

Harnessing the Power of Pattern Matching as a Catalyst for Success

BACON

Crisp Ideas • Sizzling Solutions

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What is the next number in the sequence?

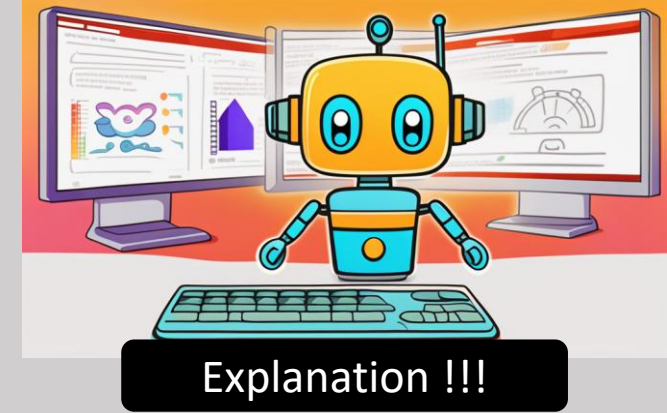
2, 3, 5, 7, 11



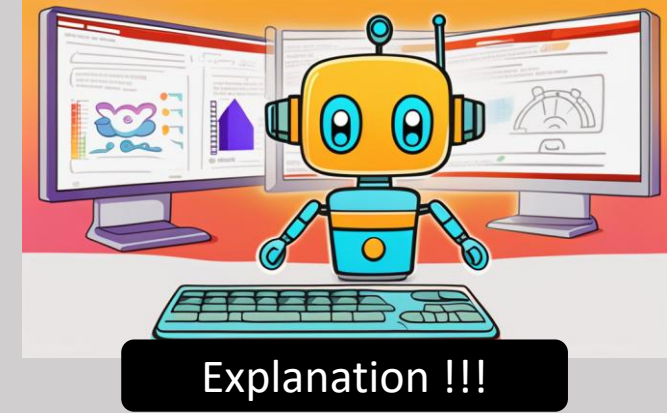
You can shout out answer!!!

What Happened?

- You looked at **the data (2, 3, 5, 7)**.
- You noticed a **recurring structure**: these are all prime numbers.
- You applied that **recognized rule (prime sequence)** to **predict the next element (11)**.



2, 3, 5, 7 11



Why it's pattern matching

- Pattern recognition: identifying a recurring property (all numbers are prime).
- Pattern extension: applying the property to continue the series.
- Pattern generalization: the ability to say “this isn’t just random, **there’s a hidden structure.**”

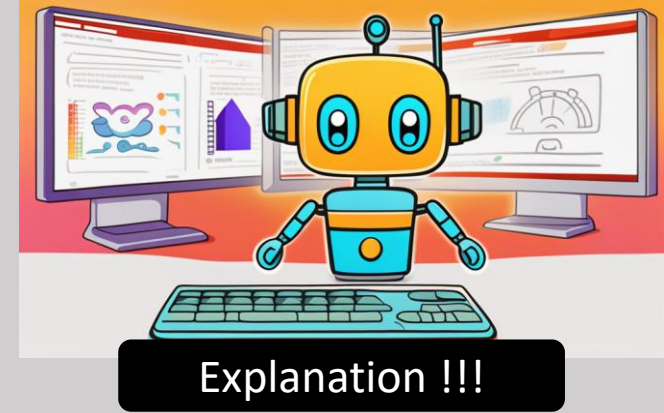
2, 3, 5, 7 11

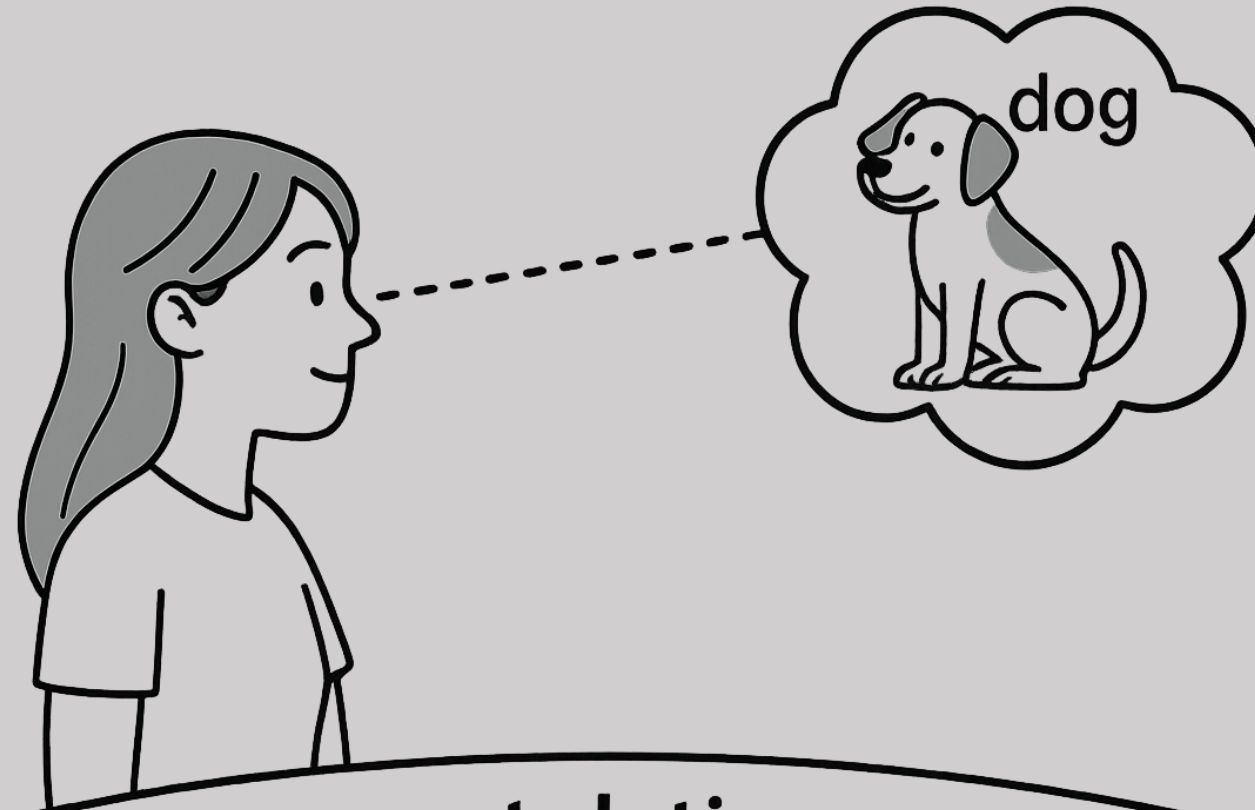




Yes

It's a dog





**Congratulations on
Successful Pattern Matching**



1) Definition of
Pattern
Matching



2) Uses in
Project
Management
Phases



3) PechaKucha
of Examples



4) CPMAI 7
Patterns of AI



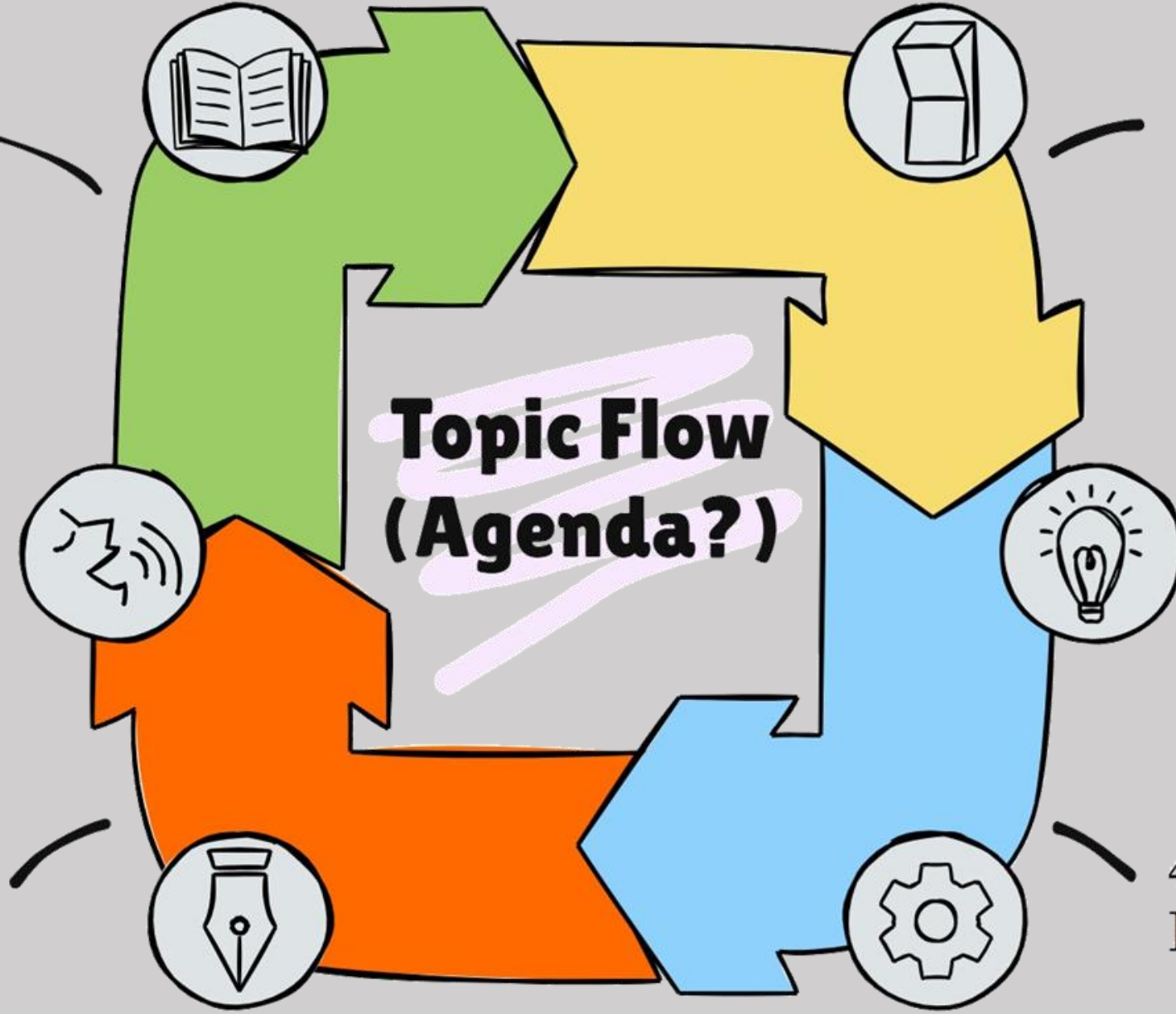
5) A Pattern
Playbook



6) Product
Adoption
Patterns



**Topic Flow
(Agenda?)**



Pattern Matching



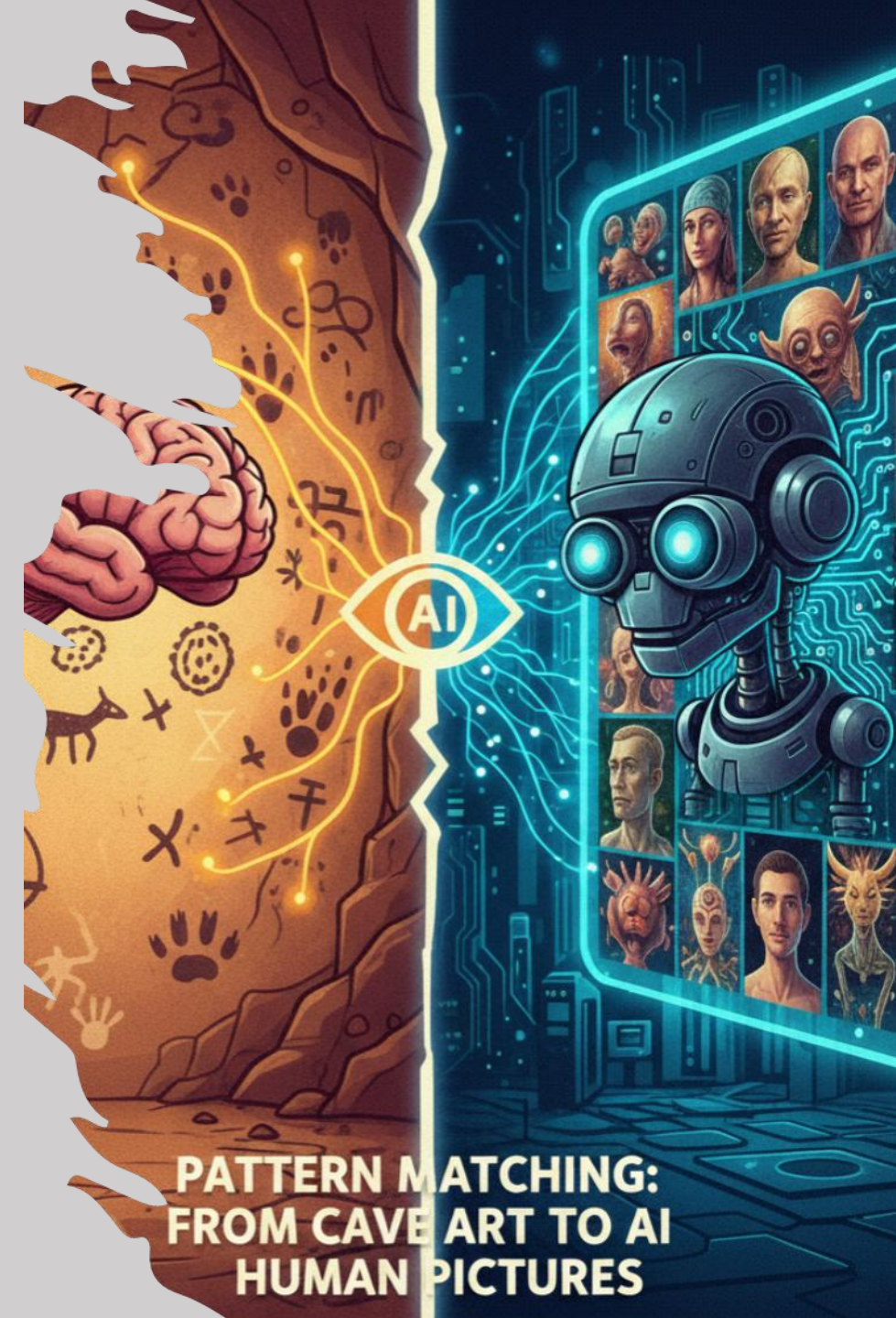
Recognizing recurring signals, structures, or relationships across situations to predict outcomes and choose the next best action.



Understanding the “patterns” helps set realistic scope and benefits, choose the right KPIs and guardrails, and monitor/control delivery based on each pattern’s typical risks and signals.

One of humanity's oldest cognitive survival skills.

- Progression of Human Pattern Matching
 - In ancient times, it was about survival (seasons, predators).
 - In religion and philosophy, it explained meaning.
 - In science, it became the foundation of discovery and classification.
 - In education, it is the foundation of reading, letters, Dolch words, and “Dick and Jane” books.
 - In technology, it evolved into statistics, computing, and now AI.
 - In project management, it is used to define workflows, manage R.A.I.D. items, and predict outcomes.
- **The history of knowledge itself is the history of ever-more-structured pattern matching.**



Determining “Type” of Project



Agentic AI

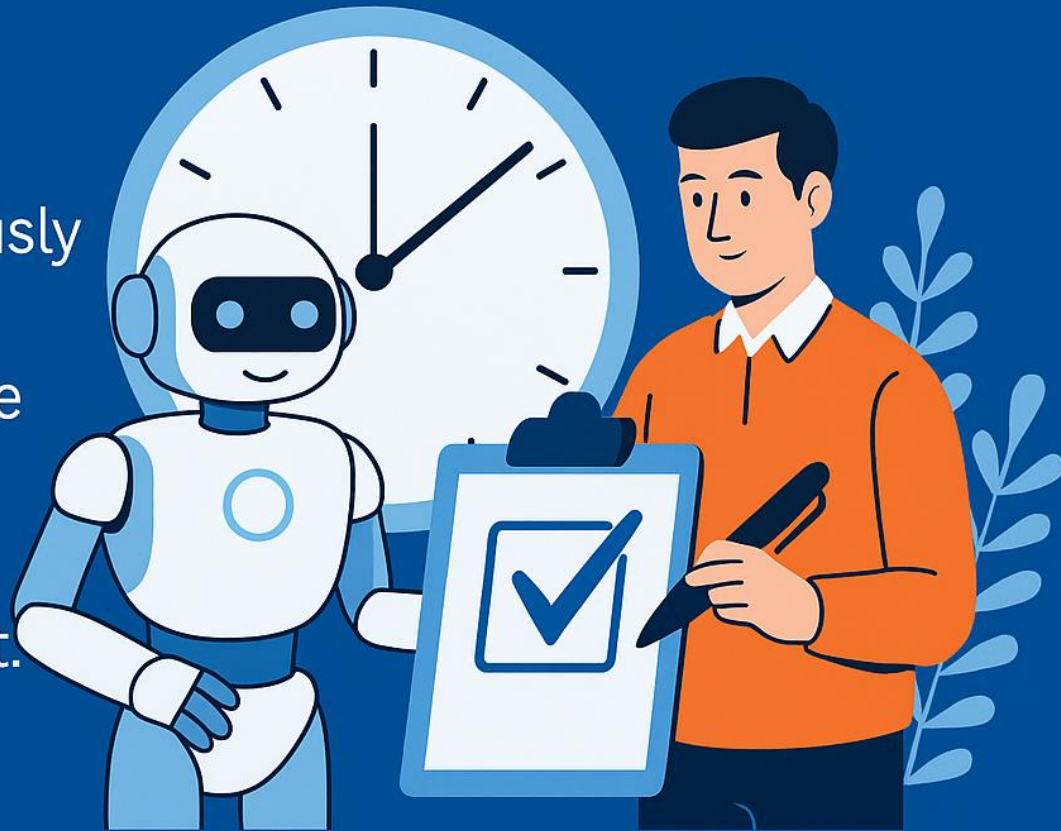
An AI system that proactively takes actions to accomplish a goal based on its own understanding of higher-level objectives, even deciding what to do based on outcomes.

Requires minimal user intervention or guidance.



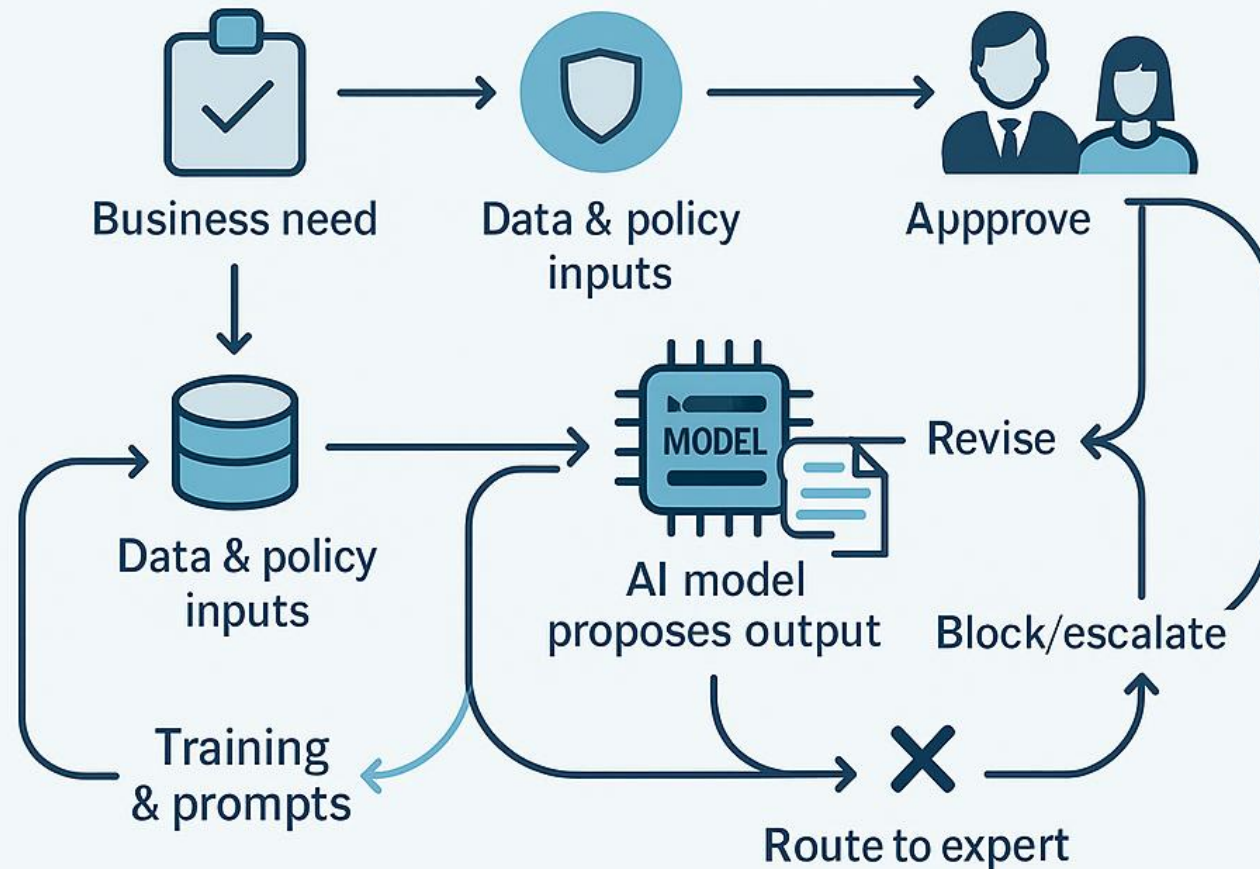
Agentic AI

Agentic AI refers to systems designed to operate autonomously to achieve specified goals or tasks. These systems can initiate actions on their own and proactively engage in tasks without continuous human input.



create a graphic that has text to explain Agentic AI to an AI Literacy Acumen presentation for a PMI session and a visual to illustrate the concepts

Human in the Loop (HITL)



HITL = Humans set goals, review and approve high-risk outputs, and feed improvements back to the system.

WHEN HITL REQUIRED:

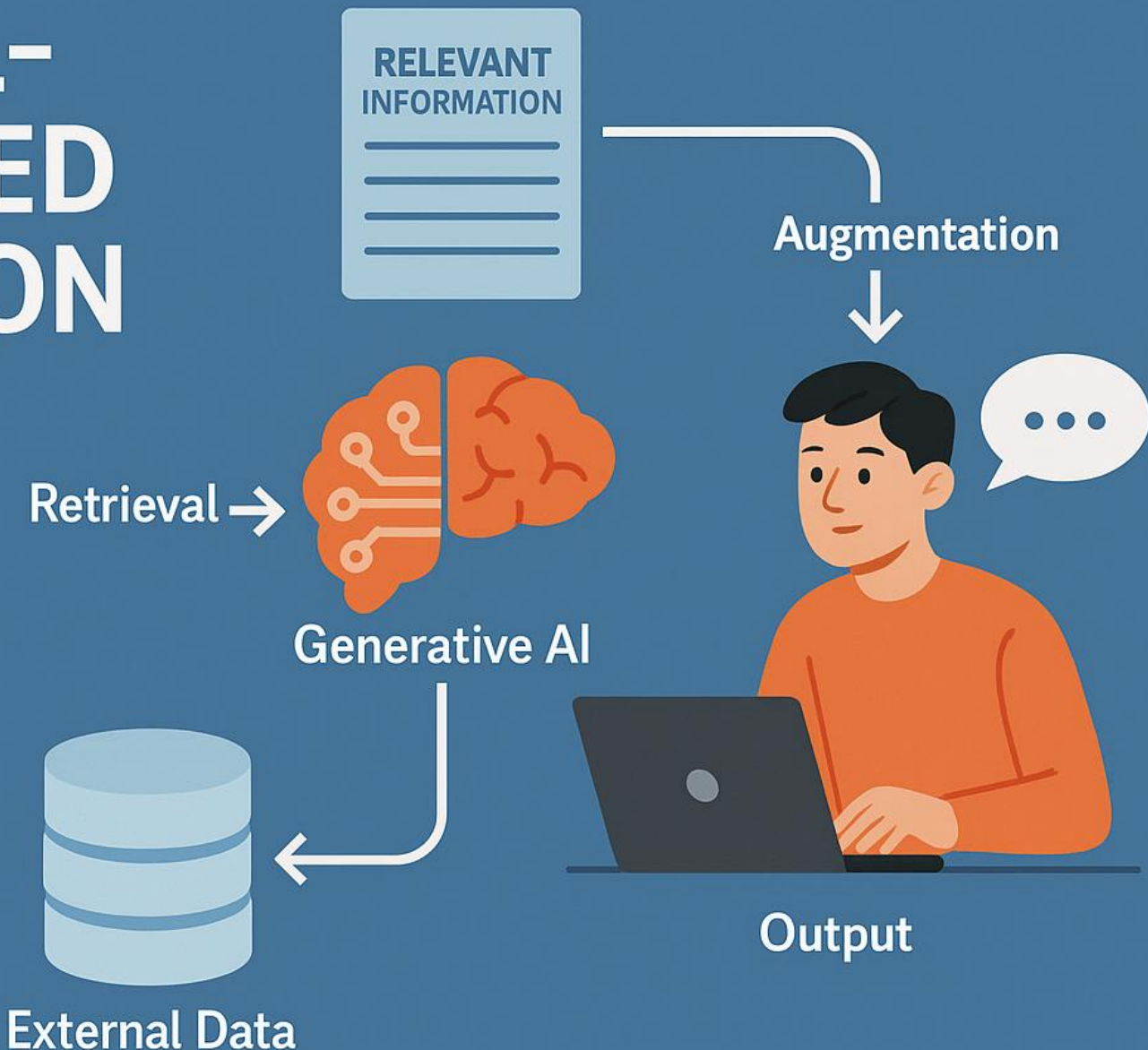
- High-impact decisions
- Regulated content
- Sensitive data
- External publication

CHECKLIST:

- Define RACI for review
- SLAs; evidence logging
- Sampling rate by risk tier
 - 100% critical
 - 20% medium
 - 0-5% low
- Metrics (factuality, quality, CSAT, turnaround time)

RETRIEVAL-AUGMENTED GENERATION

A technique in which a generative AI model retrieves information from external sources to augment its knowledge, producing more accurate and contextually relevant outputs.



Cybersecurity in an AI World

Cybersecurity in an AI world involves protecting AI systems and data from threats, attacks, and unauthorized access, ensuring resilience and trustworthiness.



SECURITY TESTING PRACTICES FOR PROJECT PLANNING



**ADVERSARIAL
TESTING**



**RED
TEAMING**



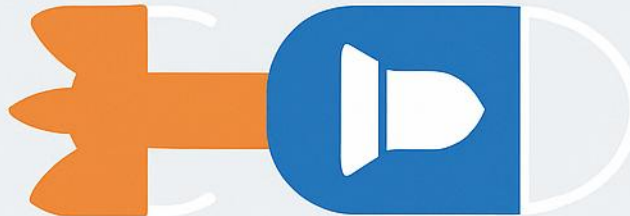
**ALGORITHMIC
BIAS & FAIRNESS
AUDITING**



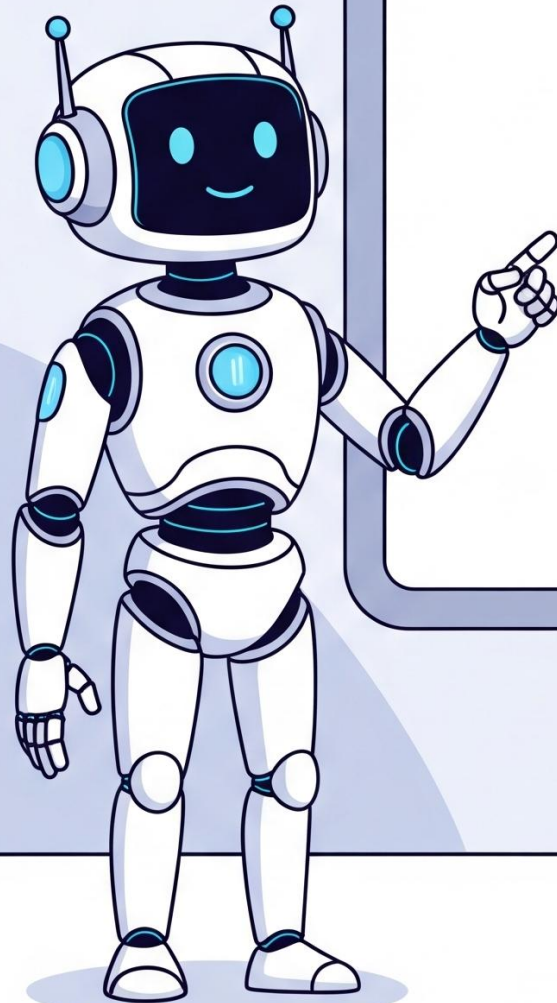
**EXPLAINABILITY
(XAI) FOR
SECURITY**



**MODEL
RESILIENCE
EVALUATION**







The 7 Patterns of AI:

1. Hyperpersonalization
2. Autonomous Systems
3. Predictive Analytics and Decision Support
4. Conversational / Human Interaction
5. Pattern and Anomaly Detection
6. Recognition
7. Goal-Driven Systems

PechaKucha

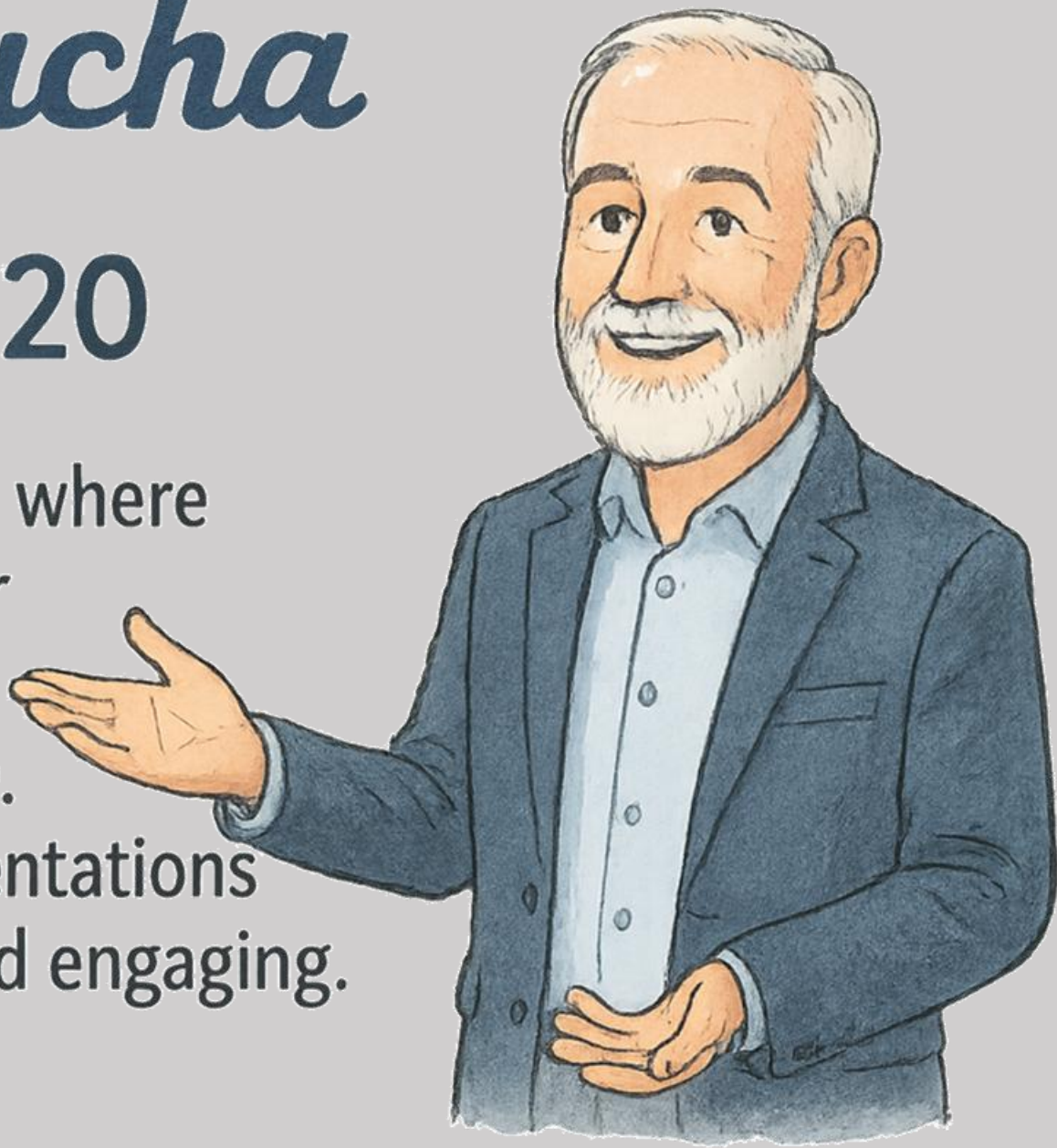


20



20

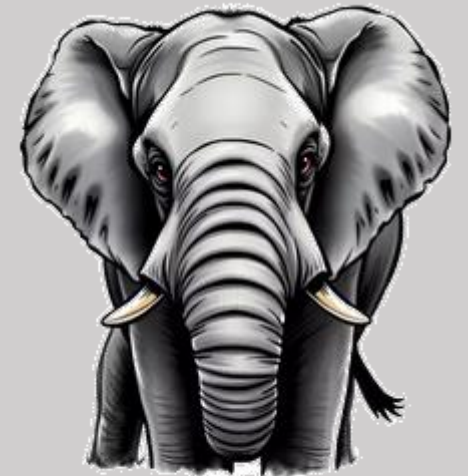
A presentation format where
20 slides are shown for
20 seconds each (total
6 minutes, 40 seconds).
Designed to keep presentations
concise, fast-paced, and engaging.



Pattern Matching has always Been Part of Fun and Learning

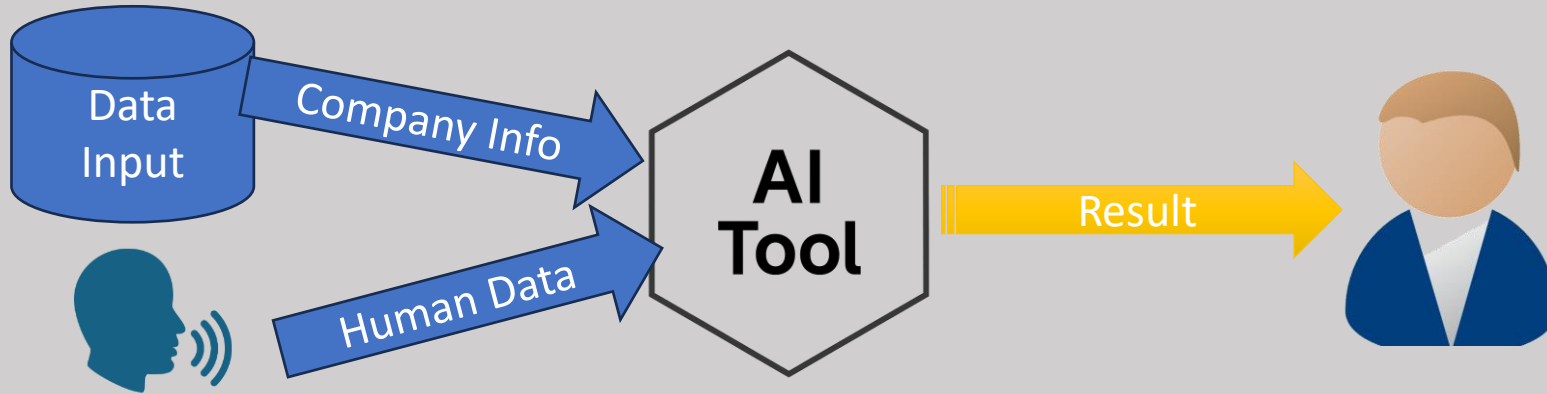


What Do These Have in Common?



Trunks

Hyperpersonalization



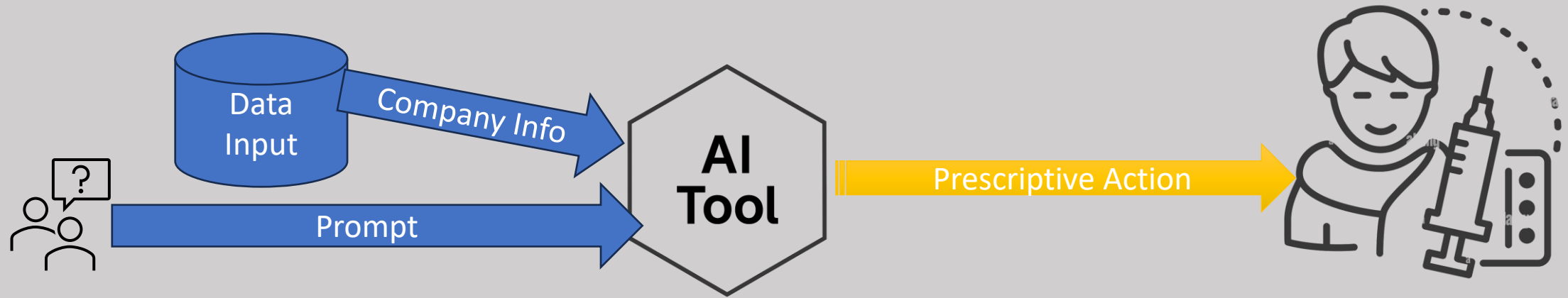
An online bot in an educational setting that greets a student by their preferred name and formulates the questions based on the student's major, home city, extra-curricular activities, age, and current grade level.

Autonomous Systems



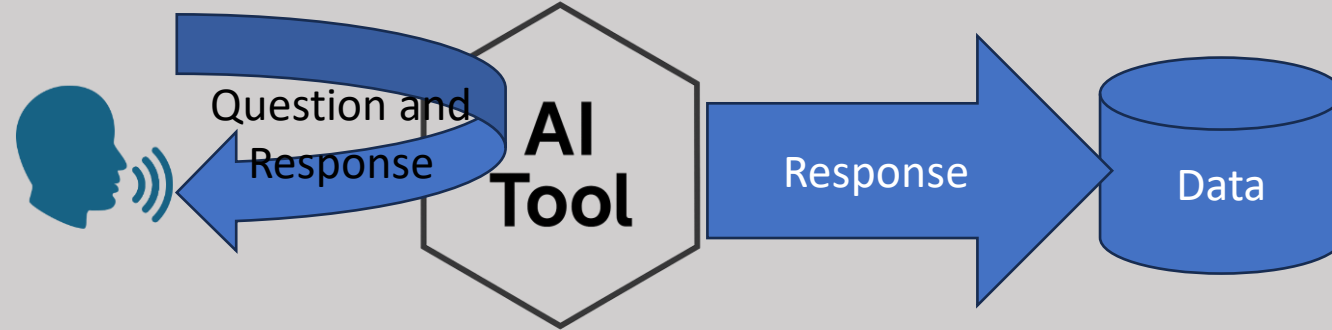
An application that programs an autonomous farm implement to cut stalks down to create a corn maze that looks like a scarecrow from above. It stops when an animal is detected and sounds a horn.

Predictive Analytics & Decision Support



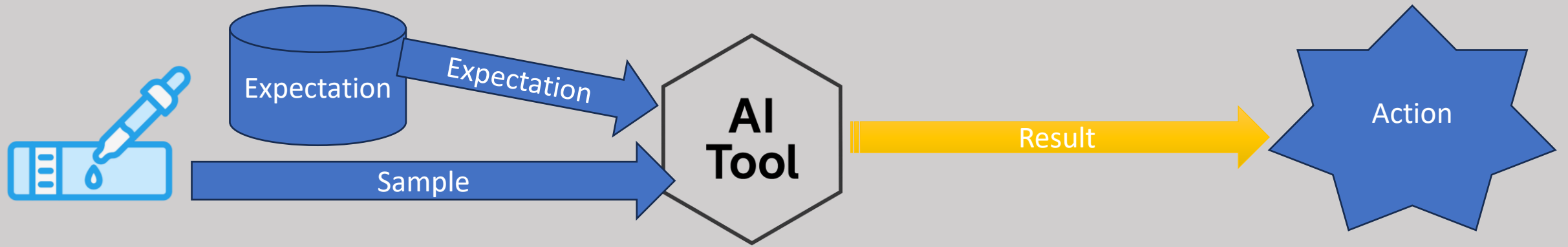
A medical device that monitors enzymes in a patient kidneys to determine how fast an IV drip should be and adjusts the drip to deliver that amount.

Conversational / Human Interaction



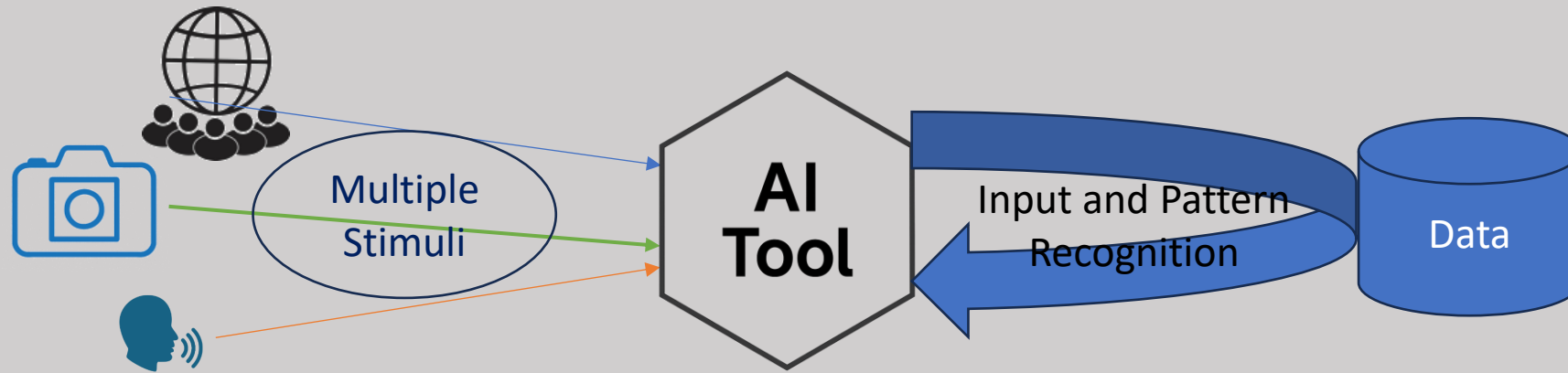
A customer service Agentic AI developing a travel itinerary with a customer taking a cruise to Alaska and discussing what the customer wants to see on ships port stops. Asks customer questions and drills down for more details.

Pattern & Anomaly Detection



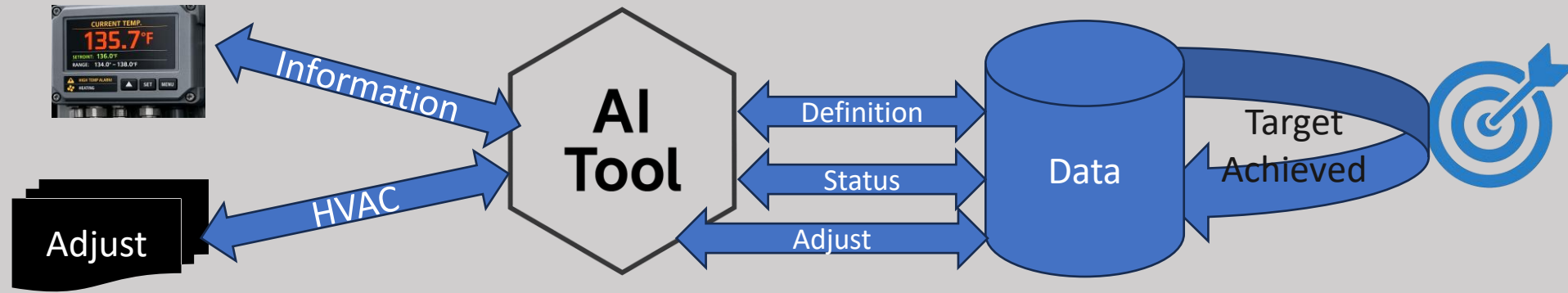
A doctor is using a new drug with a patient for treatment of a disease that involves detecting cancerous cells. The AI compares patient cell sample with “healthy” cells and detects a problem with cell structure.

Recognition



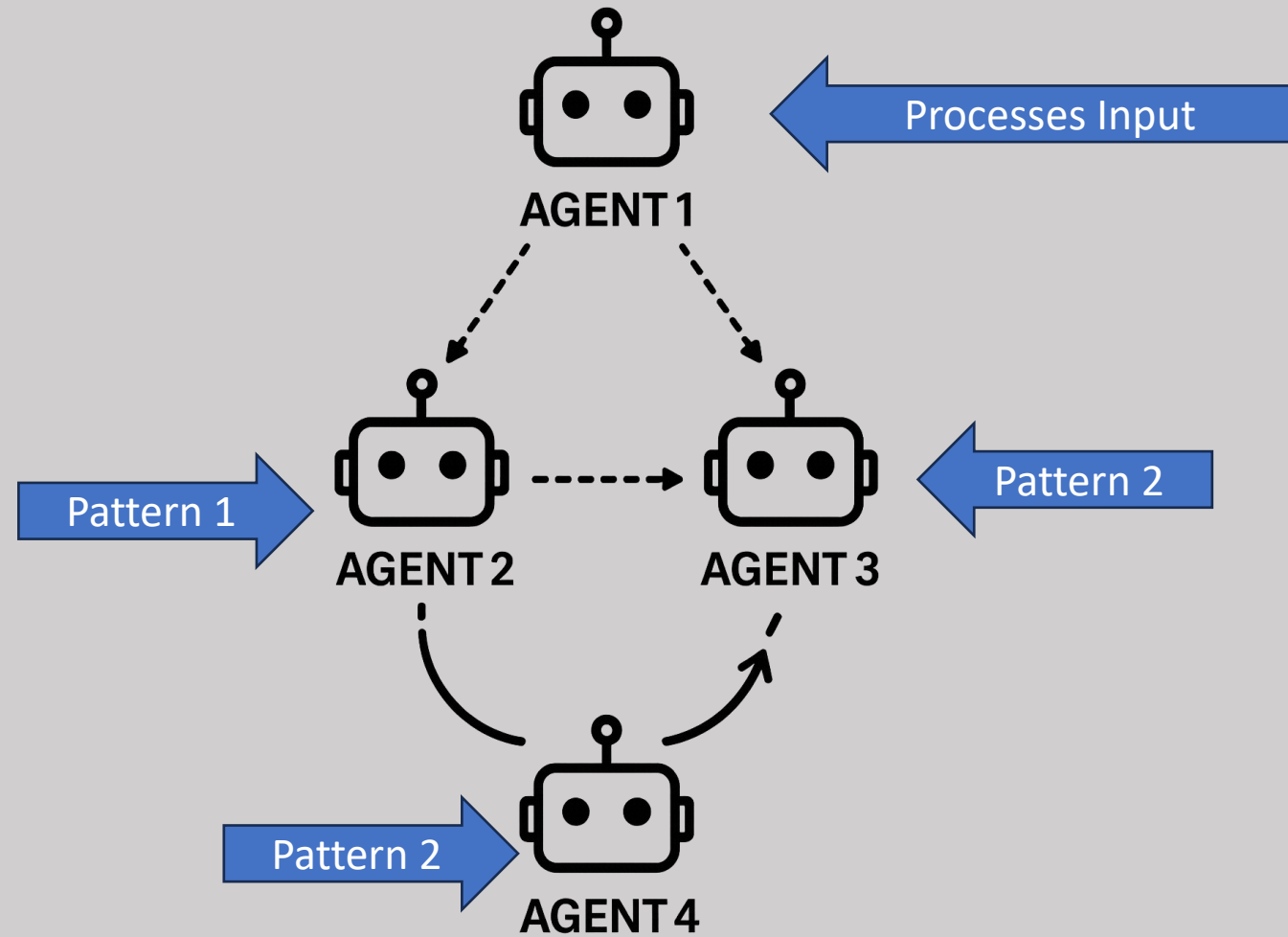
An internal audit team at a financial firm uses AI to scan emails, chats, calls, and video, recognizing sensitive terms and behaviors, then flags unusual patterns.

Goal-Driven Systems



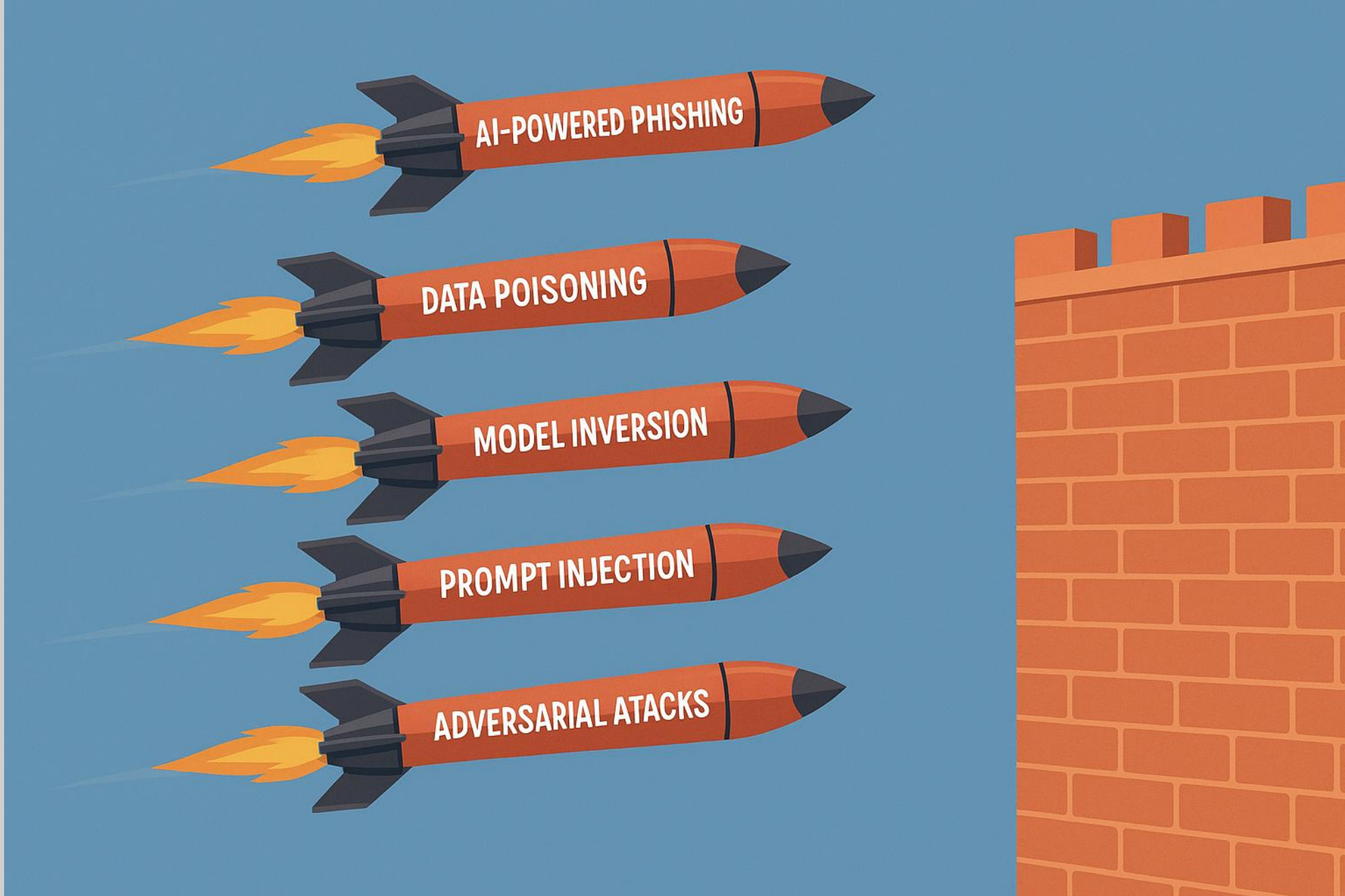
For a temperature-controlled drug manufacturing environment. Maintain temperature in each zone within a target band while minimizing cost and staying within safety/comfort constraints.

Multi-agent AI architecture





Anomaly Detection is a
Significant Pattern in Security



Chatgpt prompt: Make a graphic with a security firewall across the back and each of the threats in a missile that is being launched against the firewall - make sure each of the missiles is labeled with one of the security threats

Interesting Work on Evolving AI



**University
of Dayton**

Anomaly Detection Using Deep Learning Models

Zhongmei Yao

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Associate Professor of Computer Science

Research Director for the Center of Cybersecurity and Data Intelligence

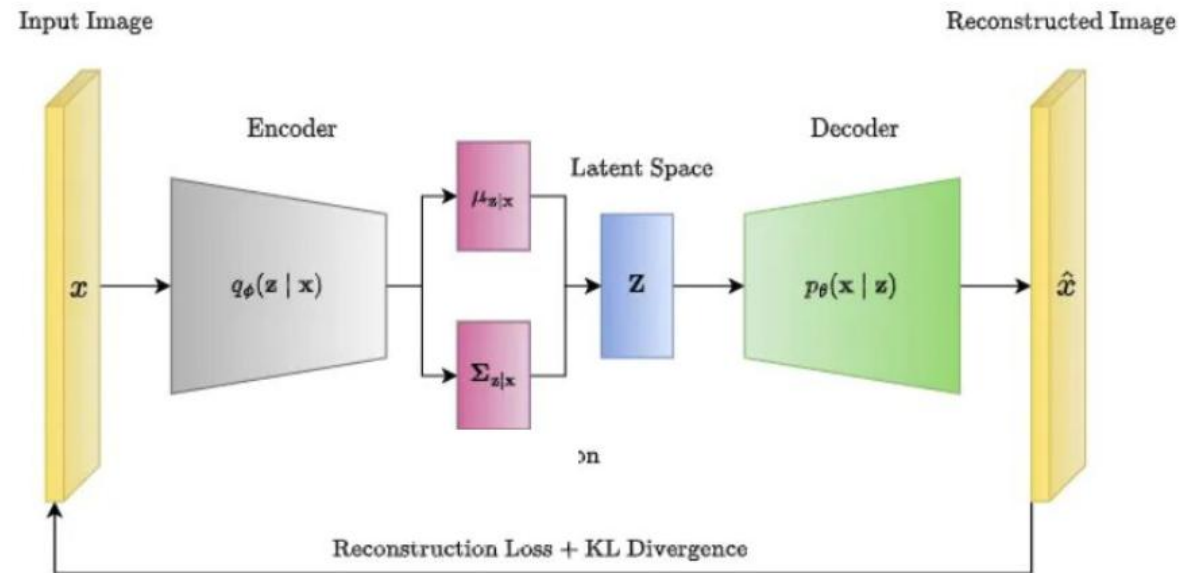
University of Dayton

Ohio Information Security Conference 2025

There are Tools to Help

What is a Variational Autoencoder (VAE)?

- **Encoder:** The encoder in a Variational Autoencoder (VAE) converts a data sample x into its latent representation z , denoted as $q(z | x)$. This is necessary because the true data distribution $p(x)$ is unknown.
- **Decoder:** The decoder's job is to transform the latent variable z back into the original space, attempting to recreate the original sample x as accurately as possible, resulting in a reconstructed sample.

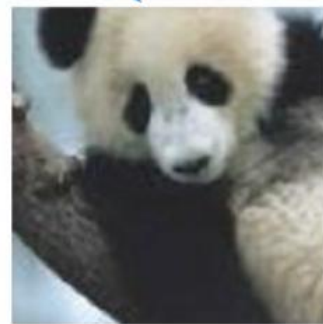


What are Adversarial Examples

- **Adversarial examples** are malicious inputs purposely designed to fool a machine learning model

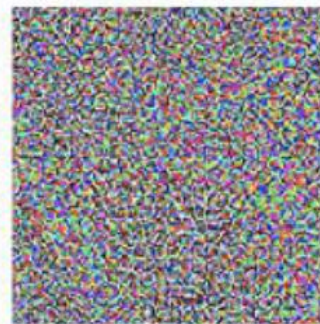
- Two images of a panda that are indistinguishable to the human's eye:

The image on the left is one of the clean images in ImageNet dataset, used to train the GoogLeNet model



"panda"
57.7% confidence

+ ϵ



=



"gibbon"
99.3% confidence

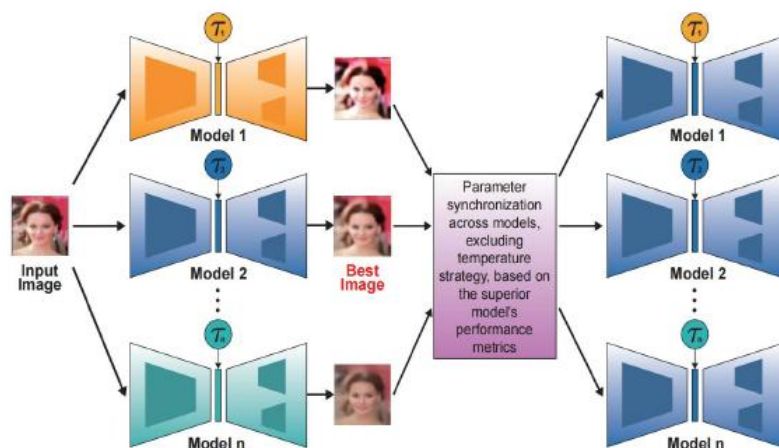
The one on the right is a slight modification of the first, created by adding the noise vector in the central image

The noise added to the first image is not random but the output of a careful optimization by the attacker

GoogLeNet: "Going Deeper with Convolutions" at <https://arxiv.org/pdf/1409.4842.pdf>

There is A Lot of Advanced Math

Our work



Algorithm 3 Temperature Adjustment Per Training Epoch

Require: Loss L_i of Model M_i for $i = 1, \dots, n$, Loss L_{best} of Model M_{best} , Learning Rate lr , Maximum Temperature τ_{max} , Minimum Temperature τ_{min} , Patience Threshold p_{thresh}

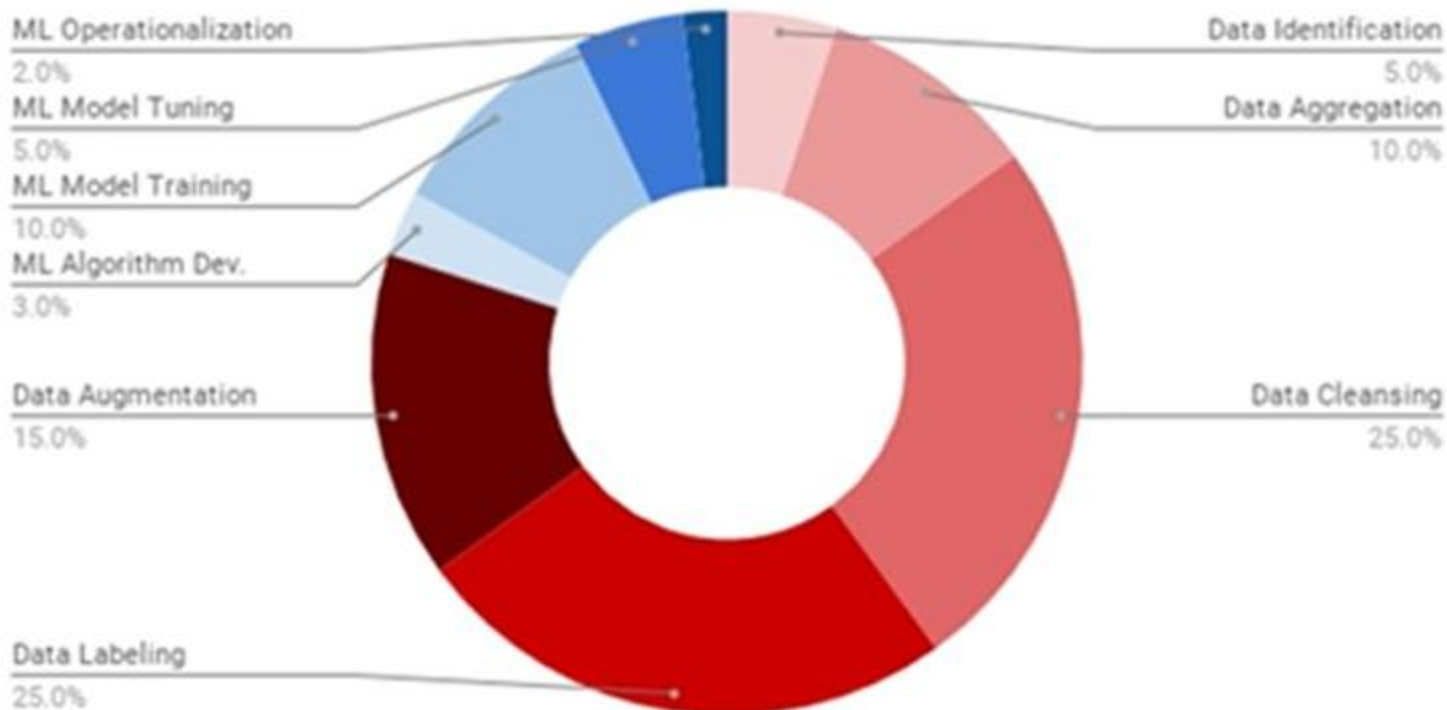
- 1: At epoch $t = 0$, initialize patience counter p_{counter_i} for each M_i
- 2: **for** $i = 1$ **to** n **do**
- 3: **if** $L_i > L_{\text{best}}$ **then**
- 4: Increment patience counter: $p_{\text{counter}_i}^{t+1} = p_{\text{counter}_i}^t + 1$
- 5: **if** $p_{\text{counter}_i}^{t+1} \geq p_{\text{thresh}}$ **then**
- 6: Adjust temperature: $\Delta\tau_i = lr \cdot (L_i - L_{\text{best}})$
- 7: Update τ_i for M_i : $\tau_i^{t+1} = \tau_i^t + \Delta\tau_i$
- 8: **end if**
- 9: **else**
- 10: Reset patience counter: $p_{\text{counter}_i}^{t+1} = 0$
- 11: **end if**
- 12: Ensure within bounds: $\tau_i^{t+1} = \max(\tau_{\text{min}}, \min(\tau_i^{t+1}, \tau_{\text{max}}))$
- 13: **end for**

Balancing exploration and exploitation in machine learning: When sub-model's performance is very close to the best sub-model's performance, it is beneficial to make a small temperature change and hence strengthen the model's exploitation ability. Conversely, the model may take significant temperature changes, leading to more exploration to find better solutions. This also helps this sub-model escape from local optima that may be caused by a fixed strategy given in Algorithm 2.

80% of AI Projects are Data Engineering

Percentage of Time Allocated to Machine Learning Project Tasks

Source: Cognilytica



Traditional Project Approaches Don't Work Well for AI

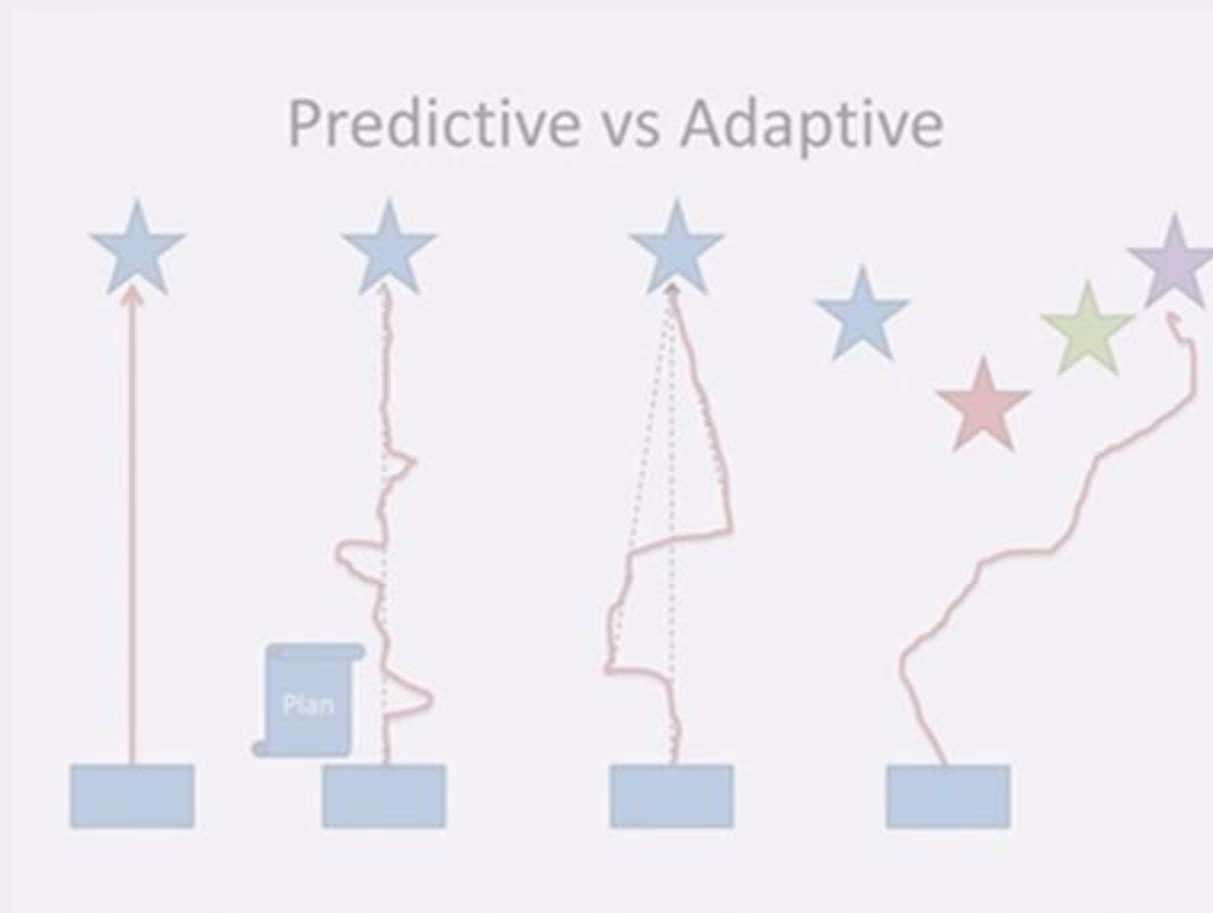
Predictive approaches are too rigid, slow, and risky.

- **Challenges:** Hard to predict obstacles and adapt to changes.

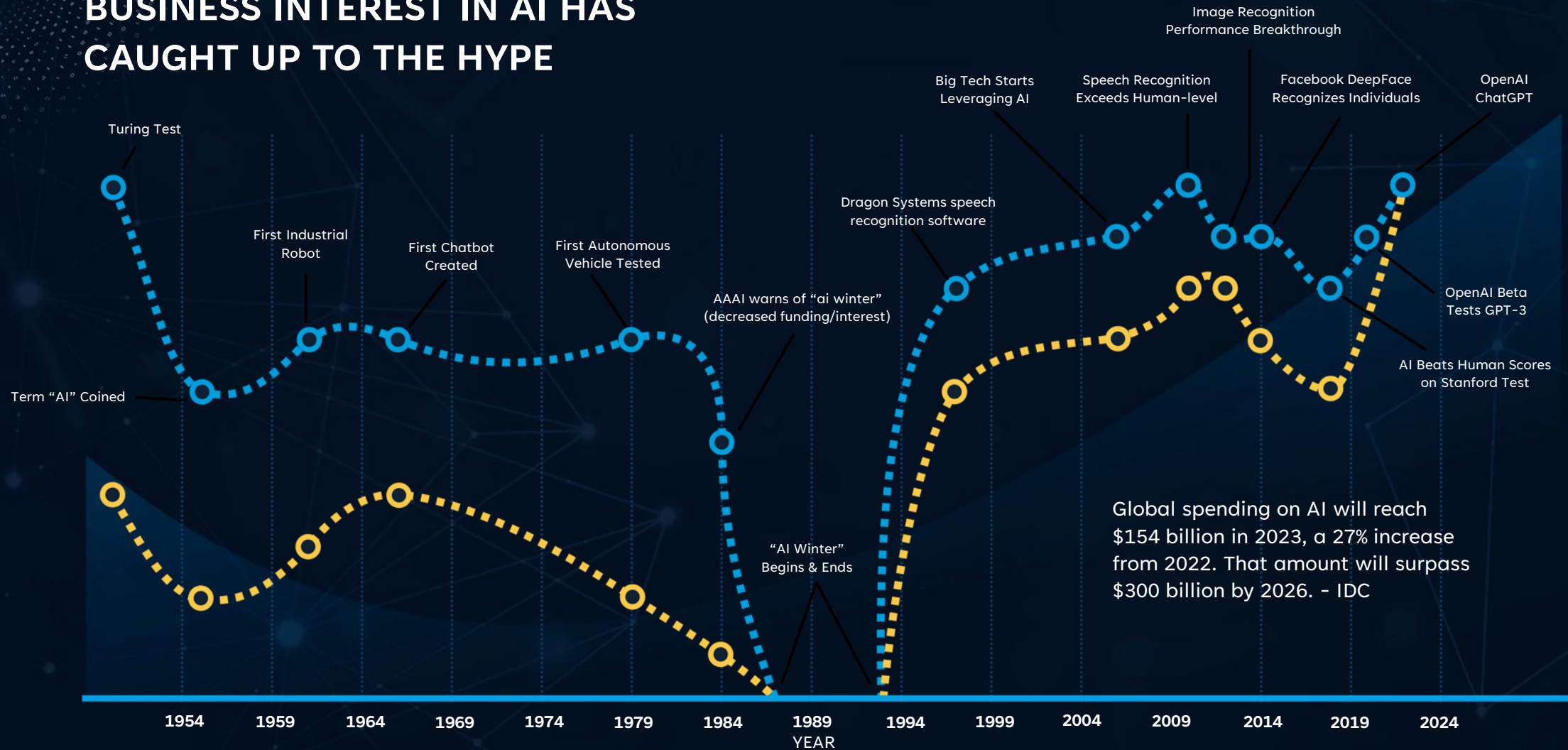
Agile approaches need tweaks to allow continuous learning and fast iteration.

- **Benefits:** Faster value delivery, flexibility to re-prioritize.

- **Key challenge:** Balancing continuous model updates with deployment.



BUSINESS INTEREST IN AI HAS CAUGHT UP TO THE HYPE



● TECHNOLOGY INTEREST
● BUSINESS INTEREST



A Distinguished Business Analyst maximizes the use of Pattern Matching for all aspects of delivering Outcomes and Capabilities.

Is PechaKucha an
example of Pattern Matching ???



Pattern Matching and PechaKucha

Aspect	Pattern matching?	Example in PechaKucha	Closest CPMAI analog	Why it's not that AI pattern
Temporal rhythm	✅ Yes	20 slides × 20 seconds cadence	Predictive Analytics (weak analogy)	No data-driven model; timing is fixed, not predicted.
Structural repetition	✅ Yes	Same slide structure, minimal text + strong visual	Pattern & Anomaly Detection (weak analogy)	No algorithmic detection; structure is pre-imposed.
Visual cue association	✅ Yes	Repeated imagery to anchor themes	Recognition (weak analogy)	Human perception, not machine classification.
Expectation & prediction	✅ Yes	Audience anticipates slide change every 20s	Predictive Analytics (weak analogy)	Audience “predicts” by format rules, not learned signals.
Conversational interaction	❌ No	One-way presentation	Conversational/Human Interaction	No dialog system or intent handling.
Autonomy/agents	❌ No	Presenter controls flow	Autonomous Systems	No autonomous behavior or control loops.
Data-driven inference	❌ No	Content isn't inferred from data in real time	Predictive/Decision Support	No model, no inference pipeline.
Anomaly handling	⚠️ Maybe (human)	A sudden long slide breaks rhythm and is noticed	Pattern & Anomaly Detection (weak analogy)	Detection is by audience cognition, not AI.
Personalization	❌ No	Same deck for all viewers	Hyperpersonalization	No per-viewer adaptive content.

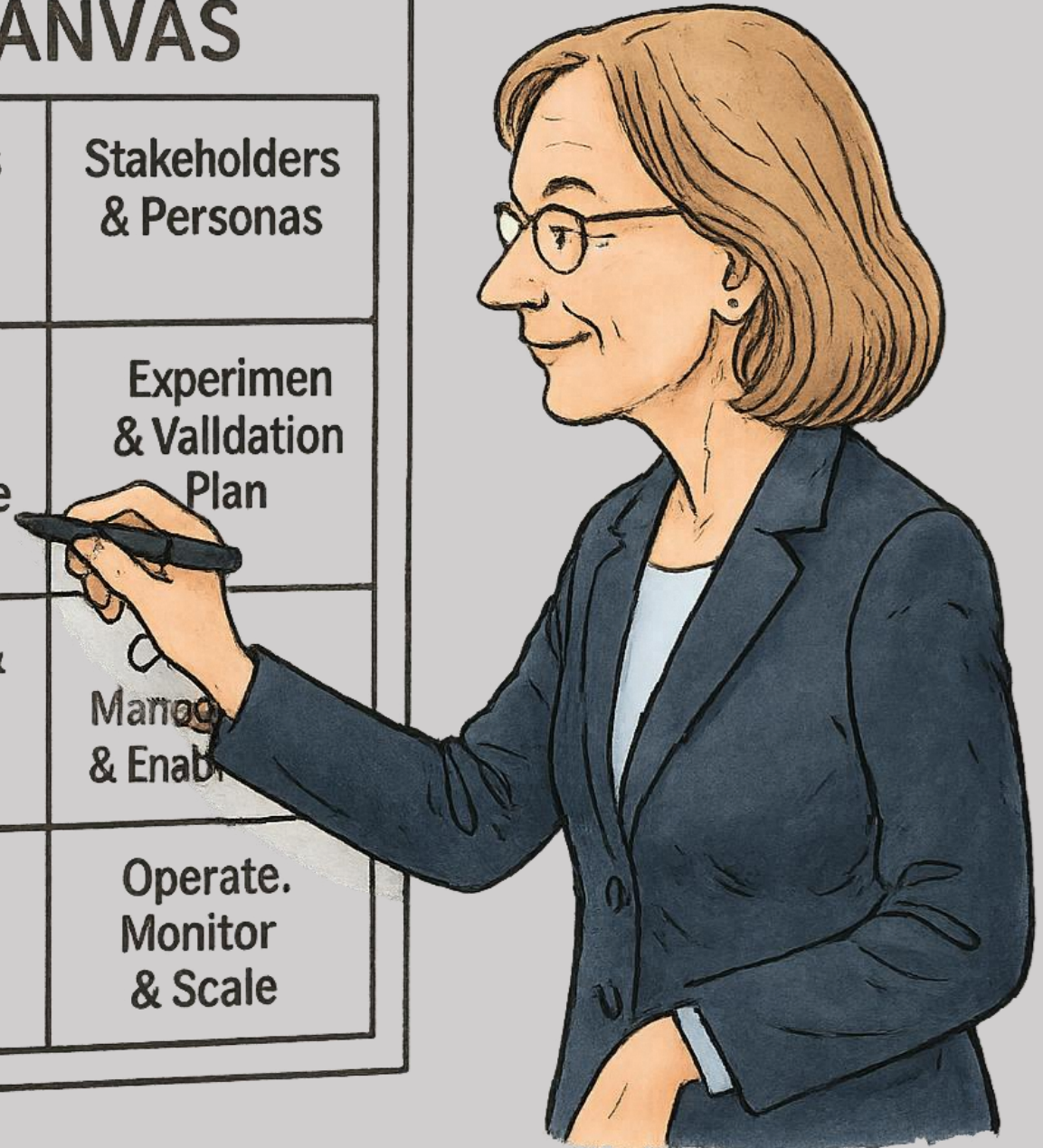
7 AI Patterns



AI Pattern	Definition	Example Use Cases	When to Apply (PM Guidance)
Hyperpersonalization	Tailoring outputs to individuals using evolving personal data	Product recommendations, personalized medicine	When user-specific insights or 1:1 experiences are critical
Autonomous Systems	AI acts independently to achieve goals or complete tasks	Autonomous vehicles, bots, auto-documentation	When reducing human effort or increasing automation is a key objective
Predictive Analytics & Decision Support	Forecasting outcomes and supporting decision-making with data	Demand forecasting, predictive pricing	When anticipating risks, trends, or outcomes adds value to decisions
Conversational / Human Interaction	Human-like interaction through voice, text, and visual content	Chatbots, virtual assistants, machine translation	When seamless user communication or content generation is needed
Pattern & Anomaly Detection	Spotting trends or irregularities in data	Fraud detection, error monitoring	When identifying unexpected behaviors or ensuring quality/control
Recognition	Identifying elements in unstructured data like images, audio, or handwriting	Facial recognition, image tagging	When interpreting visual/audio/textual inputs is essential
Goal-Driven Systems	Learning via trial-and-error to find optimal paths	Game AI, simulations, resource optimization	When exploring many solutions or adapting behavior over time is required

PATTERN CANVAS

Problem /Opportunity	Outcomes & Value (KPIs)	Stakeholders & Personas
Data Inventory & Readiness	Success Metrics & Acceptance Criteria	Experiment & Validation Plan
Risks, Bias & Ethics	Process & Integration Points	Manage & Enable
Change Management & Enablement	Operate, Monitor & Scale	Operate, Monitor & Scale



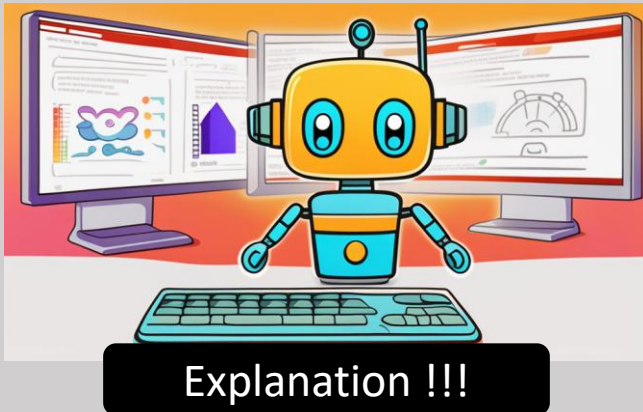
Pattern Canvas

One-page template to spot, stack, and govern patterns in projects

1) Problem & Outcome	2) Patterns in Play (CPMAI)	3) Value Drivers & KPIs	4) Stakeholders & Behaviors
5) Data & Readiness	6) Flow & Touchpoints	7) Risks & Assumptions (by Pattern)	8) Governance & Artifacts
9) Capacity & Dependencies	10) Experiment / Increment Plan	11) Ethics & Responsible AI	12) Next Decisions & Owners

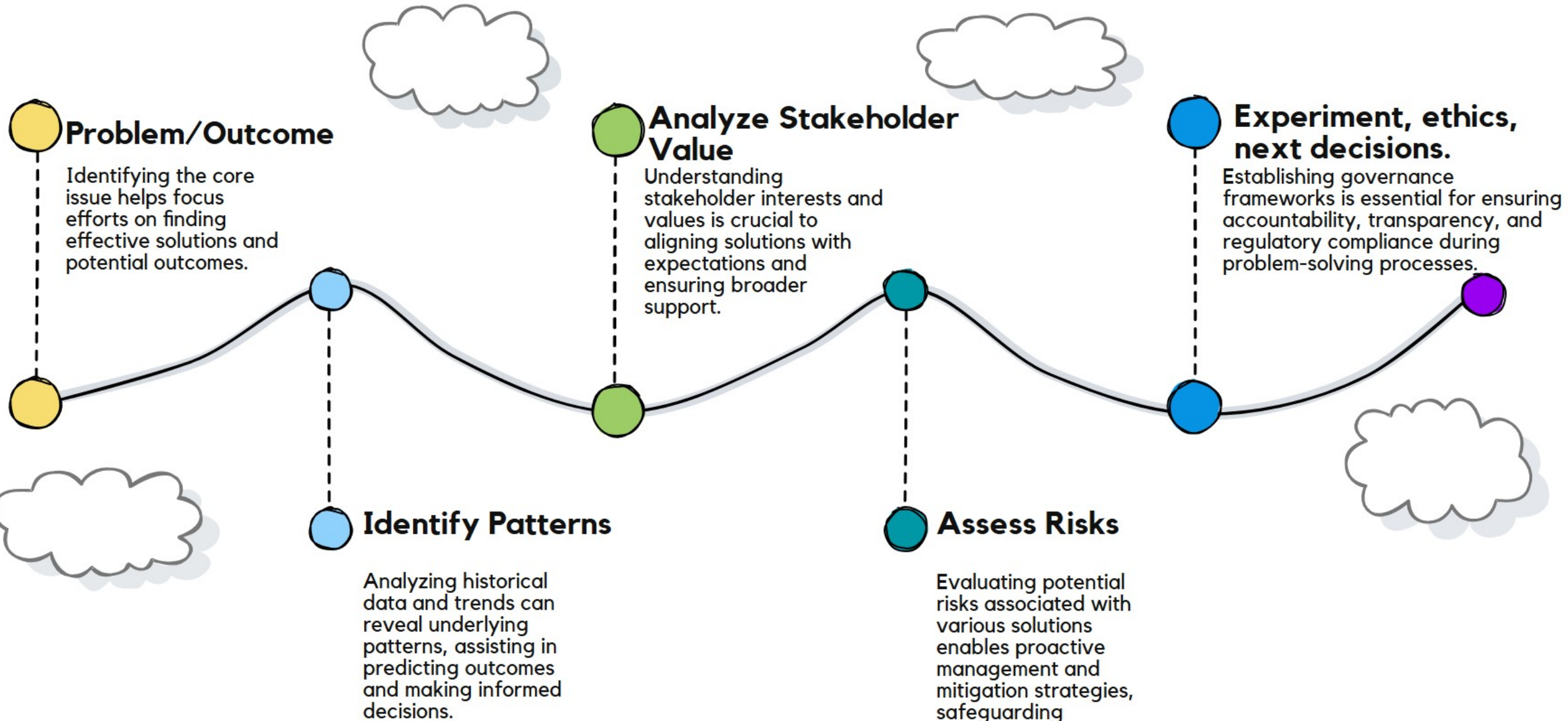
The Box Names

- 1) Problem & Outcome
- 2) Patterns in Play (CPMAI)
- 3) Value Drivers & KPIs
- 4) Stakeholders & Behaviors
- 5) Data & Readiness
- 6) Flow & Touchpoints
- 7) Risks & Assumptions (by Pattern)
- 8) Governance & Artifacts
- 9) Capacity & Dependencies
- 10) Experiment / Increment Plan
- 11) Ethics & Responsible AI
- 12) Next Decisions & Owners (DACI/RACI)



Problem Solving Facilitation

Sequence for Mapping Pattern Actions



Pattern Canvas — Filled Example (AI-enabled IT Service Desk Triage)

Pattern Canvas — Filled Example

Scenario: AI-enabled IT service desk triage with conversational intake

1) Problem & Outcome High volume IT requests; slow triage. Outcome: reduce mean time to resolution (MTTR) by 30% and improve CSAT to 4.5/5.	2) Patterns in Play (CPMAI) • Conversational/Human Interaction • Pattern & Anomaly Detection • Predictive Analytics & Decision Support • Goal-Driven Systems	3) Value Drivers & KPIs KPIs: MTTR, First-Contact Resolution, Deflection Rate, CSAT, Agent Utilization. OKR: +30% faster triage, 20% higher FCR.	4) Stakeholders & Behaviors End users prefer chat; agents resist new tooling. Managers need real-time workload visibility.
5) Data & Readiness Sources: chat logs, tickets, KB, CMDB. Gaps: label quality, PII handling, routing outcomes. Owners: Service Desk + IT Ops.	6) Flow & Touchpoints User → Chat → Intent detect → Route/assist → Solve/KB → Survey. Key systems: ITSM, KB, SSO, directory.	7) Risks & Assumptions (by Pattern) Risk: biased training data; drift; over-routing. Assumption: volume patterns persist; intents stable. Indicators: escalation spike.	8) Governance & Artifacts RAID linked to model updates; decision log for threshold changes; stage-gate for KB curation; change calendar.
9) Capacity & Dependencies Need NLP skills, KB editors, ITSM admin. Dependency: SSO, data export, privacy review.	10) Experiment / Increment Plan MVP: 3 intents; A/B routing; success $\geq$ +20% FCR in 4 weeks; guardrails for confidence < 0.6 .	11) Ethics & Responsible AI PII masking; human-in-the-loop on low confidence; transparent handoff; bias checks monthly.	12) Next Decisions & Owners Decisions: go/no-go expand intents; routing threshold. DACI: D-Product Owner, A-IT Ops Dir, C-Service Desk, I-Privacy.

CPMAI Methodology

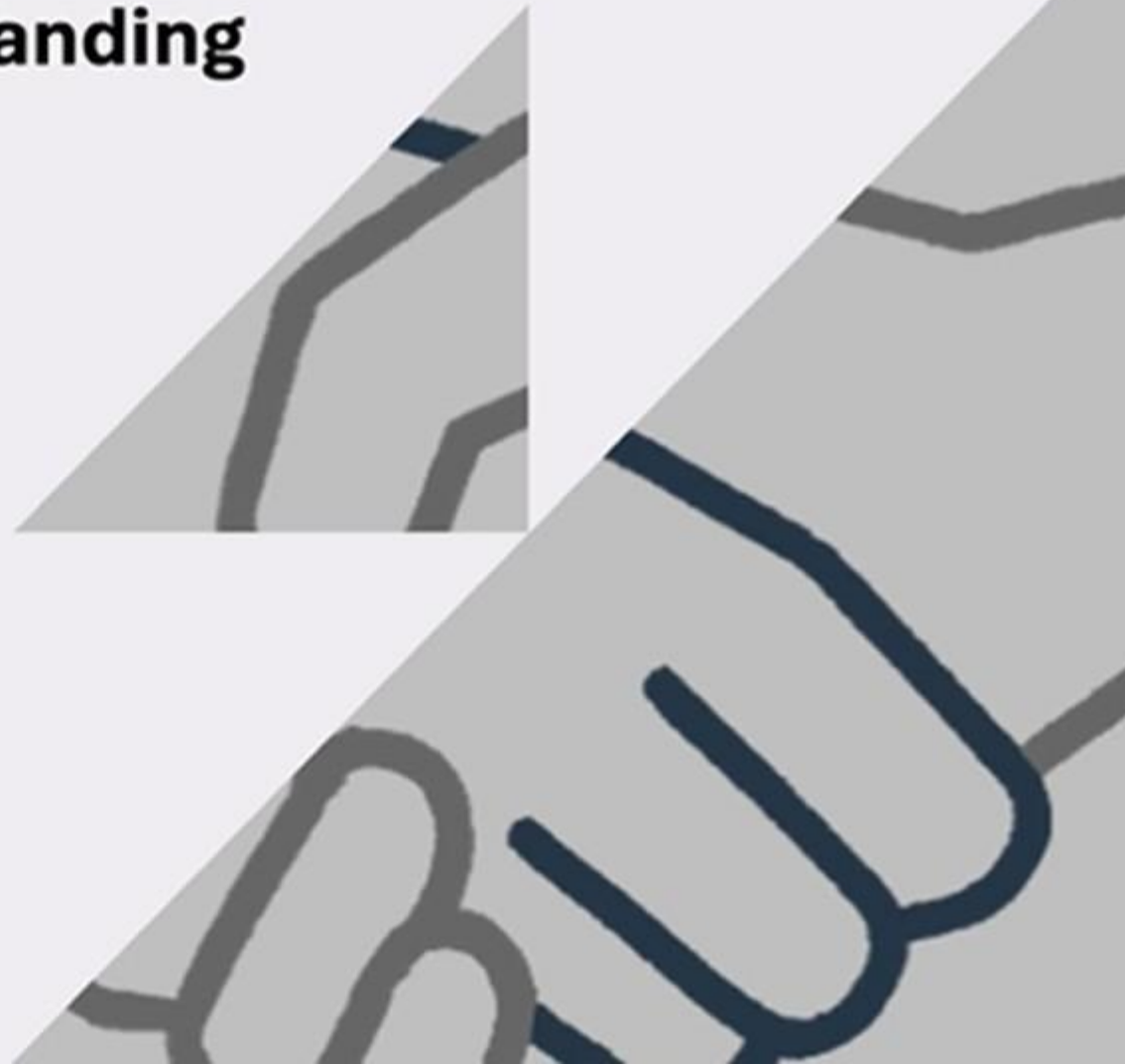


CPMAI Methodology

1. Business Understanding
2. Data Understanding
3. Data Preparation
4. Model Development
5. Evaluation
6. Operationalization

CPMAI Phase I: Business Understanding

- What problem are we solving?
- Is AI/Cognitive technology the right solution?
- Which parts require AI?
- What AI patterns will we use?
- How will we measure success?
- What are the project requirements?
- What other considerations exist?
- What skills are needed?



3 Components of CPMAI Centric Projects



Attribute	6-Step Methodology	Pattern Matching	Ethical AI
Definition	A structured, iterative framework used in CPMAI for managing AI projects, based on CRISP-DM with additional business and ethical integration.	The ability of AI systems (particularly ML) to detect patterns and correlations within large datasets to make predictions or classifications.	Practices and principles that ensure AI systems are fair, transparent, accountable, and respect privacy and societal norms.
Risk Component	Incomplete execution of one or more phases can lead to poor model performance or business misalignment.	Overfitting or false correlations may lead to inaccurate or biased decision-making.	Risk of reputational harm, regulatory non-compliance, or biased outcomes if ethics are not considered.
CPMAI Context Example	A project team skips the Evaluation phase and deploys a model that fails to meet business KPIs.	An ML model incorrectly correlates ZIP codes with loan default risk, introducing geographic bias.	A facial recognition system is evaluated for bias across demographics during the Evaluation phase of CPMAI.

ML = Machine Learning

AI Ethics

- AI Ethics, as defined in the CPMAl certification, involves ensuring that AI systems are developed and deployed in a manner that is ethical, responsible, and transparent. This includes considerations of fairness, transparency, privacy, safety, explainability, human oversight, and trustworthiness. The goal is to align AI technologies with human values and ethical standards, ensuring long-term trust and adoption.

Source

[Top 10 ethical AI considerations for AI](#) projects.

PMI Thought Leadership, Section: Consider the Long-term Impact of AI

LEARNING

Introduction to
Cognitive Project
Management in
AI (CPMAI)™



PMI Infinity prompt: give a short definition of AI Ethics as defined in the CPMAl certification

Gemmi Prompt: generate a graphic that shows a team discussing an ethical consideration on an AI product project

PATTERN MATCHING IS A CRITICAL BUSINESS ANALYST SKILL

THE POWER OF RECOGNIZING DATA PATTERNS AND RECURRING BEHAVIORS



IDENTIFY MARKET TRENDS & OPPORTUNITIES

Analyzing shifts in customer demand, competitive landscape, and industry changes.



STREAMLINE REQUIREMENTS GATHERING

Spotting similarities and grouping related needs to simplify elicitation and improve consistency.



RESOLVE RECURRING PROBLEMS

Identifying recurring issues, root causes, and defects to prevent them in future solutions.



FORECAST & PREDICTIVE ANALYTICS

Predicting future business performance, customer behavior, and resource requirements based on historical data.



OPTIMIZE BUSINESS PROCESSES

Finding inefficiencies, bottlenecks, and redundancies in workflows to design streamlined solutions.



守破離

Shu Ha Ri

Harnessing the Power of Pattern Matching as a Catalyst for Success

Questions?

**Professional
Certifications**

**Skills &
Competencies**



powered by dot.

Dave Davis PMI-PBA, PMP, CPMAl, PgMP, ACP, DASSM,I, CSM, PMI-ATP

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