

# *Driving Efficiency through an Automation Hierarchy*

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# ■ Agenda

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- Intros
- Why
- What
- How
- Closing

# ■ AI Technical Leader

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**CU** University of Colorado  
Boulder

SCHOOL OF MINES COLORADO  
**COLORADO SCHOOL OF MINES** Computer Science



# ■ Summary

podcast

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## Driving Efficiency through an Automation Hierarchy

*Ivan Portilla, Senior Technical Staff Member, Ricoh North America Customer Experience Centers*

Today's graphic enterprise operational floor is a mixture of un-codified dashboards, multiple and bespoke programming languages, human knowledge, generational values, and a rolled-up sleeves approach. Explore a real-world example of an automation hierarchy that leads to harnessing the promises of AI while delivering higher efficiency in a production environment. Spend a few minutes applying simplicity to an industry that touches the fabric of our nation each and every day.



<https://notebooklm.google.com/notebook/79f61ed8-2b7c-40cf-974a-93789ae88d1e>



embodied & autonomous



life partner

Our expectations  
are out of sync  
with reality





# Why AI in Digital Printing?

- Printing is **everywhere**: from packaging to government documents.
- Commercial digital printing is a massive operation that still relies heavily on **manual systems**.
- AI offers **a chance** to streamline, simplify, & scale.

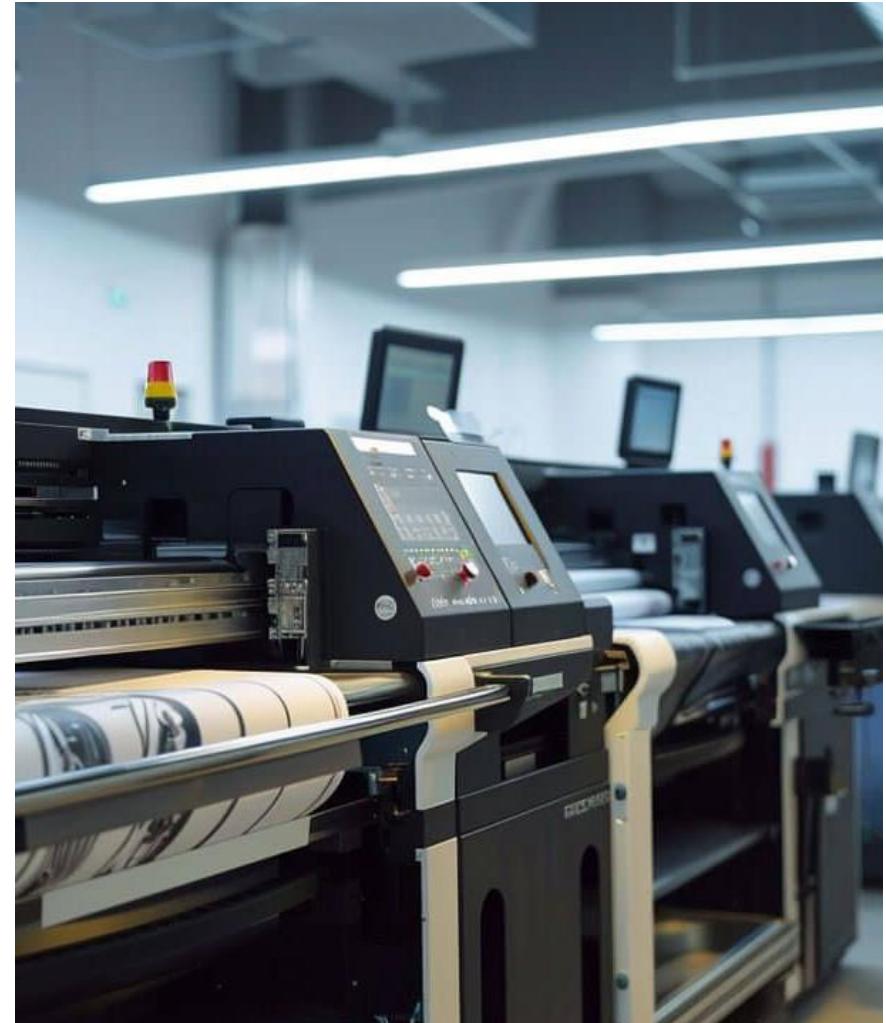


<https://www.ricoh-usa.com/en/products>



# The Current Operational Floor

- Unstructured dashboards
- Multiple, sometimes **obscure** programming languages
- **Reliance** on human knowledge & experience
- Strong generational habits and a “**hands-on**” culture





# The Current Operational Floor

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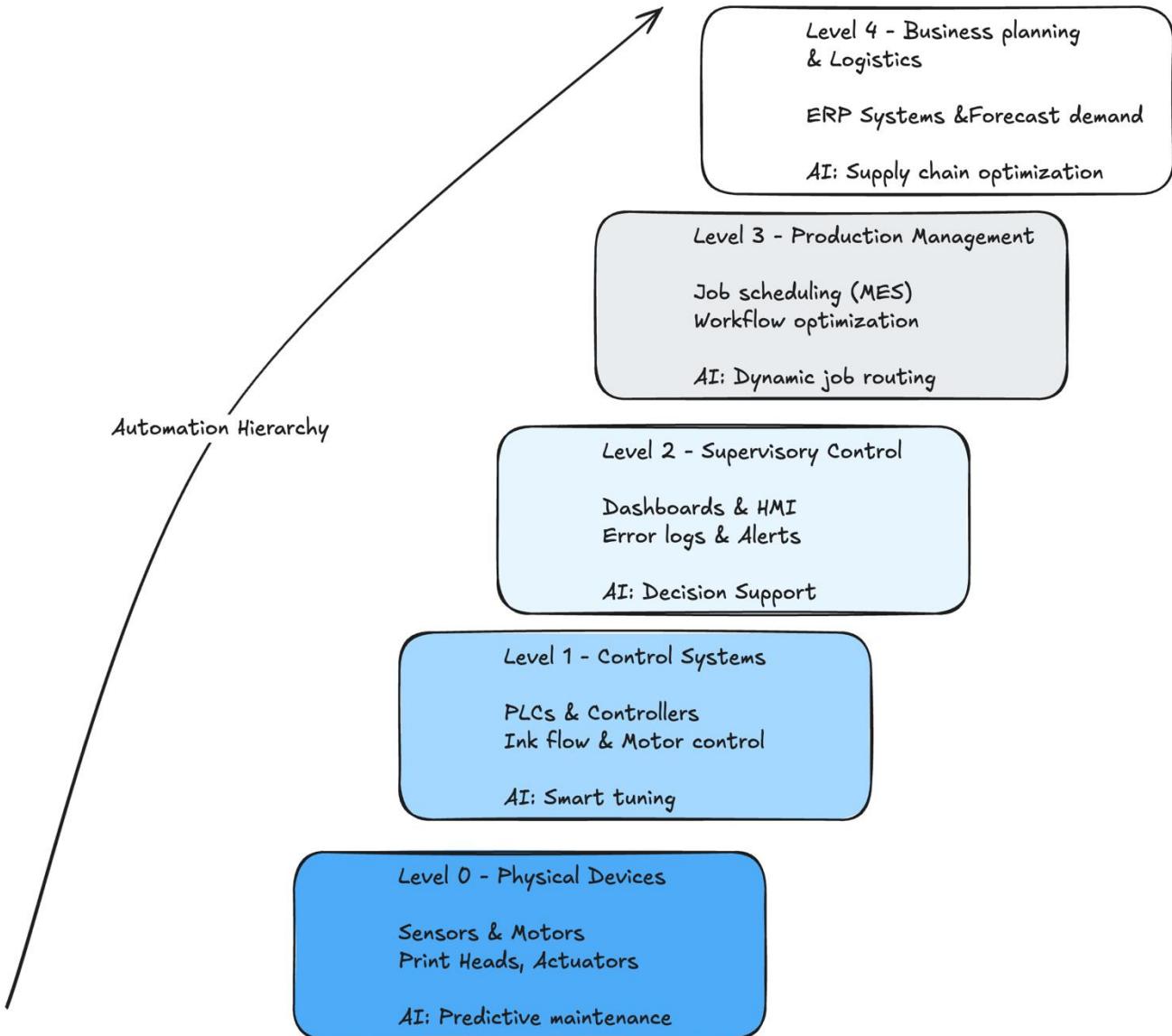




# What Is an Automation Hierarchy?

How AI Enhances Each Layer of Production

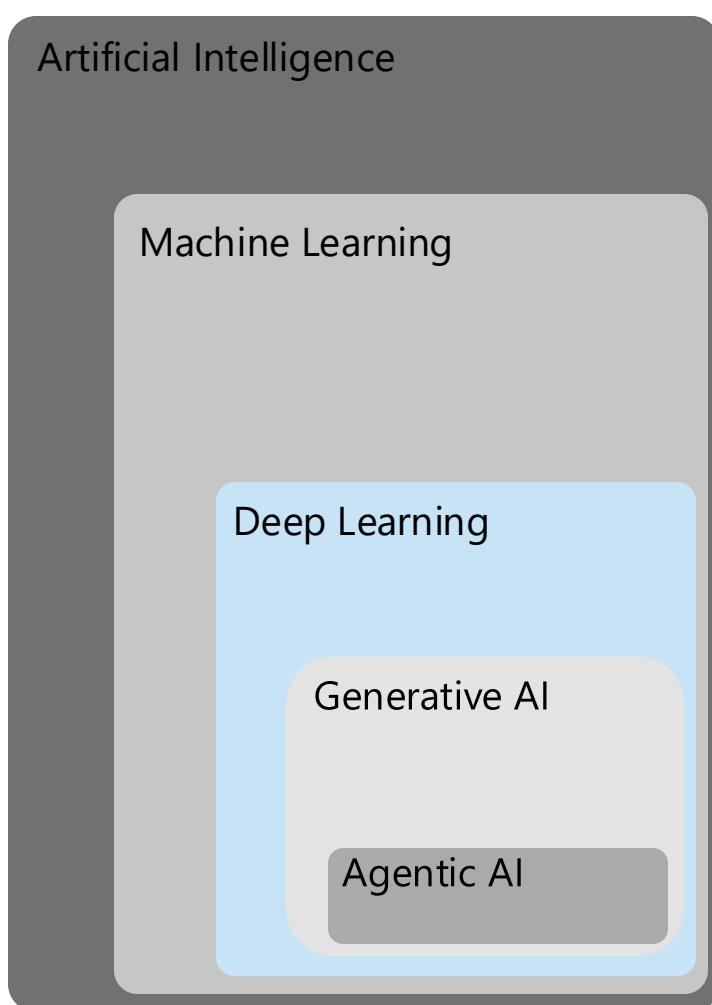
- Layered approach to automating complex systems
- From basic mechanical processes → smart decision-making with AI
- Provides a roadmap for where & how AI fits





# Brief history of artificial intelligence

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## Artificial Intelligence

Intelligence demonstrated by machines



## Machine Learning

Learn from data



## Deep Learning

Model after the human brain (Neural Networks)



## Generative AI

Create new written, visual, and auditory content



## Agentic AI

Can set goals, make decisions, & take actions to achieve those goals



# Generative AI

a type of artificial  
intelligence that  
creates new content  
based on existing data

The best thing about AI is its ability to ...

learn	4.5%
predict	3.5%
make	3.2%
understand	3.1%
do	2.9%



# MSFT partnership with OpenAI

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*Ensure that artificial  
general intelligence (AGI)  
benefits humanity.*



*Empower every person and  
organization on the planet  
to achieve more*

**GPT-3**

Generate and Understand  
Text

**Codex**

Generate and Understand Code

**DALL·E**

Generate images from text  
prompts



**OpenAI**



**Microsoft**

Generative AI

**GPT-x**

Prompt:

Write a tagline for an ice cream shop.

Response:

We serve up smiles with every scoop!

**Codex**

Prompt:

```
Table customers, columns =  
[CustomerId, FirstName,  
LastName, Company, Address,  
City, State, Country,  
PostalCode]
```

```
Create a SQL query for all  
customers in Texas named Jane  
query =
```

Response:

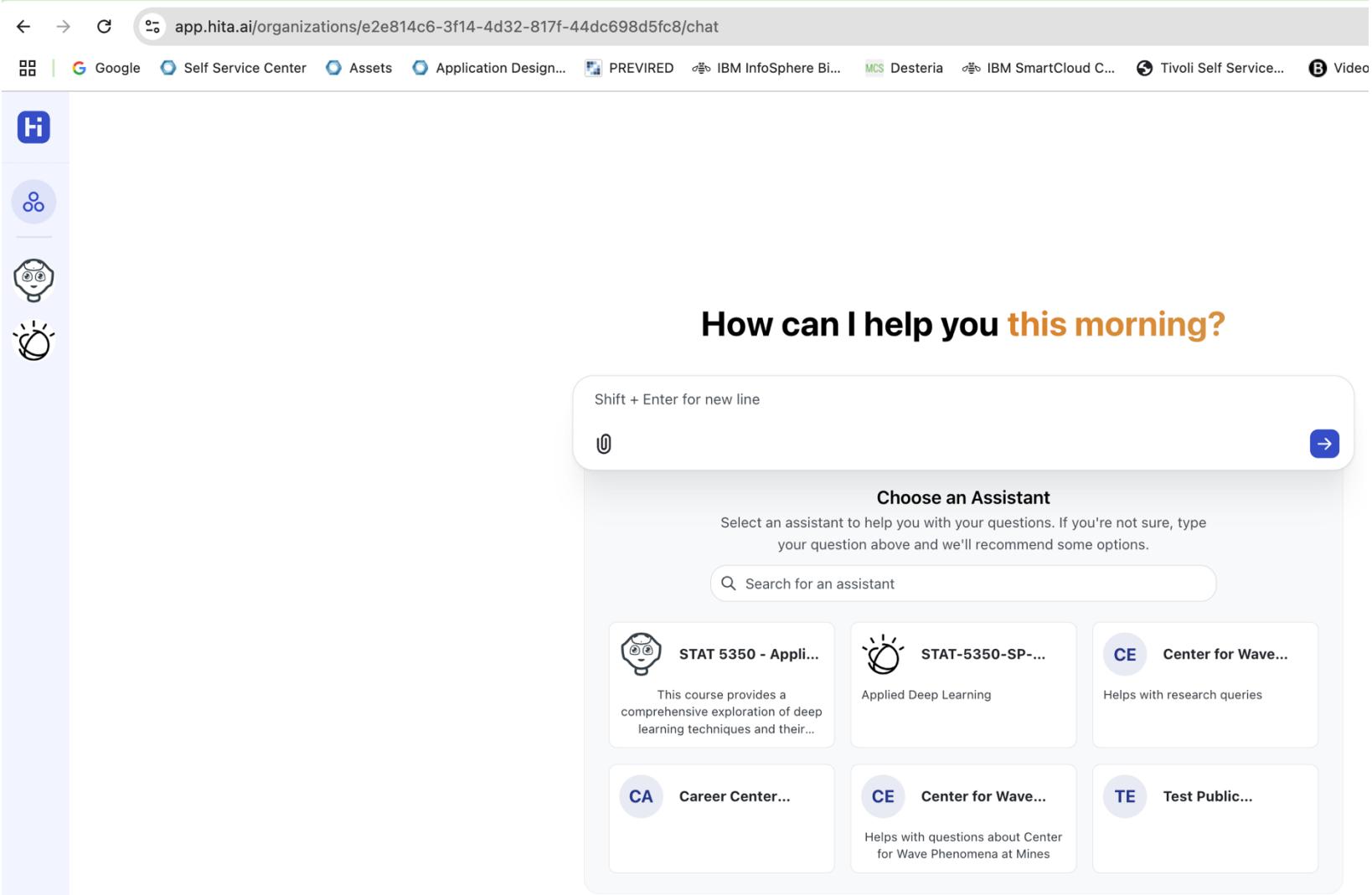
```
SELECT *  
FROM customers  
WHERE State = 'TX' AND FirstName  
= 'Jane'
```

**DALL·E**

Prompt: A white Siamese cat

Response:





← → ⌛ app.hita.ai/organizations/e2e814c6-3f14-4d32-817f-44dc698d5fc8/chat

Google Self Service Center Assets Application Design... PREVIRED IBM InfoSphere Bi... Desteria IBM SmartCloud C... Tivoli Self Service... Video

H People Chat Help

How can I help you this morning?

Shift + Enter for new line

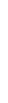
Choose an Assistant

Select an assistant to help you with your questions. If you're not sure, type your question above and we'll recommend some options.

Search for an assistant

 STAT 5350 - Appli... This course provides a comprehensive exploration of deep learning techniques and their...	 STAT-5350-SP-... Applied Deep Learning	 Center for Wave... Helps with research queries
 Career Center... Helps with questions about Center for Wave Phenomena at Mines	 Center for Wave... Helps with questions about Center for Wave Phenomena at Mines	 Test Public... Helps with questions about Center for Wave Phenomena at Mines

<https://docs.hita.ai/user-guide>



# Text to Image Example

## FLUX.1 [dev]

12B param rectified flow transformer guidance-distilled from [FLUX.1 \[pro\]](#)

[\[non-commercial license\]](#) [\[blog\]](#) [\[model\]](#)

a cowboy on a horse in mars

Run



<https://huggingface.co/spaces/black-forest-labs/FLUX.1-dev>

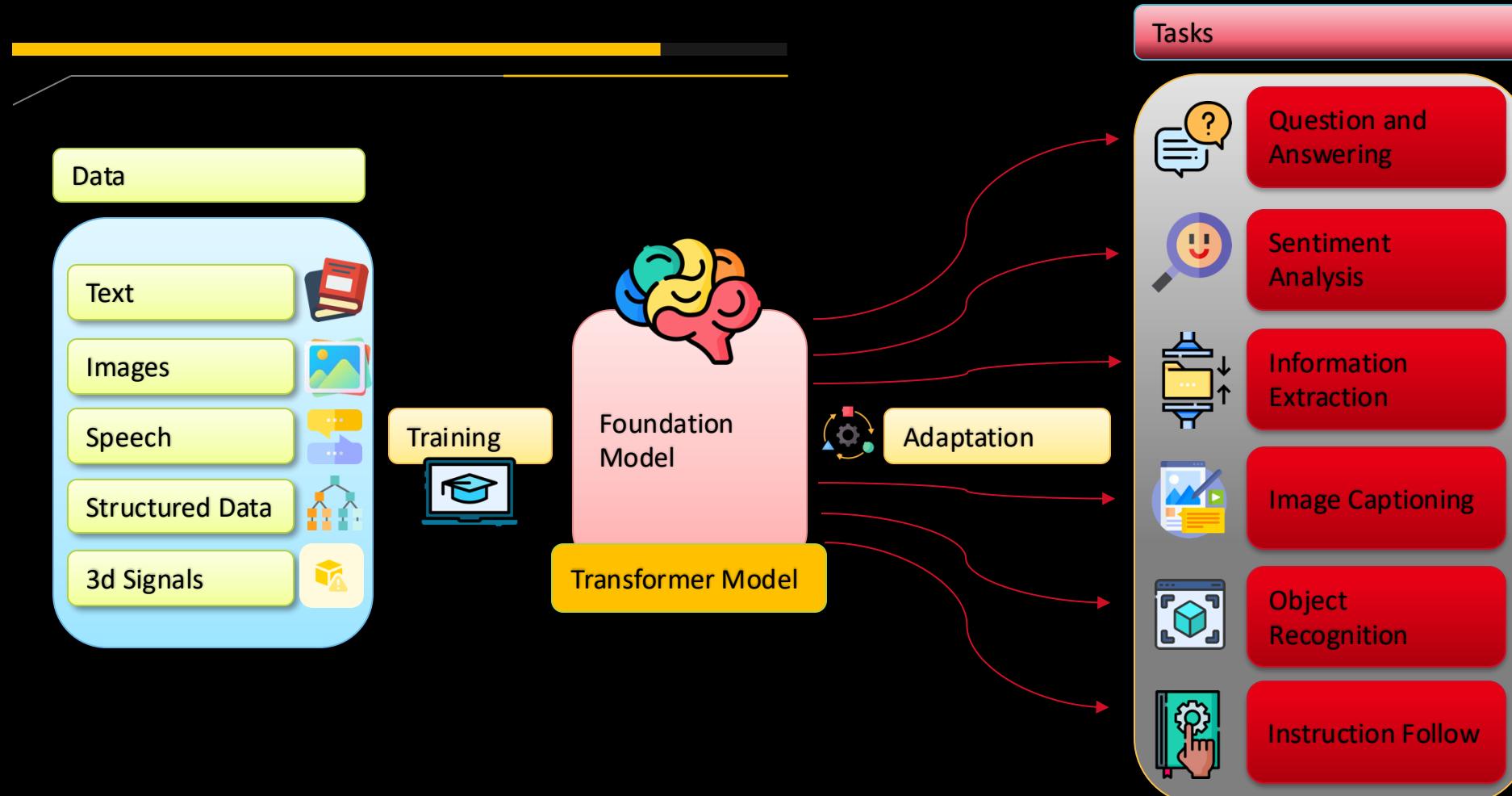


# Image Generation





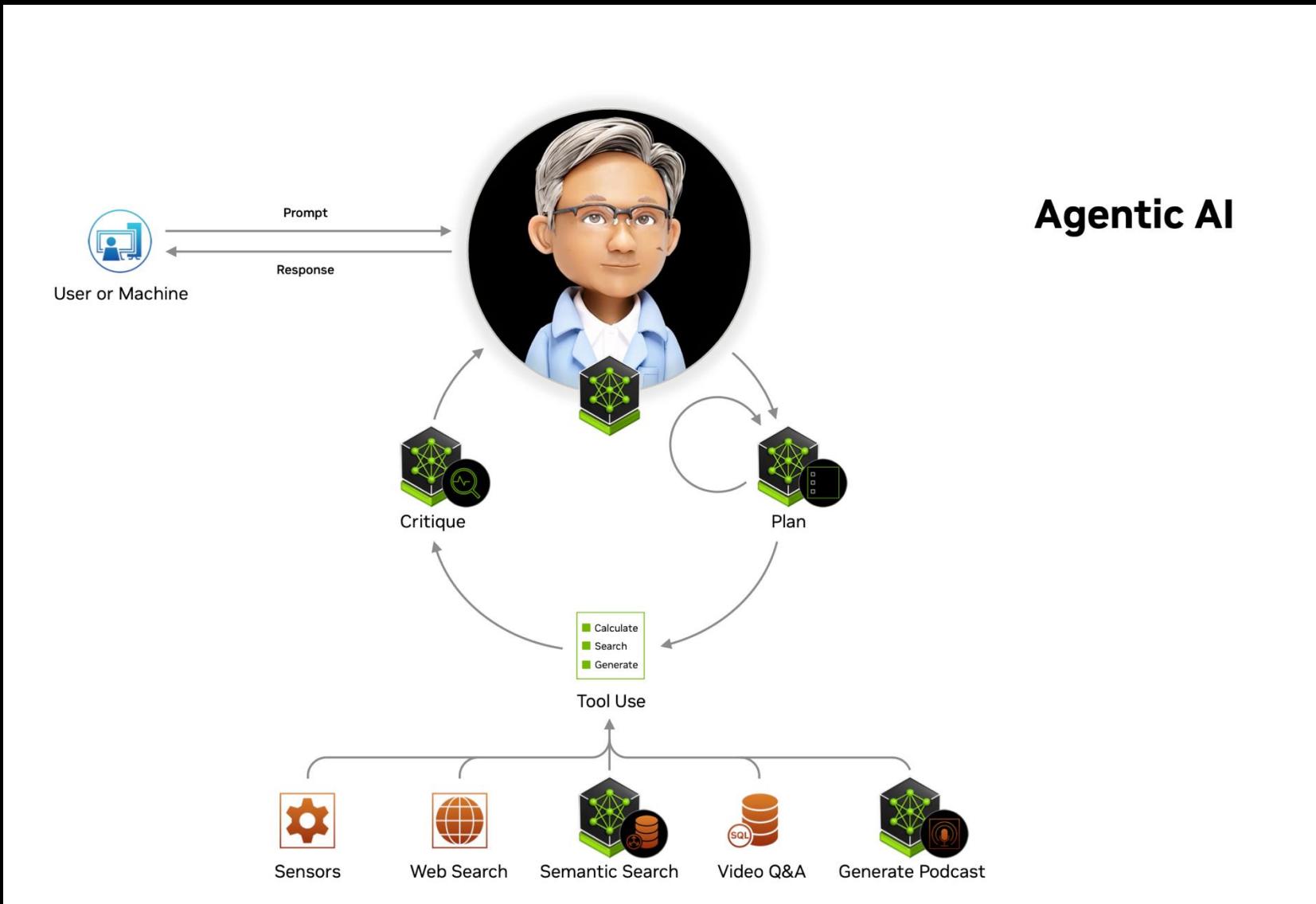
# Foundation Models



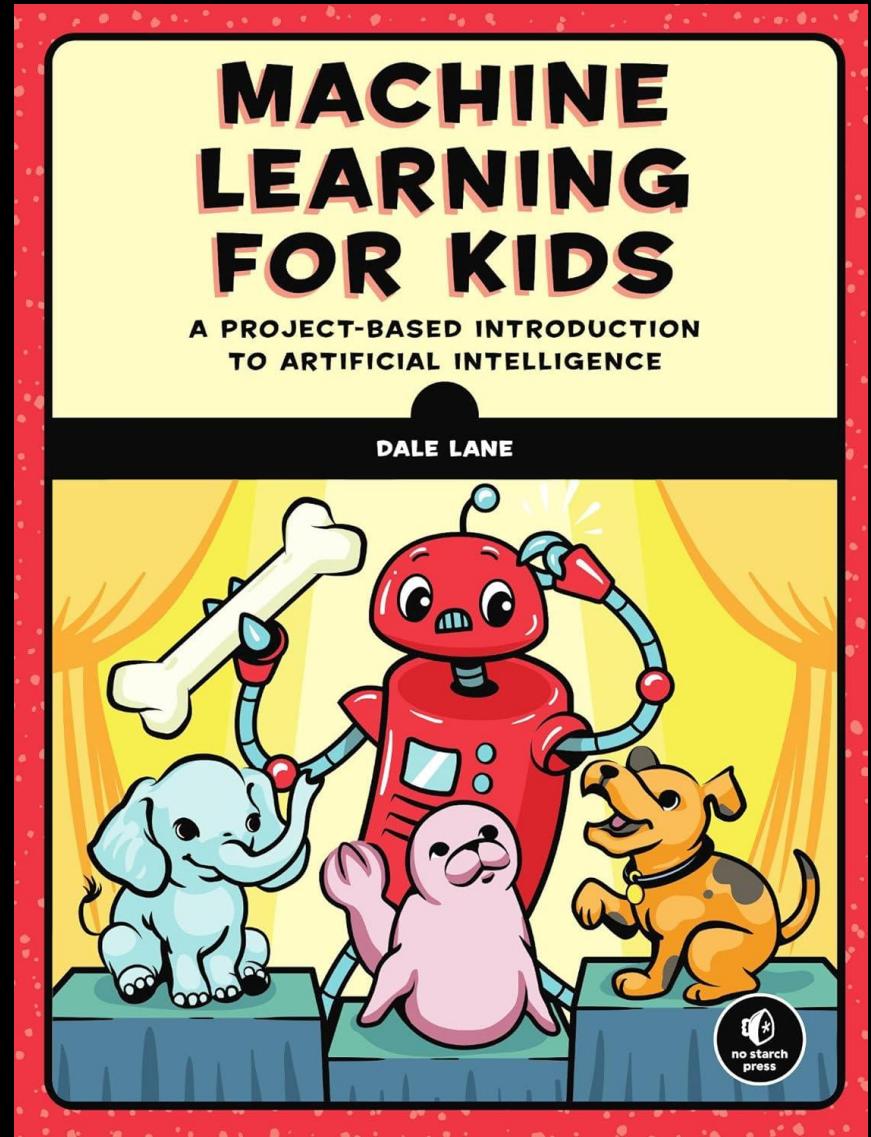


# Agentic AI

AI systems that act as autonomous *agents*, capable of making decisions, taking actions, and pursuing goals with **minimal** human intervention



How many animals on these pictures?



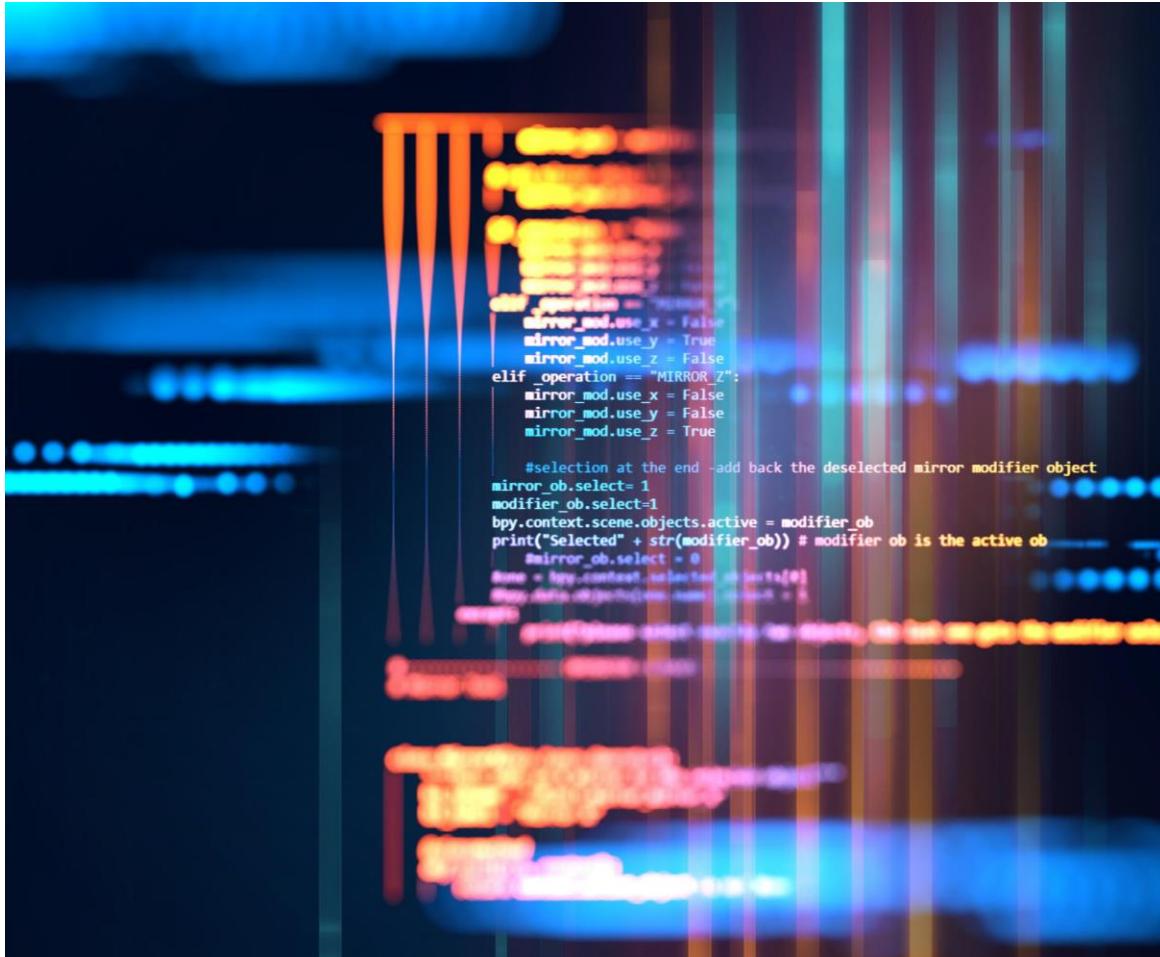


# Vibe coding

Fast, intuitive coding with AI assistance

# ■ What's Changing?

**AI tools now co-write code, design systems, & offer intelligent suggestions**

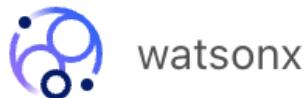


- Generation
- Completion
- Explanation
- Translation
- Testing
- Documentation

# Code generation

Write a Python script that connects to a MongoDB database, retrieves documents from a 'users' collection, and prints usernames and their corresponding email addresses.

⋮

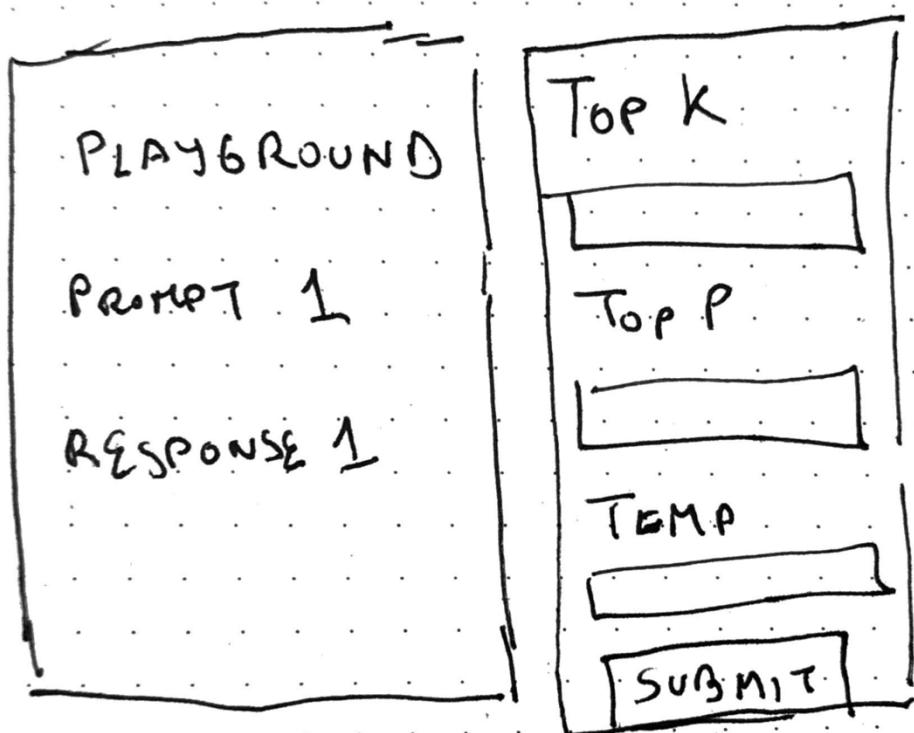


```
# Assisted by watsonx Code Assistant
import pymongo

# Connect to MongoDB
client = pymongo.MongoClient("mongodb://localhost:27017/")

# Access the 'users' collection
db = client["mydatabase"]
collection = db["users"]
```





## Playground

Response 1

Response 2

Response 3

### Top K

Enter top K value

### Top P

Enter top P value

### Temperature

Enter temperature valu

### Max New Tokens

Enter max new tokens

**Submit**

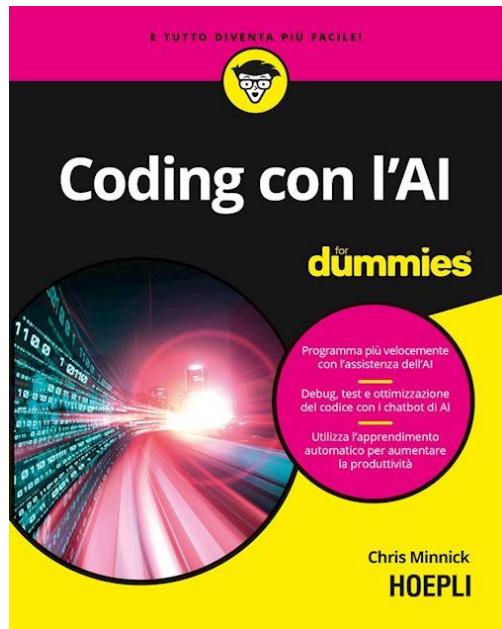


# GitHub Copilot Demo



Engineers Anyone can build faster, smarter, & with less manual work

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### I. Techniques & Technologies

1. Benefits
2. Parsing ML/DL
3. AI coding tools
4. Coding w chatbots

### II. Using AI to write code

5. From plan to prototype
6. Formatting & improving code
7. Find, eliminate bugs
8. Translate & optimize code

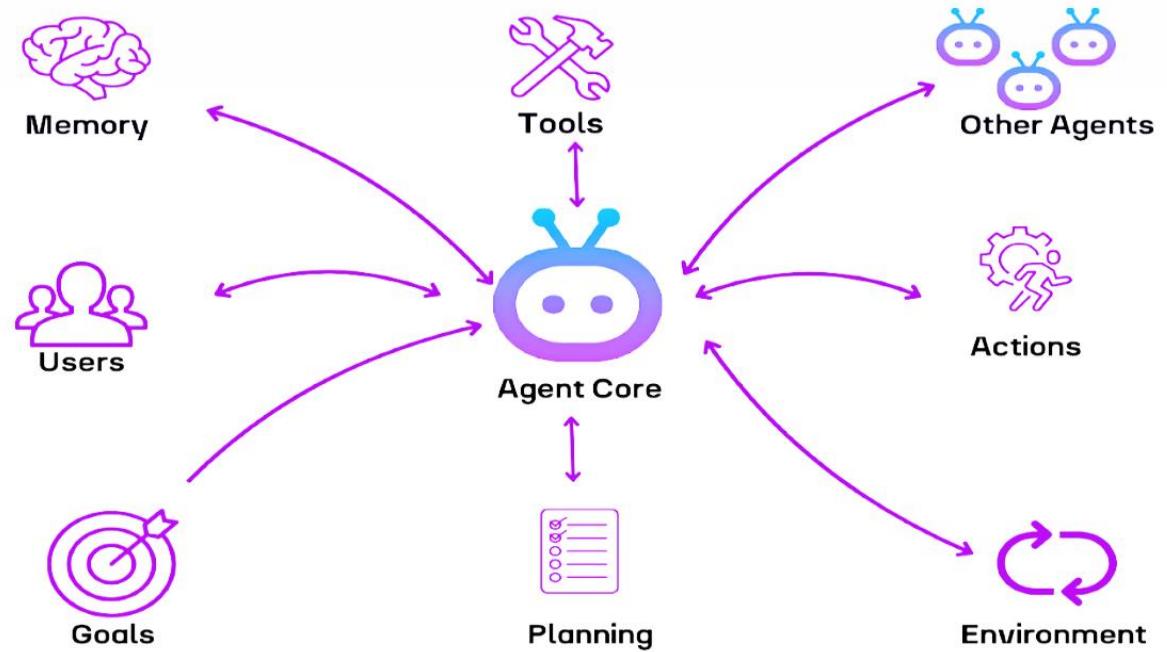
### III. Test, Document & Maintain code

9. Testing your code
10. Documenting you code
11. Maintaining your code



# The Role of GenAI, Agents, and AI-Driven Coding

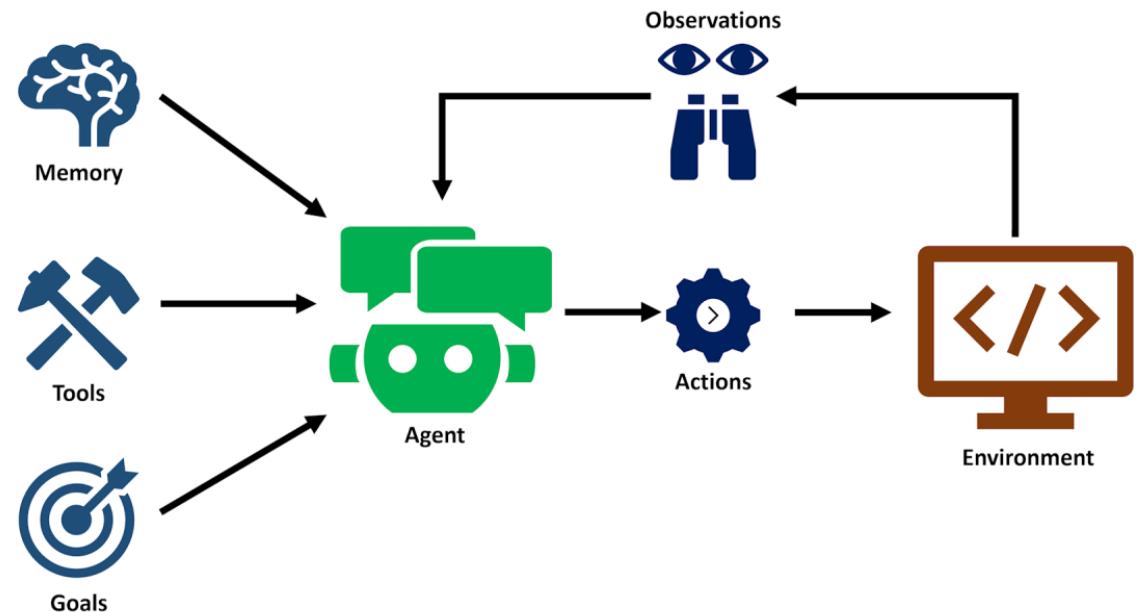
- **Generative AI:** Simplifies coding, UI generation, troubleshooting
- **Intelligent Agents:** Monitor, react, and optimize processes
- **AI-driven coding:** Translates goals into efficient programs (vibe coding)





# Real-World Example – AI in Action

- A production environment before vs. after automation hierarchy
- **Measurable** gains: fewer errors, faster turnaround, reduced waste
- Human-machine collaboration: not replacement, but **augmentation**





## Real-World Example – AI in Action

### VC80000 Maximizes Productivity through Automation



- Ricoh's VC80 customer calculated a 56% increase in productivity over their prior system.
- System wide architecture redesign to promote advanced automation to maximize OEE with minimal operator skills.
- Fully automated press and substrate setup with continual real time monitoring and correction to ensure consistent output over time.



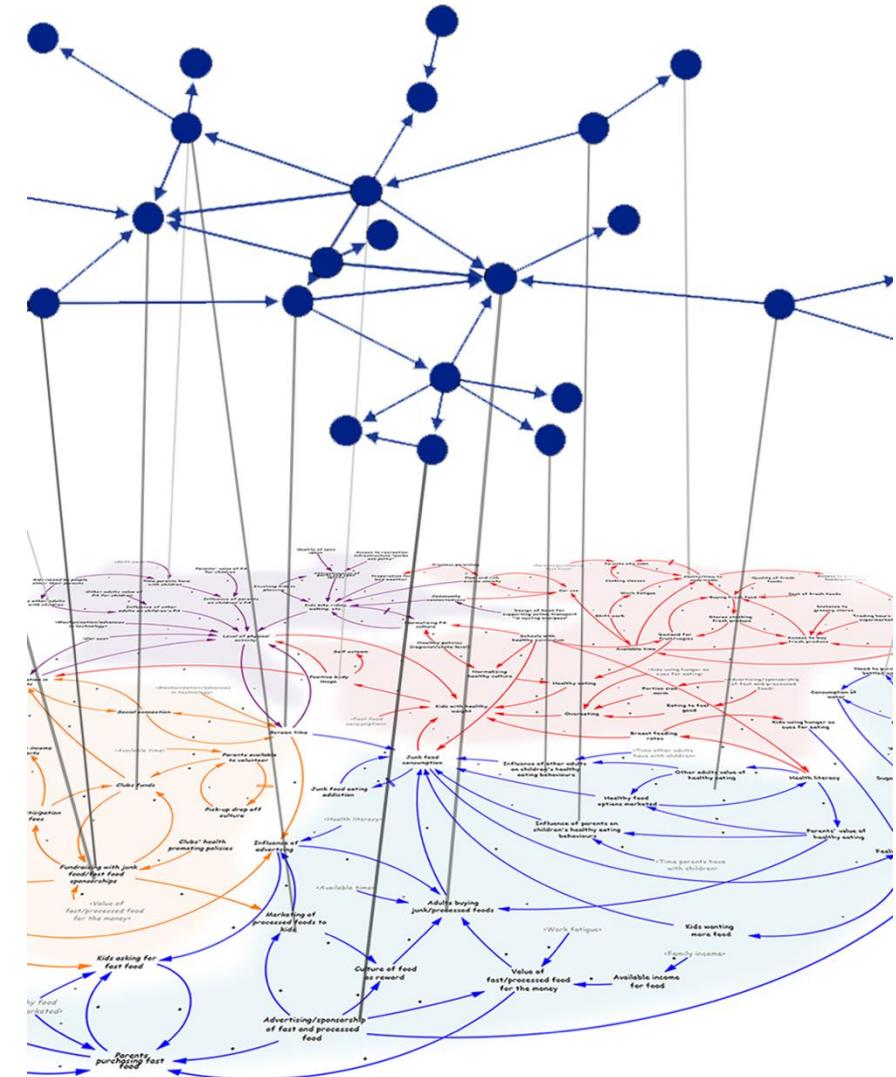
# Human Factors Still Matter

- Why human expertise is still essential
- Designing with generational knowledge in mind
- AI as a *partner* in operations, not a replacement



# Simplicity is Key

- Even complex systems can be made simple with good design and AI
  - Automation doesn't mean complexity – it means clarity
  - What this means for the next generation of technologists

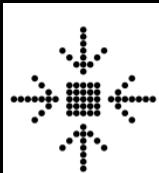




# Simplicity is Key

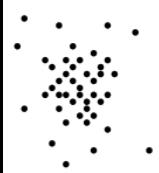
<http://lawsofsimplicity.com/>

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## LAW 1 / REDUCE

The simplest way to achieve simplicity is through thoughtful reduction.



## LAW 2 / ORGANIZE

Organization makes a system of many appear fewer.



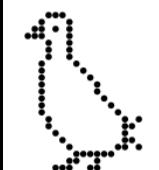
## LAW 3 / TIME

Savings in time feel like simplicity.



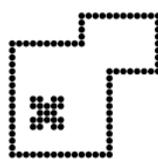
## LAW 4 / LEARN

Knowledge makes everything simpler.



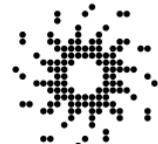
## LAW 5 / DIFFERENCES

Simplicity and complexity need each other.



## LAW 6 / CONTEXT

What lies in the periphery of simplicity is definitely not peripheral.



## LAW 7 / EMOTION

More emotions are better than less.



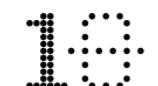
## LAW 8 / TRUST

In simplicity we trust.



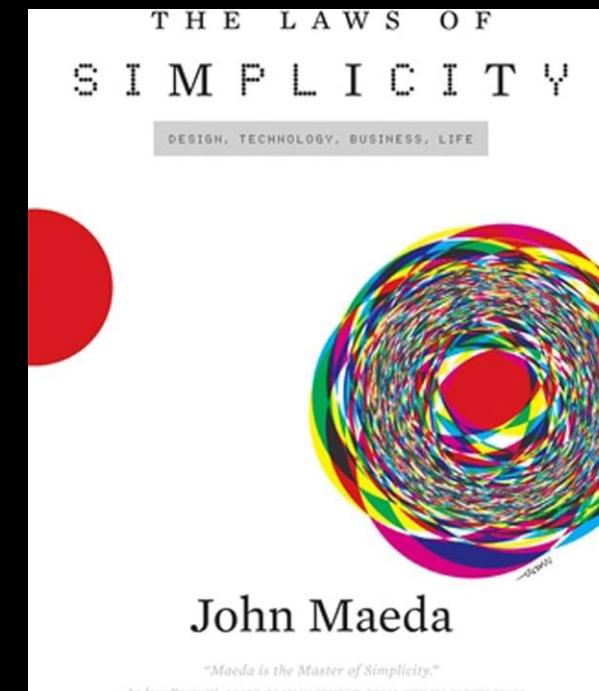
## LAW 9 / FAILURE

Some things can never be made simple.



## LAW 10 / THE ONE

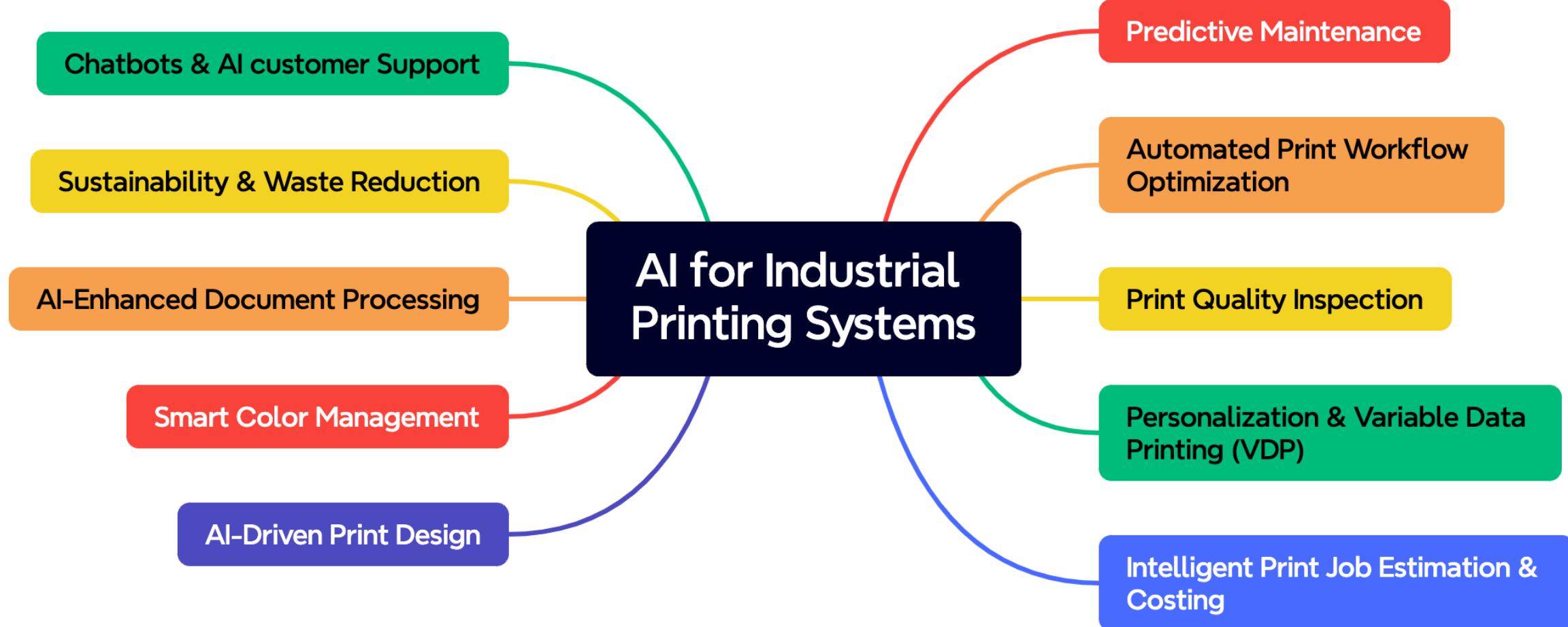
Simplicity is about subtracting the obvious, and adding the meaningful.



John Maeda

"Maeda is the Master of Simplicity."

—Andrea Wagnleitner, BOARD OF MANAGEMENT, ROYAL Philips Electronics





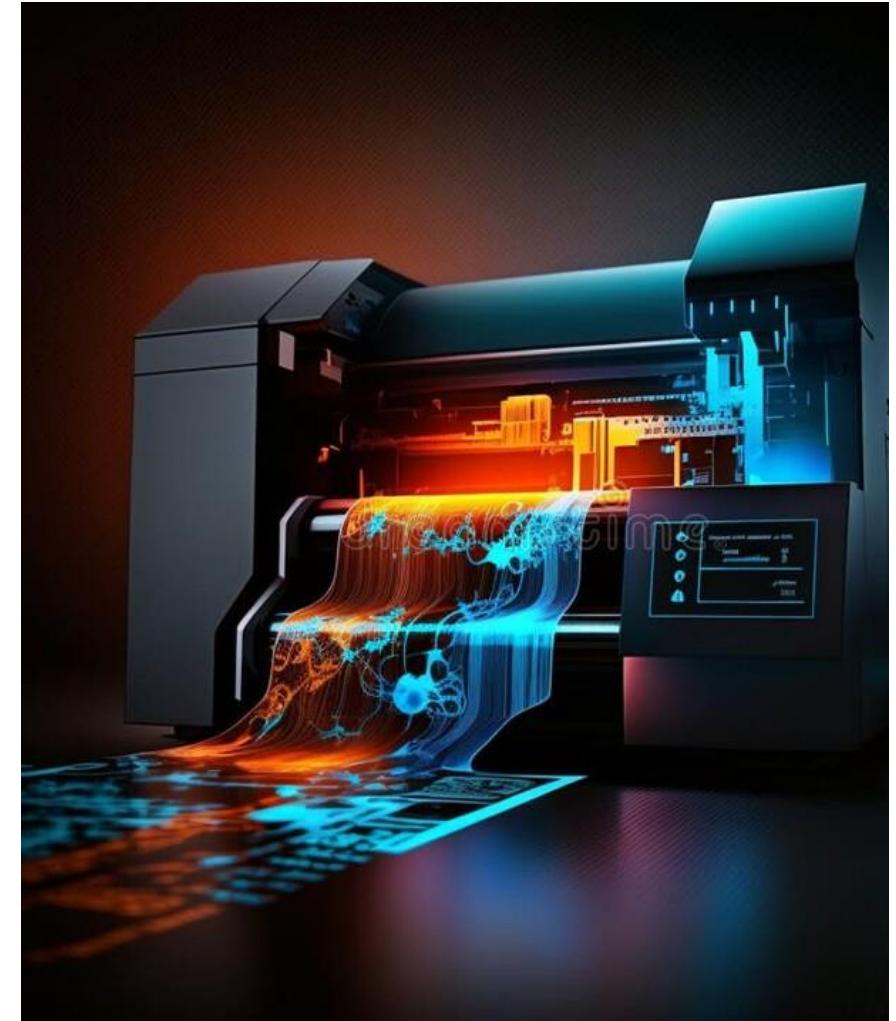
## Why This Matters to You

- AI isn't just for tech giants—**every** industry needs it
- Commercial printing supports **critical** infrastructure, education, commerce
- **Opportunity** for innovation and impact



# ■ Takeaways

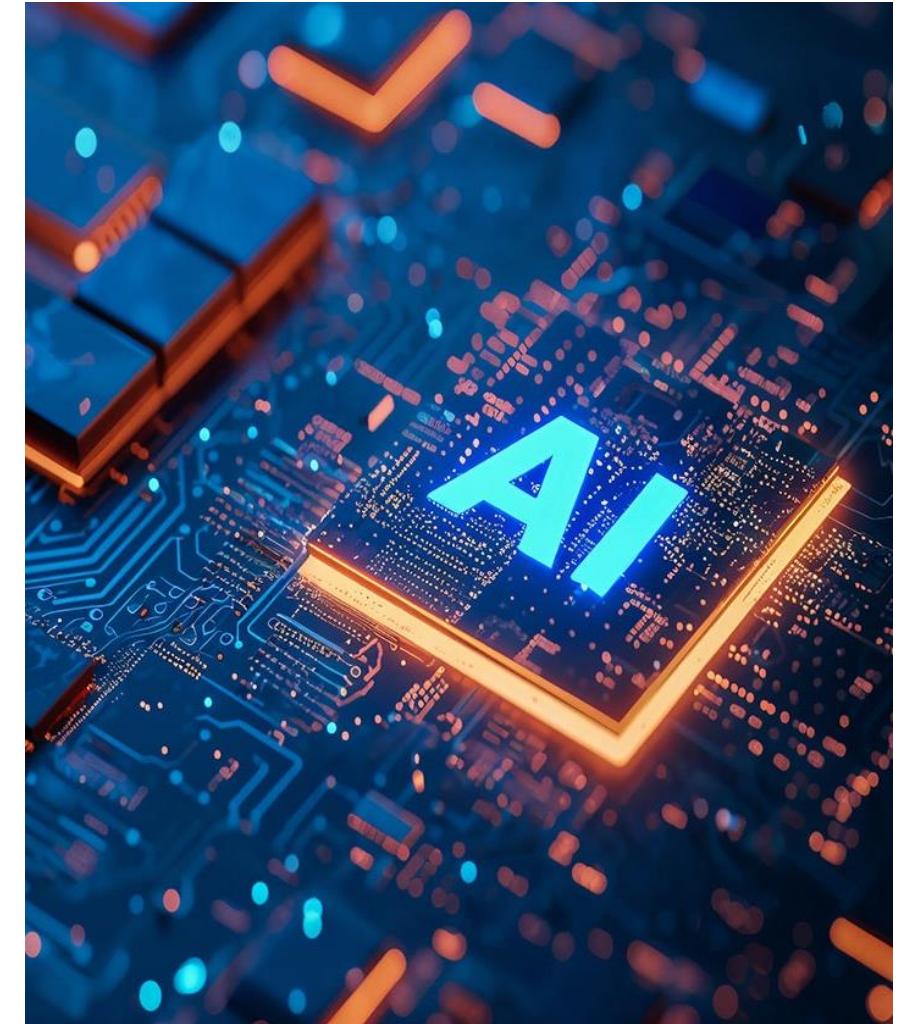
- Digital printing is a **living lab** for AI transformation
- Automation hierarchy (AI) **helps** structure change
- **You** can be part of this revolution





## Q&A

- AI's role in production
- Career paths in industrial AI
- Ethical or human-centered design in automation



# Closing

We are hiring

<https://careers.ricoh-usa.com/>



Slides:

<https://github.com/iportilla/TAGA>

Contact info

<https://www.linkedin.com/in/ivanportilla/>

