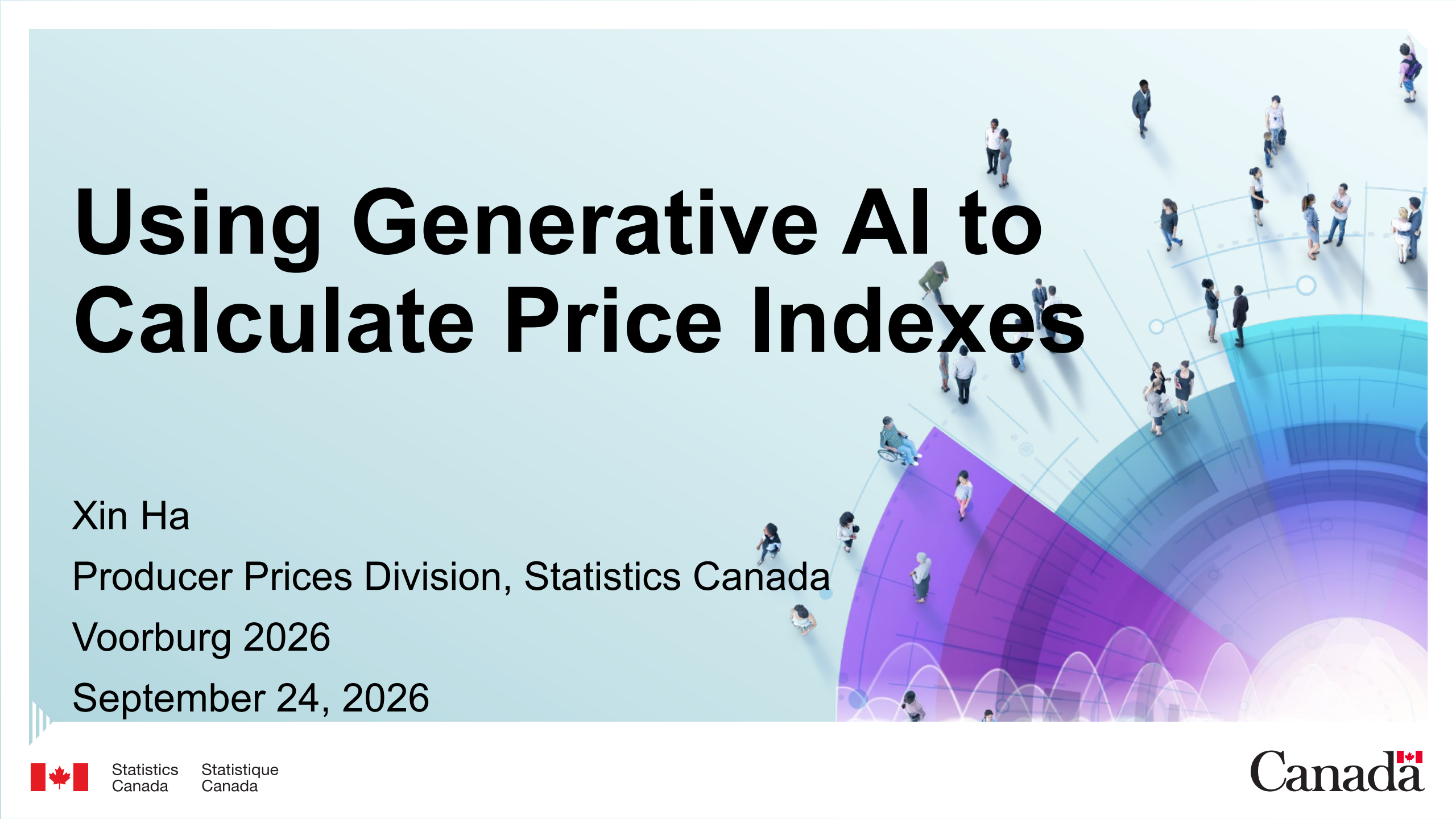


Using Generative AI to Calculate Price Indexes

The background of the slide features a stylized illustration. It shows a group of diverse people walking along a path that is overlaid with blue and purple data lines and circular patterns. The path leads towards a large, semi-circular graphic on the right side of the slide, which is composed of concentric arcs in shades of blue and purple. The overall aesthetic is modern and technological, suggesting a focus on data and innovation.

Xin Ha

Producer Prices Division, Statistics Canada

Voorburg 2026

September 24, 2026



Statistics
Canada

Statistique
Canada

Canada

Agenda



Background & Motivation



Artificial Intelligence at Statistics Canada



Concepts



Model Limitations & Strategies



Multi-agent Workflow



Implementation & Demo



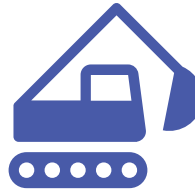
Future Work

Background



Pre-2021:

Internal IT-driven systems
Centralized, rigid
Hard to adapt, slow to update



PPD Modernization (2021-Present):

Open source, purpose-built packages
(piar, gpindex, sps, etc.)
Transparent, efficient, and collaborative
workflows
Modern reproducible pipelines with version
control and modularity



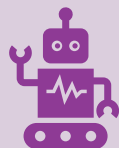
Pain points:

Similar and time-consuming work across
programs
Updating or extending pipelines requires
manual effort

Motivation

- GenAI is now embedded in everyday life and evolving rapidly beyond chatbots
- Reduce fragmented efforts across teams and tools through developing a structured, scalable AI solution with a focused team
- Accelerate the translation from statistical methods to production-ready pipelines
- Free up more resources for statistical reasoning, methodological design, analytical work, and data quality
- Empower people with advanced tools, democratize coding, and reduce technical barriers
- Current focus: Automatically generate reproducible R-based pipelines for price index calculation, eliminating the need to build from scratch.

Artificial Intelligence at Statistics Canada



AI in action -> Data processing • Service delivery • Automation • Data analysis



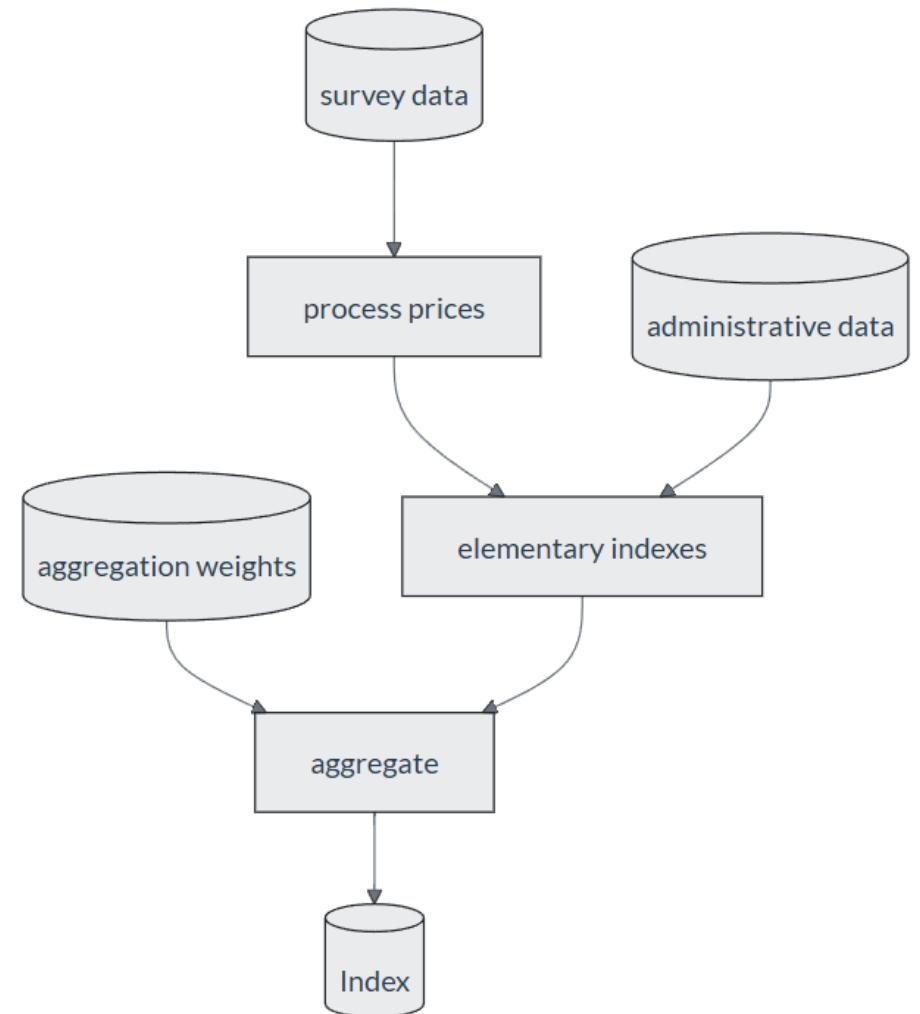
Safeguards → Privacy • Confidentiality • Cybersecurity • Human/expert oversight



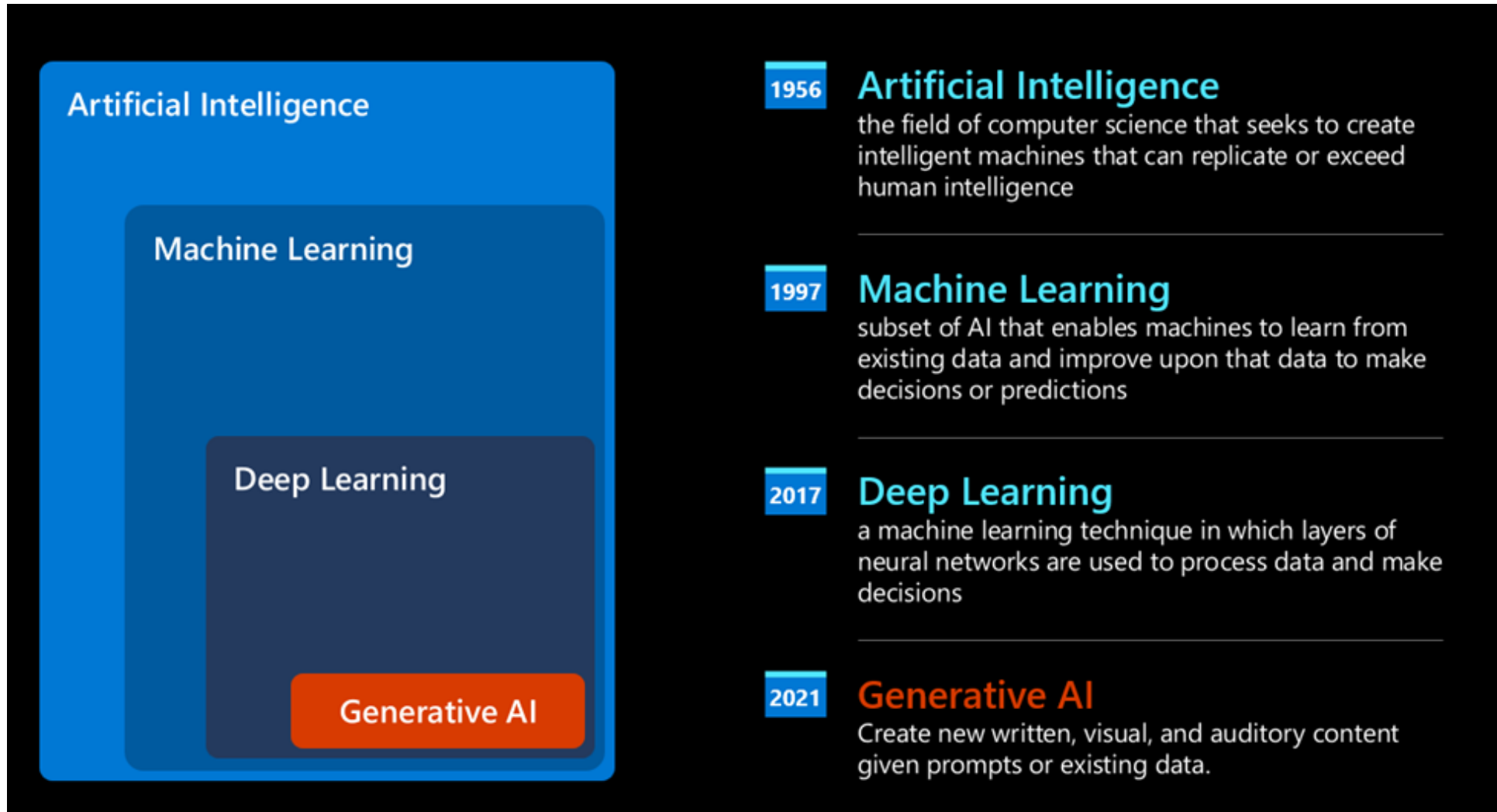
Looking ahead → Responsible ML • AI/LLM research • Data integrity

Reproducible Analytical Pipeline

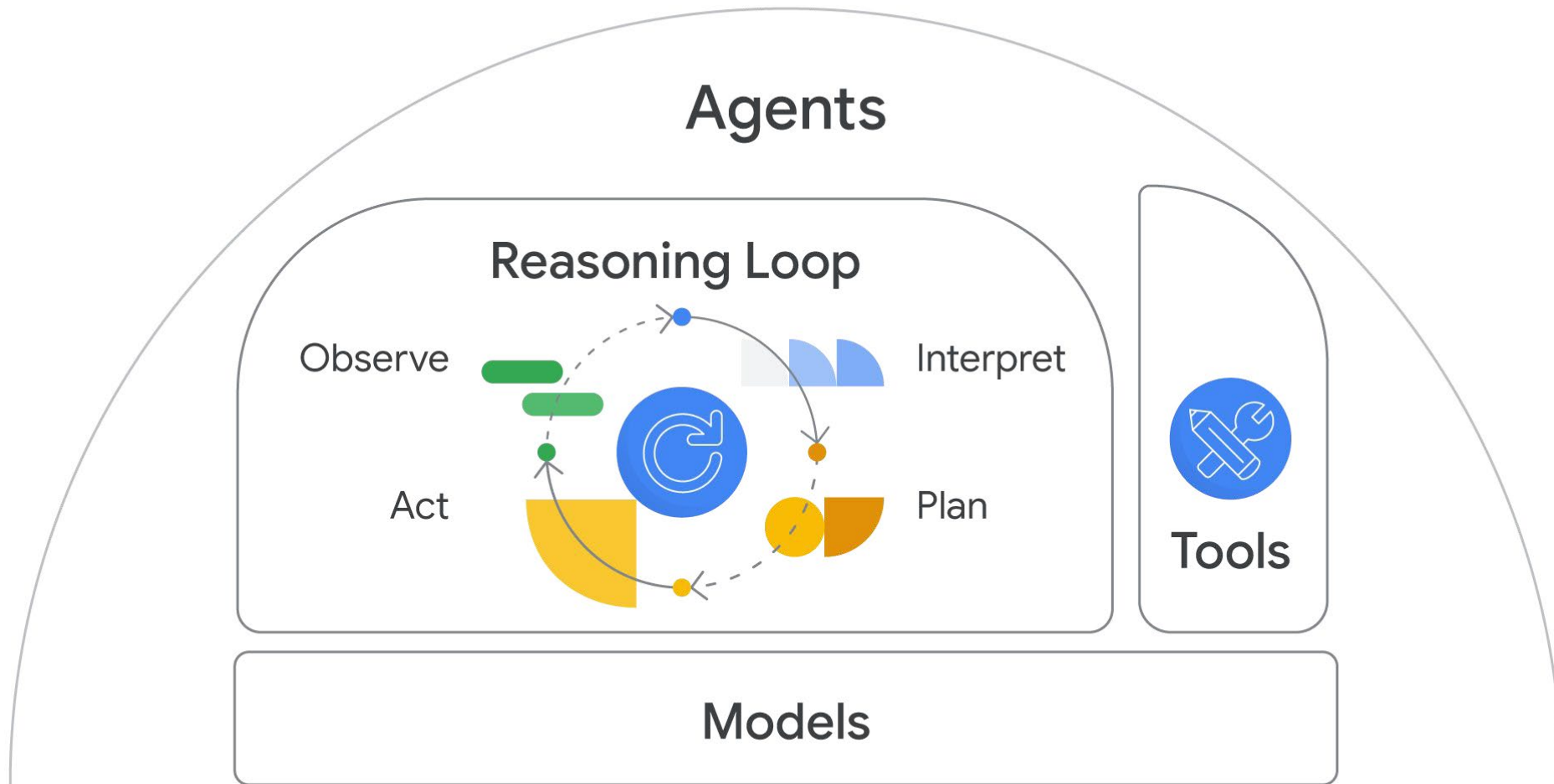
- Structured, automated sequence of steps built using code transforming raw data into repeatable outputs
- Ensures transparent, reproducible, high-quality, and reliable official statistics



Generative AI



Models & Agents



Model Limitations

- Hallucinations: Model can produce incorrect or fabricated information with high confidence
- Data Dependency: Performance relies heavily on the quality, size, and recency of training data
- Bias: Model can reflect and amplify biases present in training data, leading to unfair or skewed outcomes
- Inconsistency: Same input can produce different results because of probabilistic nature, undermining exact reproducibility

Strategies for Mitigating Model Limitations

- Humans in the loop: Critical review and oversight
- Prompt Engineering: Refining system instructions and applying prompting frameworks
- Model randomness control: Top-p and temperature
- Grounding: Retrieval-augmented generation
- Hybrid: Deterministic and generative agents

Multi-Agent Workflow



Modularity and Collaboration: Multiple agents operate independently while coordinate within a structured workflow, enhancing resilience and reliability



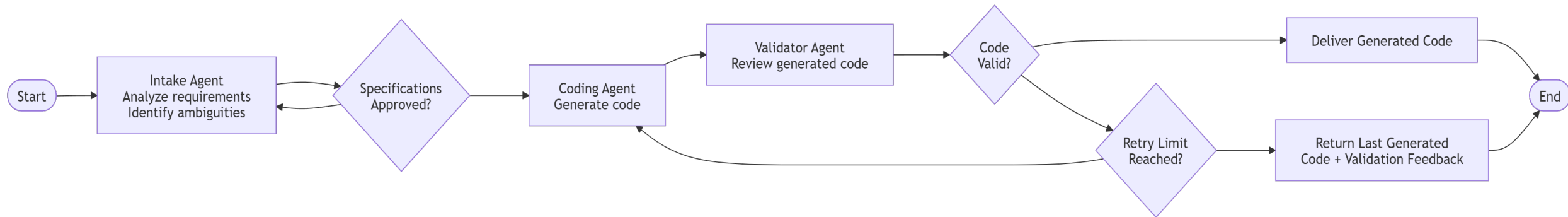
Autonomous decision-making: Each agent has a specialized role and makes decisions within its domain, improving efficiency and accuracy while reducing manual intervention



Interdependent tasks: Outputs from one agent serve as inputs to another, supporting reproducibility and consistency

Implementation & Demo

- User Input → Specification Intake → Code Generation → Code Validation → Script Output





Future Work

- Workflow Scaling: Extending the current workflow into a reusable framework covering data ingestion, processing, generalized aggregation methods, and dissemination across different programs
- Reusable Skills: Introducing modular and rule-based building blocks with clear and structured instructions that guide model behavior for specific tasks
- Model Fine-Tuning: Training a pre-trained model using domain-specific R code to enhance production-quality outputs

Thank you

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