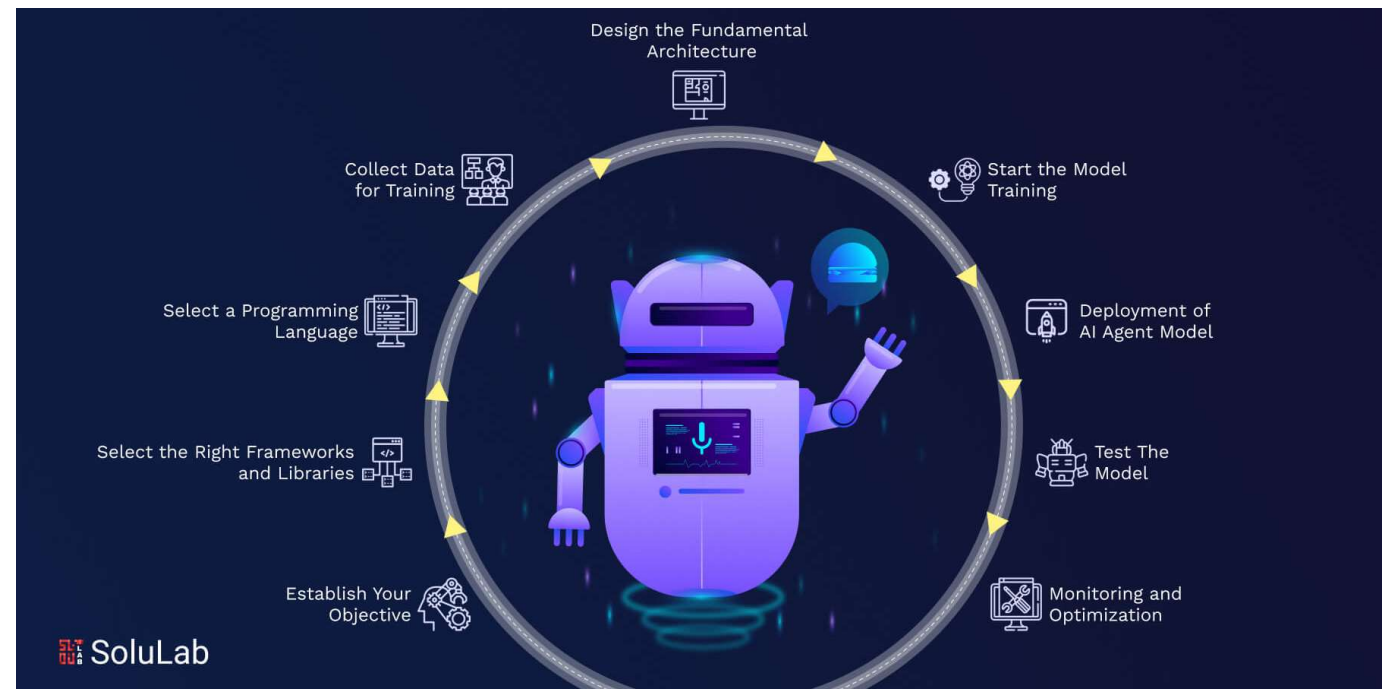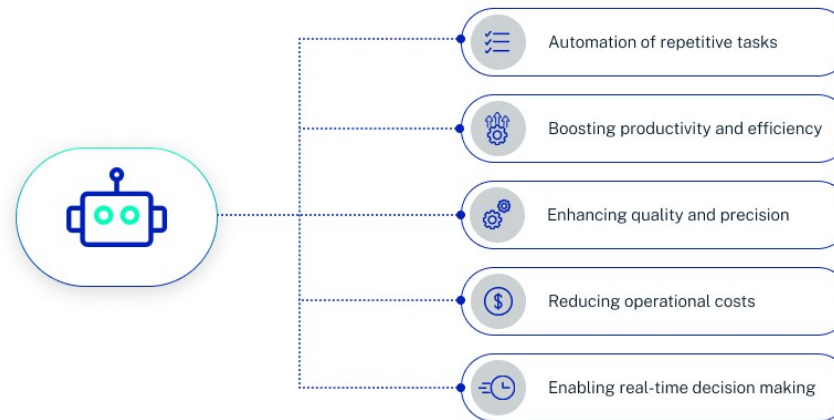# Building Intelligent AI Agents for Real-World Applications

Task Automation with AI Agents

How AI agents perform tasks?

Data Extraction

- The agent scans documents to find and pull out specific information, like names and dates from a report.

Email Writing:

- The agent generates text, like a marketing email or a professional reply, based on a simple goal and context.

Decision-Making:

- The agent uses tools to gather information (e.g., searching the web) and then reasons over that data to recommend a course of action.

Example: Finance Report Automation

Plans the steps
- access sales data, get expense figures, and calculate profit.

Acts
- by using tools to connect to databases (e.g., SQL query) and accounting software APIs.

Extracts
- the key numbers (e.g., revenue, costs, top-selling products).

Reasons
- over the data to identify trends and calculate key metrics
  - (e.g., profit margin).
- Generates a concise, natural-language report and emails it to stakeholders.

Example: Legal Document Summarization

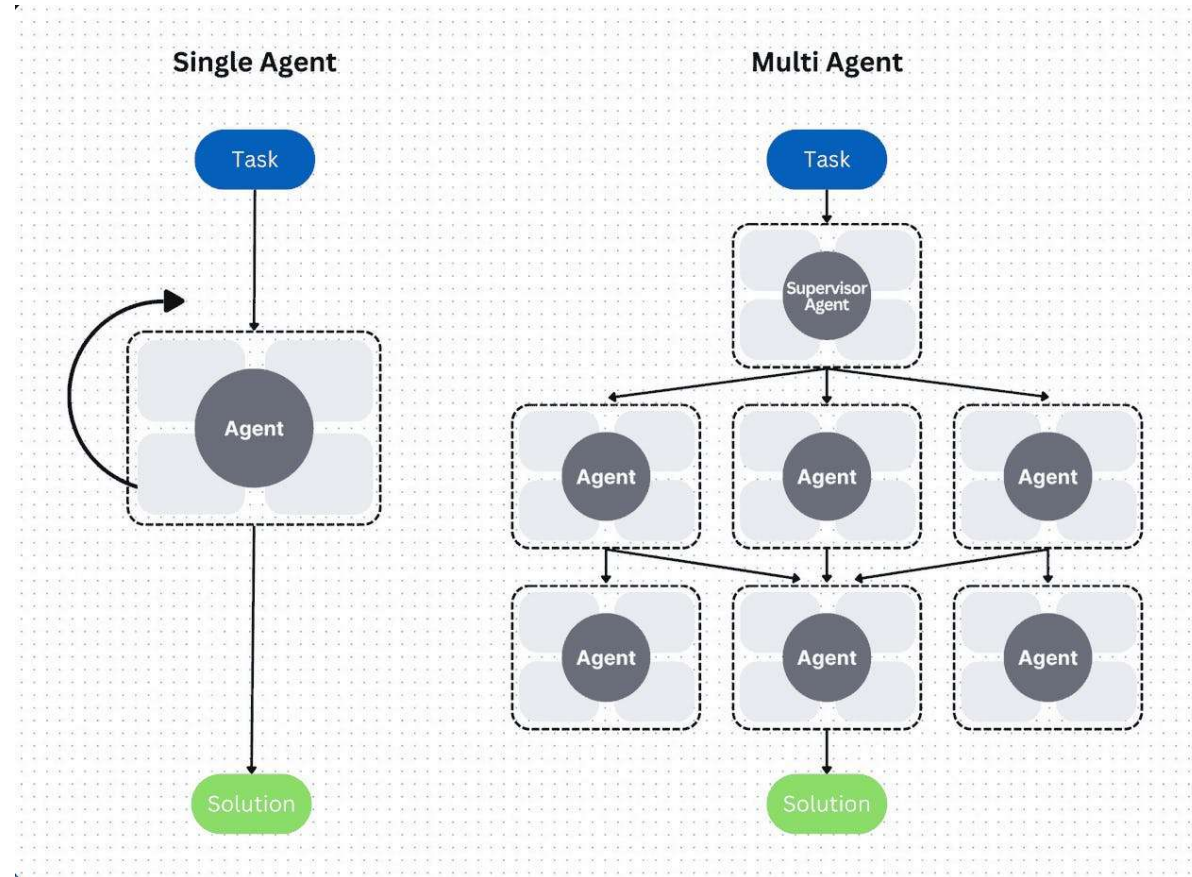Ingests the entire document

- (e.g., a 100-page PDF).

Reasons based on its pre-trained knowledge of legal concepts.

Extracts critical entities like party names, effective dates, liability limits, and termination clauses.
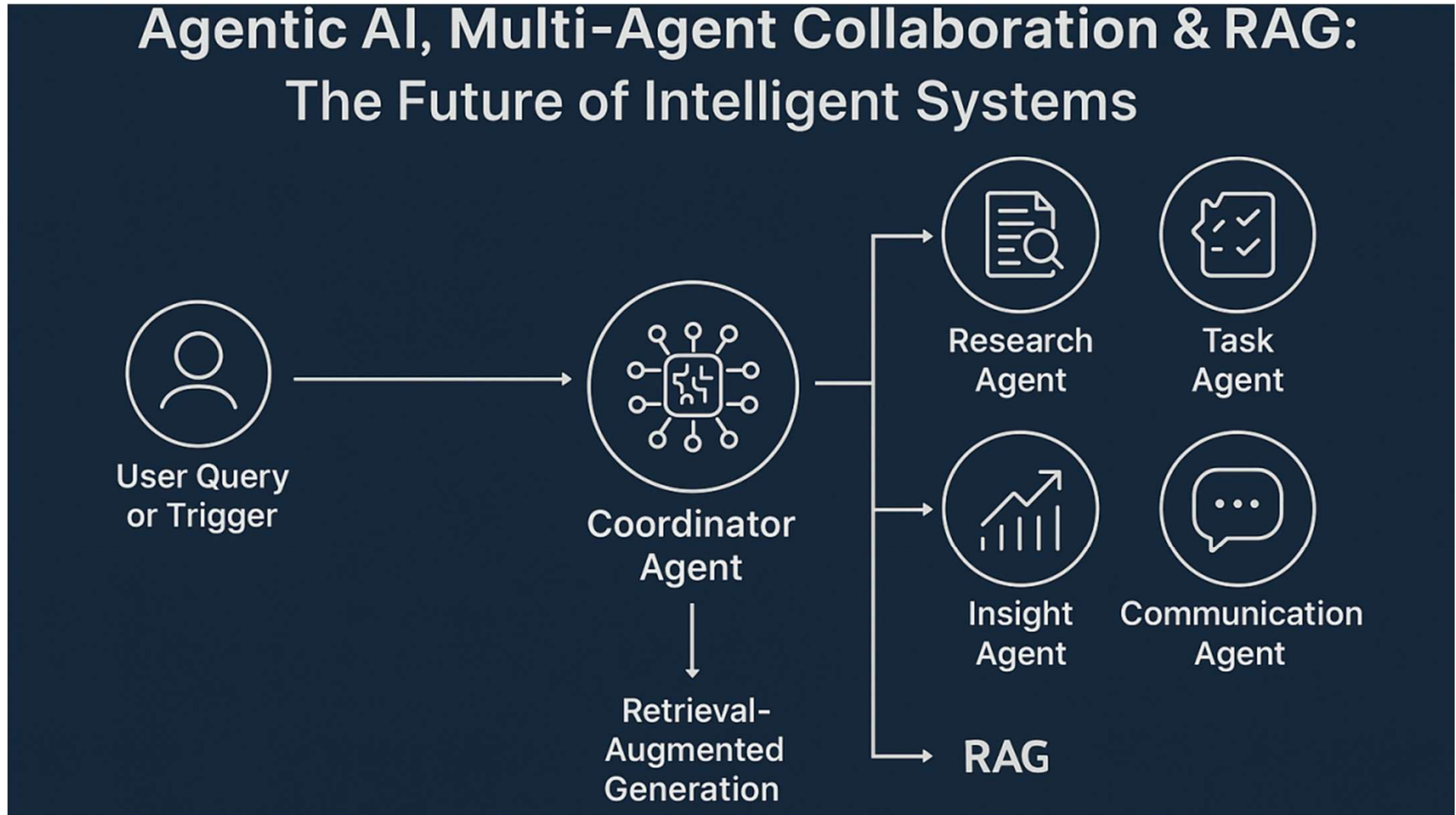
Analyzes the relationships between clauses to identify potential conflicts or risks.

Generates a structured summary with bullet points for easy review

Multi-Agent Collaboration and Decision Making

- ## How multiple AI agents collaborate

How multiple AI agents collaborate

For complex problems, a single agent isn't enough.

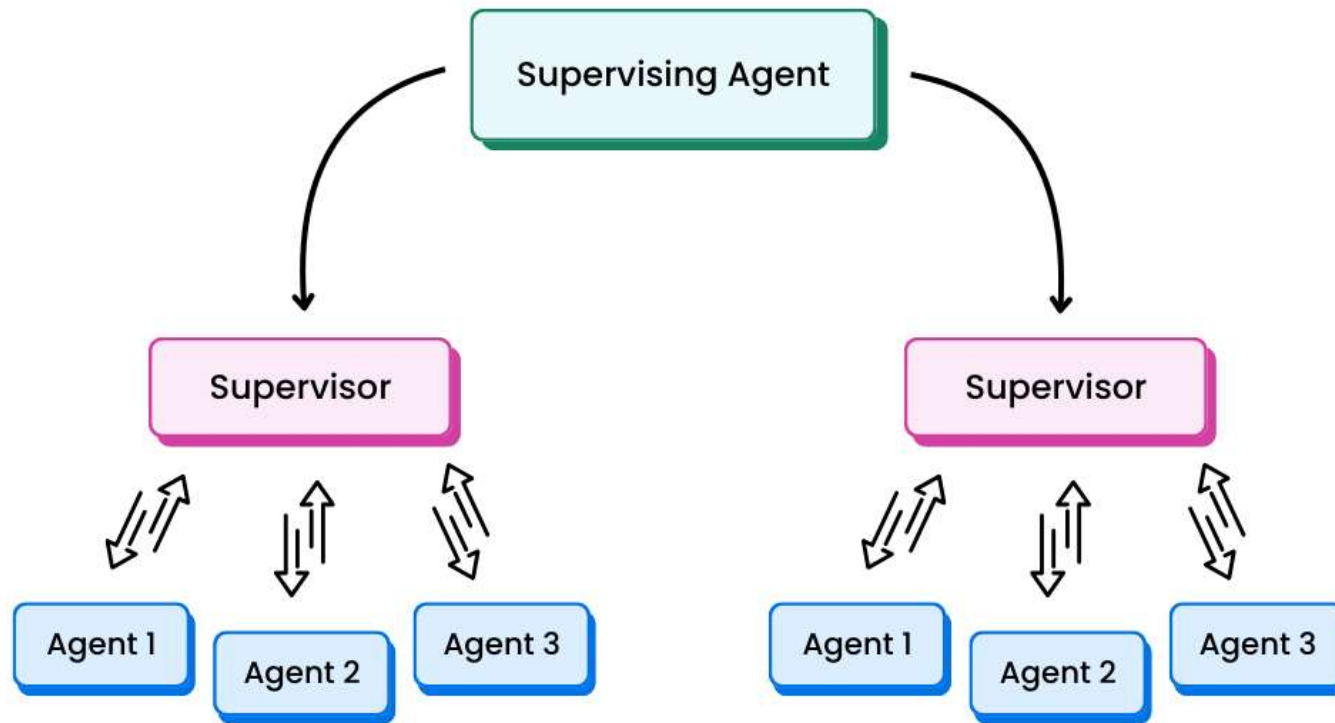**Multi-agent systems orchestrate specialized agents to work together**

Hierarchical Collaboration

- A "manager" or "orchestrator" agent breaks down a large goal into smaller sub-tasks
- It then delegates each sub-task to a specialized "worker" agent

Parallel Task Execution

- Multiple agents work on different, independent parts of a problem simultaneously
- This is ideal for tasks that can be easily divided to save time
  - Instead of one agent reading all reviews, 10 parallel agents are each given 100 reviews

Hierarchical Collaboration

Case Study: Optimizing Customer Support with AI Agents

- The Challenge: Traditional Support Inefficiencies
  - High Wait Times:
    - Human agents are often overwhelmed by the volume of repetitive queries.
  - Inconsistent Answers:
    - Knowledge varies between agents
      - Leading to inconsistent customer experiences.
  - Slow Resolution:
    - Require manual lookups across multiple systems for simple tasks like:
      - Checking an order status or
      - Processing a refund

Case Study: Optimizing Customer Support with AI Agents

The Solution

- A Multi-Agent Support System

A team of specialized AI agents collaborates to handle customer interactions:

- Triage Agent (The Front Door):
  - Instantly greets the customer and uses NLP to understand their intent
    - e.g., "billing question," "technical issue," "refund request"
  - Routes the query to the appropriate specialist agent.
- Information Agent (The Knowledge Expert):
  - Uses RAG to access the company's knowledge base (FAQs, product manuals).
  - Provides instant, accurate answers to common questions.
- Action Agent (The Problem Solver):
  - If an action is needed, this agent uses tools to connect to backend systems
    - e.g., CRM, order management APIs
  - Can autonomously check order statuses, process refunds, or update account details without human intervention.
  - Escalates to a human agent only for complex issues

Thanks