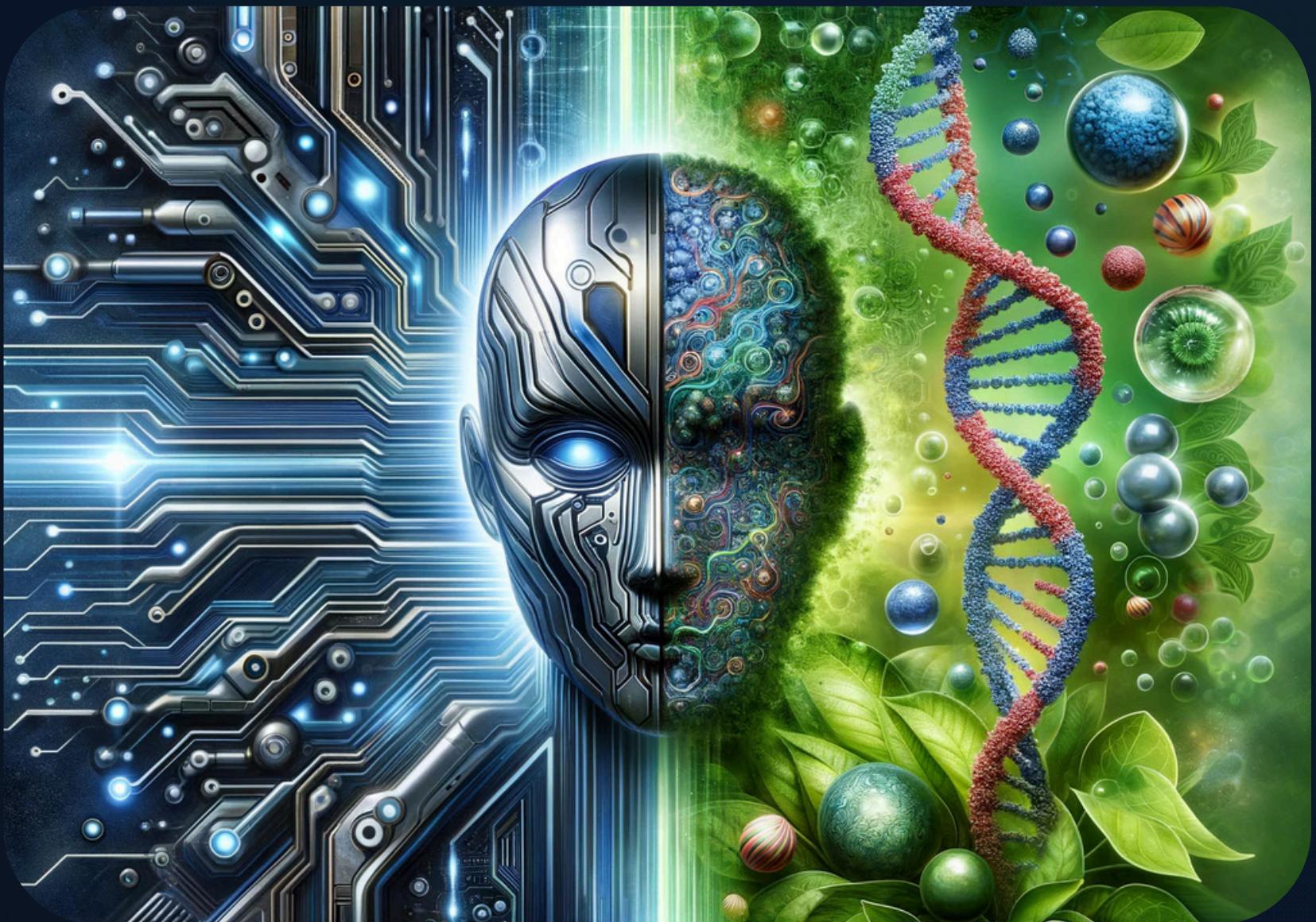
- ✓ **Zero Latency (< 5ms):** Critical for autonomous driving & robotics.
- ✓ **Federated Learning:** Training models across devices without sharing raw data.
- ✓ **Hardware:** Specialized NPUs (Neural Processing Units) in smartphones.

# Trend #4: AI for Science

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Accelerating discovery in biology and materials.

- ✓ [AlphaFold 3](#): Predicting the structure of almost all biological molecules.
- ✓ [GNoME](#): Discovering 2.2 million new crystals/materials for battery tech.
- ✓ [Weather Forecasting](#): GraphCast outperforming traditional supercomputers.



# Trend #5: Explainable AI (XAI)

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Trust is the barrier to adoption in Law & Medicine.

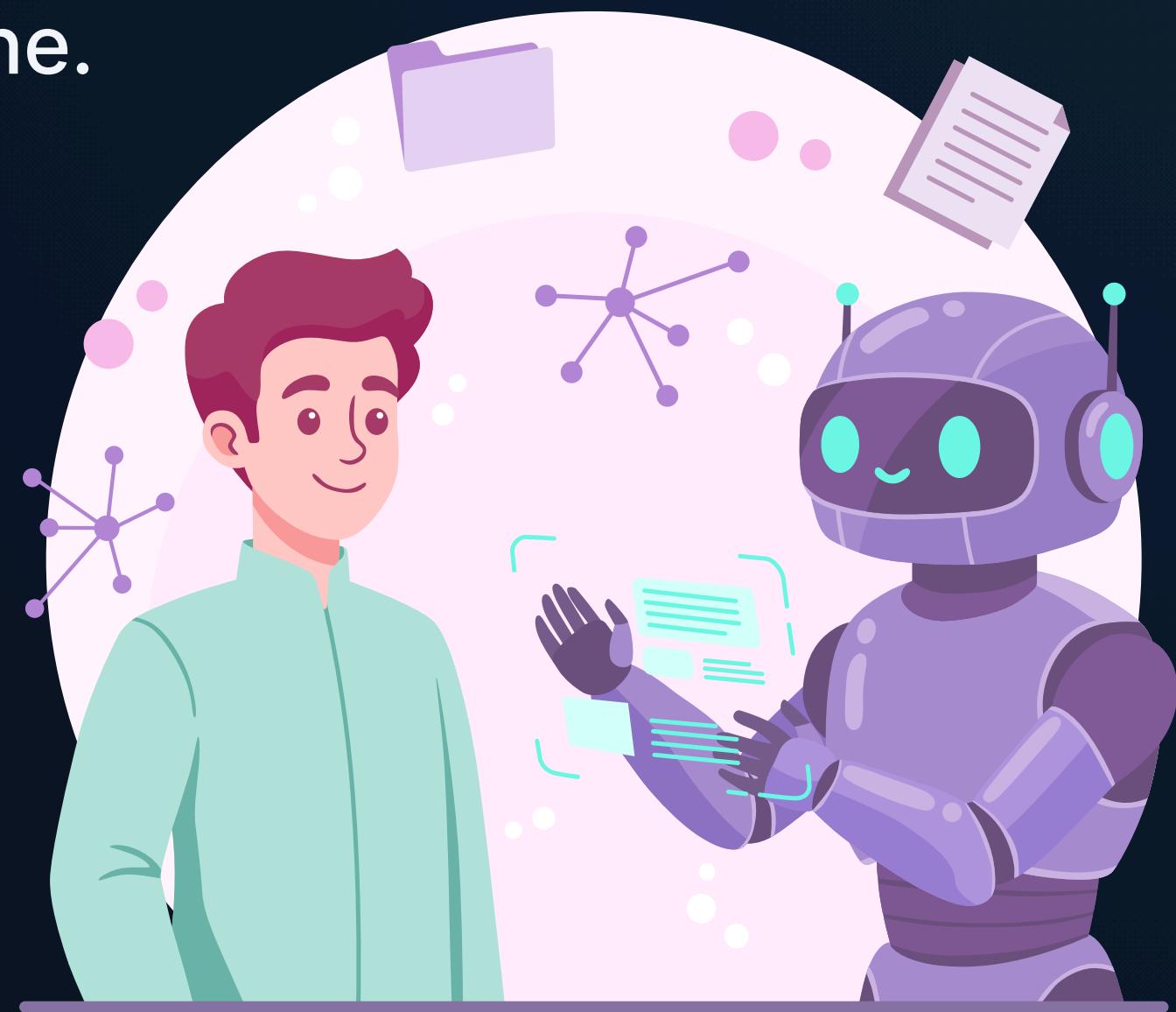
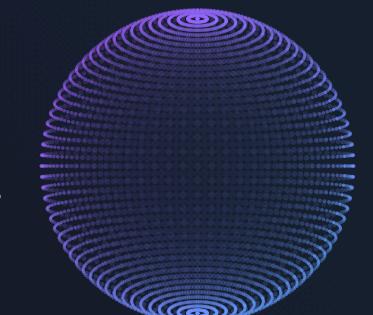
## The Black Box Risk

High accuracy, zero transparency.  
*"Loan Denied." (Why?)*



## The Glass Box Solution

Using SHAP values and saliency maps.  
*"Denied due to debt-to-income ratio."*



# The New Professional

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From Coder to System Architect.

- ✓ Flow Engineering: Designing the logic flow of agents (not just prompting).
- ✓ Data Curation: "Data-Centric AI" - Synthetic data generation.
- ✓ Eval & Testing: Building benchmarks for hallucinations.

# Impact: Green AI

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Case Study: DeepMind & Google Data Centers.

**40%**  
**Reduction in Energy**

Achieved via Reinforcement Learning control systems.

**Goal:** Net Zero Compute by optimizing model architecture (pruning/quantization) to reduce carbon footprint.



# Challenges & Ethics

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## Navigating the Ethical Frontier.

- ✓ Bias & Fairness: RLHF to prevent historical prejudice.
- ✓ Deepfakes: C2PA Cryptographic watermarking.
- ✓ Compliance: EU AI Act (Risk-based auditing).
- ✓ Copyright: Fair use vs training data rights.



# Thank You!



Presented By: Abishek S & Muhilan V