Agentic AI

For dummies

A **Wiley** Brand

Integrail Special Edition

Create custom
AI agents quickly

—

Simplify business
processes with agentic AI

—

Boost productivity with
multi-agent systems

Tom Leyden

Guy Hart-Davis

About Integrail

Integrail provides AI Studio, an agentic AI platform designed to help businesses adopt and implement agentic AI, a new paradigm that uses multi agent systems to automate entire workflows. The platform is built around the idea that businesses can significantly enhance their processes by leveraging AI agents that work together instead of relying on single-agent AI tools.

With AI Studio, users can design, build, and deploy AI-driven applications without requiring coding expertise. The platform provides a no-code, drag-and-drop interface that makes it accessible to both technical and non-technical users. AI Studio also allows for the integration of various AI models and large language models (LLMs), providing flexibility for different business needs.

Additionally, the platform supports seamless integration with existing business tools like CRM, ERP, and HRM systems. This allows AI agents to be embedded into core business operations, optimizing processes such as customer service, marketing, and data management. Integrail also offers features like a benchmarking tool for selecting the best-performing AI models, and retrieval-augmented generation (RAG), which helps provide AI agents with real-time, relevant data.

Overall, Integrail enables businesses to automate complex workflows, reduce operational costs, and drive innovation through advanced AI applications.

Agentic AI

Integrail Special Edition

by Tom Leyden and
Guy Hart-Davis

for dummies®
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Agentic AI For Dummies®, Integrail Special Edition

Publisher's Acknowledgments

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Introduction

Artificial intelligence (AI) is the hottest topic in computing these days, and it's the new computing frontier driving innovation in all areas of business and society, including drug discovery, business, science, education, medicine, IT security, and more. AI will also be the main driver for business efficiency and GDP growth.

Since swarming to join ChatGPT after OpenAI released it in November 2022, consumers have shown special enthusiasm for generative AI models that are capable of creating original text, images, and videos from prompts. Vendors are keen for AI action. NVIDIA is driving AI development and adoption with its graphics processing units (GPUs), AI software platforms, and research. Intel is selling AI-optimized processors, while Microsoft has built AI capabilities into its high-end laptops, its Windows operating system, and its flagship productivity apps. Not to be outdone, Apple has developed a suite of AI tools called Apple Intelligence that runs on the iPhone, iPad, and Mac.

Business, meanwhile, is developing ways of using AI less flashily but more practically, aiming to automate repetitive processes, to increase productivity without increasing staff, to get a jump on the competition, and to improve the bottom line.

For businesses, the hottest topic within AI is *agentic AI* — systems that use multiple AI entities called *agents* that cooperate with each other to perform tasks.

About This Book

Agentic AI For Dummies, Integrail Special Edition, is your guide to what agentic AI is and how you can implement it in your business. Agentic AI provides a framework for building AI workflows that incorporate multiple agents, each performing a different task or set of tasks. Each agent is autonomous, so it's capable of independent thought and action. Each agent has sensors to accept physical or virtual input from its environment, a digital brain to evaluate that input and make decisions, plus actuators it uses to take physical or virtual action in its environment.

Foolish Assumptions

This book makes three assumptions about you, the reader:

» You work with AI at your company as a business decision maker, an AI builder, or an AI user.

» Your company wants to use AI to get more done for less — to boost efficiency, increase productivity, reduce costs, improve decision-making, and so on.

» You want to gain competitive advantage over your competitors — or increase your existing advantage.

Icons Used in This Book

This book displays icons in the margin to point you to three specific types of information:

The Remember icon flags information you should make sure you don't forget.

REMEMBER

The Tip icon points out practical advice and key information you're likely to find helpful.

TIP

The Warning icon draws your attention to pitfalls you want to avoid.

WARNING

Beyond the Book

This book explains what agentic AI is and why it's the future direction of AI. But agentic AI is a large topic, and a book this length can barely scratch the surface. If this book whets your appetite and you want to dig into agentic AI, follow these links:

» `integrail.ai/free:` Navigate to this page to start using AI Studio for free.

» `integrail.ai/university:` Visit AI University by Integrail to find expert-led courses and hands-on workshops to build your AI knowledge and skills.

Chapter **1**
Getting to Grips with Agentic AI

n this chapter, you survey the current state of artificial intelligence (AI) and learn about agentic AI, an exciting approach that greatly increases the capabilities of AI systems by using multiple autonomous agents to perform tasks. Along the way, you explore how generative AI works, grasp how agentic AI builds on traditional AI, and see how a technique called retrieval-augmented generation boosts the power of agentic AI. Finally, you meet a new web-based service that enables you to create your own agentic AI applications quickly, easily, and without writing a single line of code.

REMEMBER

In AI, an *agent* is an intelligent computer program designed to accomplish specific goals. An AI agent acts autonomously, interacts with its environment, makes decisions, and takes actions.

Grasping the Basics of AI

AI is the development of computer systems able to perform tasks that typically require human intelligence, such as learning from experience, understanding natural language, and making decisions by reasoning.

AI encompasses a plethora of different technologies. Generally speaking, AI has six key areas:

» Machine learning, in which algorithms learn from data

» Natural language processing, which includes text generation, translation, and speech recognition

» Computer vision, which includes facial recognition and object detection

» Robotics and autonomous systems, which combine AI with robotics for tasks such as industrial automation and drones

» Expert systems, which use AI to simulate human decision-making abilities

» Generative AI, which focuses on creating new content, such as text or images

Recently, generative AI has received headline attention, but the other areas are also important and are experiencing rapid development. Agentic AI, which is now coming to prominence, uses AI agents that draw capabilities from different AI areas together into coherent workflows that automate business processes.

AI use has exploded in the consumer sphere, too:

» You can generate text with ChatGPT, Google's Gemini, Microsoft's Copilot, and other chatbot-style AI tools.

» You can generate pictures from text prompts by using tools such as OpenAI's DALL-E, Midjourney, and Stable Diffusion. Similarly, you can generate video from text prompts by using tools such as Runway ML or Synthesia.

» AI virtual assistants are inescapable, with Siri on Apple's iPhone, Google Assistant on Android phones, and Alexa on Amazon devices vying for your attention.

» Netflix, Spotify, YouTube, and Amazon use AI to power their recommendation systems for movies, music, videos, and products.

>> Apple has developed a suite of AI tools, which it calls Apple Intelligence, and built them into the iPhone, iPad, and Mac.

AI is also widely used in business, which I cover in the next section.

Analyzing AI in the Enterprise

Businesses can benefit from AI even more than consumers can, so it's no surprise that businesses in many sectors are adopting AI to improve efficiency, automate repetitive tasks, and drive innovation. Business sectors are using AI in different ways:

>> **All sectors:** AI chatbots act as the first line of customer support, responding to straightforward queries and referring more complex queries to human agents.

>> **Most sectors:** AI systems improve supply chain management by forecasting demand; optimizing inventory, transportation, and logistics; and identifying potential risks and disruptions, giving you the chance to plan around them.

>> **Healthcare:** AI performs tasks such as analyzing medical images to help diagnose diseases and crunching large volumes of data to speed up the development of new medications.

>> **Finance:** AI algorithms analyze massive amounts of transaction data in real time to flag possible fraud. AI systems also perform credit scoring of customers, including factors such as social media activity and online behavior as well as traditional credit scoring (based on fiscal data, such as amounts owed and payment history).

>> **Retail:** AI systems draw on customer information and purchase history to create personalized customer experiences and optimize pricing strategies.

Exploring Generative AI's Workings and Capabilities

AI systems that enable you to create content — such as text, images, or video — have helped drive consumer adoption of AI. This type of AI system is *generative AI*, which learns patterns from

its training data and uses them to generate new, similar content based on prompts that you input. Generative AI has been a huge advance on traditional AI, which performs tasks based on pre-defined patterns programmed into it.

Like customers, businesses have enthusiastically adopted generative AI. Businesses use generative AI for a wide variety of tasks, such as the following:

» **Marketing:** Automatically create product descriptions, social media materials such as blog posts, or marketing campaigns.

» **Sales:** Generate potential leads from customer data and create customized proposals for clients.

» **Human Resources:** Write accurate and up-to-date job descriptions. Screen resumes to weed out unqualified candidates.

» **Legal:** Draw up draft contracts and other legal documents for review by human experts.

» **Research and development:** Analyze the market and competitors' offerings to identify potential product areas. Brainstorm new product ideas and generate design concepts.

REMEMBER

By using generative AI, your business can not only save time, effort, and money, but also you can execute shifts of strategic direction more nimbly, respond more quickly to opportunities, and differentiate itself from your competitors. Generative AI also plays a crucial role in agentic AI workflows.

Learning How Agentic AI Extends Traditional AI

Traditional AI, which is sometimes called *narrow AI*, is designed to excel at a particular task that it performs in isolation. To date, generative AI has largely followed this pattern, with most generative AI apps using only a single agent.

By contrast, agentic AI increases the capabilities of AI by using multiple agents that work together, enabling you to automate an entire workflow rather than just an individual task. Within the workflow, each agent performs a particular task for which it is

specialized, in much the same way that human workers work together in a team.

The AI agents you use in agentic AI can interact with the real world. An agent has physical or virtual sensors to gather input, a "brain" computer system to interpret data and make decisions, and physical or virtual actuators that enable it to take physical actions or virtual actions. See Chapter 2 for a detailed breakdown of an agent's components.

By choosing suitable agents for your agentic workflows and configuring them to collaborate effectively, you can build workflows that run complete processes automatically and efficiently and that free up your human staff to focus on strategic initiatives.

REMEMBER

Agentic AI systems are more powerful and capable than traditional AI systems. Agentic AI systems are built to function autonomously, making decisions that align with predetermined goals. They don't just react; they proactively solve problems and make independent choices. For instance, agricultural drones powered by agentic AI can monitor crop health, detect pests, and decide on the best time for watering or applying pesticide based on real-time sensory data.

Boosting Agentic AI with RAG

Generative AI models return results based on their training data. To get around this problem, an AI agent can use retrieval-augmented generation (RAG) to access external data sources in addition to its training data. RAG can get even better results by feeding more and more specific data to the model. By combining the data returned by RAG with the data from its training database, the agent can generate content that is accurate, relevant, and up to date.

REMEMBER

Adding real-time data from external sources via RAG increases the agent's understanding, improves its decision-making, and gives it greater autonomy.

Many agentic AI workflows have multiple agents that collaborate and make decisions based on the latest information available. RAG is essential in such workflows to give the agents up-to-date information that will enable them to make suitable decisions.

Meeting an Agentic AI Solution

If your company could benefit from creating workflows, you may be wondering what kind of programming is required and what sort of developer you would need to perform it. There's good news here: You can create AI workflows without writing a single line of code.

AI Studio by Integrail, shown in Figure 1-1, features a drag-and-drop interface that enables you to create a workflow. You select the agents you want to use, configure them to work together, and implement RAG if needed. After you've created the workflow, you can either run it from the Integrail AI Cloud or host it on your own premises.
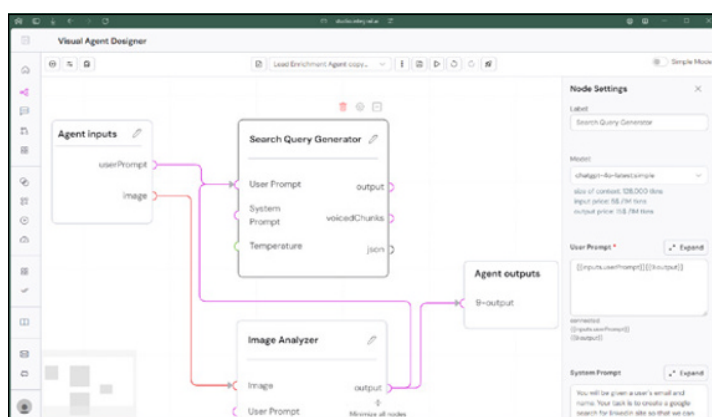
FIGURE 1-1: AI Studio by Integrail enables you to build agentic AI without coding.

See Chapter 5 for more information about AI Studio and its capabilities.

Chapter **2**

Understanding the Benefits of AI Agents

To automate tasks, artificial intelligence (AI) uses agents — software that can act autonomously to perform actions. In this chapter, you explore what AI agents are and what they can do. You analyze the components of an AI agent from the sensors the agent uses for perception to the algorithms and models that process information and make decisions. After that, you look at how you can make multiple agents work together to accomplish actions more complex than a single agent can manage. Finally, you discover how agentic AI provides a framework for integrating multiple agents into a cohesive workflow to automate a process.

Defining AI Agents and Their Capabilities

AI agents play the central role in using AI to get things done. In AI, an *agent* is a software program or system capable of interacting with its environment, making decisions, and taking actions.

REMEMBER

Here's the key difference between a traditional software app and an AI agent: The traditional app follows strict instructions from the user, but an AI agent is built to be more flexible, allowing it to respond appropriately to changing inputs and environments.

Here are three examples of AI agents:

» **Customer service chatbot:** Many companies deploy AI agents to act as customer service chatbots. Such a chatbot receives customer queries as input, processes that input to determine the customer's needs, and delivers relevant responses. With time, as the chatbot handles more queries, its chatbot should gradually improve in quality and accuracy.

» **Recommendation system:** Shopping or rental websites often implement recommendation systems to inform their customers about other items that may interest them. By using deep learning algorithms to analyze vast amounts of data, a recommendation system agent may be able to identify patterns that elude human analysis. Similarly, by using natural language processing, the agent may be able to interpret customer preferences well enough to generate relevant personalized recommendations.

» **Self-driving vehicles:** These vehicles run on AI agents that accept input, make decisions, and navigate autonomously. While building self-driving vehicles for safe and reliable personal transport on public roads remains in the future, self-driving vehicles are demonstrating their promise in more controlled circumstances. For example, autonomous tractors can plow fields with minimal overlap, adjusting tillage depth based on soil thickness and quality, and apply precision doses of fertilizers and pesticides to enhance the seeds they plant with millimetric precision.

Exploring the Components of an AI Agent

Broadly speaking, you can think of an AI agent as similar to a human, using three essential classes of components:

» **Eyes, ears, touch:** An agent's eyes can be physical devices, such as cameras or radar, or software devices that capture

text or user input. Similarly, an agent can hear via microphones and feel via probes.

>> **Brain:** Rather than gray matter, the agent's brain is a large language model (LLM) that uses models, rules, and algorithms. The brain receives input from the senses and interprets that data by using machine learning models and rules. The brain then runs decision-making algorithms to decide what action to take and commands the hands to take that action.

>> **Hands:** The agent uses its hands to take actions, either physically (such as steering a self-driving vehicle) or virtually (such as writing data to a database). The agent may also use other body parts to take action. For example, where a human may use vocal cords and tongue to speak, an agent can synthesize speech.

For example, consider how the components work together in an agent that runs a marketing campaign:

>> The eyes and ears gather relevant data, such as target demographics, market trends, and customer behavior.

>> The brain identifies suitable customer segments for a product, forecasts trends and customer behavior, and selects suitable marketing channels and messaging.

>> The hands generate personalized marketing messages and social media posts; launch and manage marketing campaigns, adjusting them with real-time feedback; and engage with customers to provide personalized support.

Accomplishing Complex Objectives with Multi-Agent Systems (MAS)

Individual agents can accomplish impressive feats. But the true power of agentic AI comes from combining agents into multi-agent systems that can execute complex workflows.

A multi-agent system (abbreviated to MAS) is a system built from multiple autonomous AI agents. These agents interact with their environment and work together to achieve a common objective.

In a MAS, each agent performs its own specialized task. Here's an example in which three agents automate shopping on an e-commerce website:

» **Customer support:** One agent handles customer queries, resolving them itself when it can and referring them to human agents when it can't.

» **Order processing:** A second agent processes and executes the orders that customers place.

» **Inventory monitoring:** A third agent keeps tabs on the inventory level, ordering items as needed.

While each agent performs its own task, together they form a MAS that automates shopping.

Building Solutions with Agentic AI as a Framework

Agentic AI is the framework that enables you to integrate multiple AI agents into cohesive workflows. Instead of deploying several individual AI agents to perform their tasks in isolation, you use the agentic AI framework to make those agents collaborate seamlessly together in a workflow. This collaboration enables you to automate more complex processes than by using agents separately.

As an example, consider a sales workflow that uses three AI agents. The first agent generates leads, while the second agent engages the leads and nurtures relationships with them, and the third agent schedules follow-ups as needed. Coordinating with each other, exchanging data in real time, and making decisions as needed, the agents ensure that the workflow runs smoothly, allowing business processes to be completed in a streamlined manner.

REMEMBER

By using the agentic AI framework, your company can build flexible and scalable solutions that meet its business needs. When those needs change, you can modify a workflow quickly without having to start again from scratch. For example, you could add new agents to the workflow to perform extra tasks that the workflow's process now requires.

IN THIS CHAPTER

» **Identifying the AI models used to build agentic AI**

» **Understanding the role LLMs play in multi-agent systems**

» **Picking suitable AI models by benchmarking**

» **Recognizing and reducing AI hallucination**

» **Increasing accuracy by adding retrieval-augmented generation**

Chapter **3**

Picturing How Agentic AI Combines AI Elements

In this chapter, you learn about the artificial intelligence (AI) elements used to build agentic AI solutions. You meet the AI models used to power agentic AI, such as generative AI (GenAI) models, reinforcement learning models, and neural networks. You explore the role that large language models (LLMs) play in multi-agent systems and learn how to use benchmarking to select suitable AI models for agentic AI projects. You also identify AI hallucinations — essentially, when AI systems lie to you — and how to minimize this problem. Last, you explore how to use retrieval-augmented generation (RAG) to enable AI agents to make suitable decisions and to boost the accuracy of agentic AI results.

Meeting the AI Models Used in Agentic AI

Each AI agent has an AI model that acts as its brain, controlling how the agent interprets data and how it responds to input. An AI model is a mathematical framework that represents a real-world system or concept. The model consists of algorithms and data

structures that process data to classify information, make predictions, produce insights, or take actions based on patterns.

A wide variety of AI models are available. The following three models are widely used in agentic AI:

REMEMBER

» **Generative models:** These are AI programs that can understand natural language input and generate natural language output. Generative models can add creative capabilities to AI agents, enabling them to collaborate better, solve problems more efficiently, and adapt to changing circumstances.

Some of the best-known generative models are LLMs, models trained on immense amounts of textual data and able to perform assorted tasks from generating creative content to answering questions and summarizing text. Examples of LLMs include OpenAI's Generative Pre-trained Transformer (GPT) series, used in ChatGPT and elsewhere, and Google's Gemini LLM.

» **Reinforcement learning models:** These models learn through trial and error. They interact with their environment, receiving rewards for desirable actions and punishments for undesirable actions. Reinforcement learning systems are especially useful for making decisions in complex and dynamic environments. In agentic workflows, you can use reinforcement learning models to train AI agents to collaborate effectively.

» **Neural networks:** Neural networks, which include recurrent neural networks (RNNs) and long short-term memory (LSTM) networks, can identify complex patterns and relationships in data. They're often used for tasks such as natural language processing and image recognition. RNNs and LSTMs can process sequential data, maintain context, learn from experience, and collaborate effectively with other agents in workflows.

Mapping the Role of LLMs in Multi-Agent Systems

Because of their various strengths, LLMs often play a key role in multi-agent systems, performing tasks such as these:

» **Understanding language:** Trained to interpret natural-language input, LLMs are good for tasks such as answering customer inquiries.

>> **Summarizing and organizing information:** LLMs strengths include creating summaries of long or complex texts and organizing information into reports.

>> **Generating content and ideas:** LLMs can generate fresh content and ideas, such as for a marketing campaign.

REMEMBER Whereas most AI applications restrict you to using a single LLM, multi-agent systems let you choose the LLM.

Selecting Suitable AI Models via Benchmarking

REMEMBER When you're constructing an agentic AI workflow, it's critical that you select AI models that enable the workflow to run full bore at affordable cost. To pick the best AI model for each agent in the workflow, you can benchmark different AI models to see how they perform at particular tasks.

Various benchmarking tools are available. One handy tool is the benchmark tool in AI Studio by Integrail, which enables you to evaluate several agents against each other in head-to-head tests. You can choose the criteria on which to evaluate the results, such as speed, accuracy, cost, and reliability. Head to Chapter 5 for more information on AI Studio.

Identifying and Minimizing AI Hallucination

Although AI models typically return accurate information, they sometimes suffer from glitches called *hallucinations* in which they return information that's factually incorrect, misleading, or simply nonsensical. For example, lawyers using AI to prepare arguments have caught hallucinations such as LLMs including fabricated cases alongside genuine cases.

WARNING LLM hallucinations sometimes hit the headlines because they can have serious consequences, especially in high-impact fields such as law, finance, or healthcare. But LLMs are far from the only AI models that can hallucinate. For example, generative adversarial networks (GANs) that are used to generate images may produce

artifacts or distorted images; speech recognition models may misinterpret input or commands because of poor audio quality or noise; and autonomous systems, such as for self-driving vehicles, may hallucinate nonexistent obstacles.

In a single-agent system, you must use human oversight to verify the accuracy and suitability of AI model outputs. In agentic AI, however, you can use multiple agents to mitigate hallucination, enabling real-time feedback loops between the agents to keep output within your chosen parameters. This level of verification isn't available in single-agent systems.

Boosting Accuracy by Incorporating RAG

While AI models can produce fast and accurate responses by drawing on the data from which they're trained, you need the responses to include up-to-the-minute information for timeliness and accuracy. You can add this information by using RAG. In RAG, when the AI model receives a prompt, it retrieves not only historical data from its training set but also real-time data from external sources, such as databases or websites. The model then generates its response using all the relevant information it has retrieved, enabling dynamic decision-making appropriate to the context.

TIP By providing the latest and most relevant information, RAG can reduce the risk of AI hallucinations occurring. RAG also has the benefit of increasing users' trust in AI by providing outputs that contain up-to-date data.

BOOSTING AUTONOMY AND ADAPTABILITY WITH VECTOR MEMORY

Many agentic AI systems use *vector memory*, which is memory that stores data as vectors (numerical sequences), to represent complex concepts and relationships. Storing data as vectors brings multiple advantages, including letting the agentic AI system maintain context over time, which deepens contextual understanding and decision-making; quickly retrieve information based on its similarity to a search vector; and make predictions and answer questions.

Chapter **4**

Automating Business Workflows with Agentic AI

To make your business run smoothly and efficiently, and to get more done without increasing headcount and costs, you want to automate as many of its operations as possible. In this chapter, you first identify the general benefits that agentic artificial intelligence (AI) automation can offer to businesses. You then examine how agentic AI can automate entire workflows from start to finish and how you can connect workflows to your exist‐ing business tools. Finally, you discover how to optimize your automated workflows by inputting suitable prompts.

Recognizing the Benefits of Automating with Agentic AI

In a typical business, the easiest place to start implementing automation is with repetitive tasks, such as data entry, invoice processing, or inventory management. Automating such isolated

tasks can swiftly bring some benefits, but this is only the low-hanging fruit. You can make much greater gains by automating entire workflows instead of tackling individual tasks piecemeal.

This is where agentic AI shines. In an agentic AI setup, agents don't operate in isolation; instead, they collaborate to handle complex workflows, passing tasks to each other as needed to implement end-to-end automation.

TIP

Automating business processes with agentic AI delivers four key benefits:

- » **Greater efficiency:** Tasks are processed faster, and the need for manual intervention is reduced or eliminated.

- » **Higher accuracy:** You can program your AI agents to give high levels of accuracy, minimizing the risk of human error.

- » **Cost savings:** Automated systems reduce your operational costs by cutting out human labor.

- » **Scalability:** Quickly scale your agentic AI systems to handle increased volumes of data and tasks without adding staff or increasing work hours.

Automating End-to-End Workflows

Agentic AI enables you to automate complex, multi-step workflows from start to finish, even if the workflows involve separate departments. This capability provides significant gains in productivity over automating individual tasks in isolation. For example, say you need to create an end-to-end workflow for a marketing campaign launch. You may use four agents like this:

- » **First agent:** Uses an LLM to generate campaign content

- » **Second agent:** Handles customer segmentation and targeting for the campaign

- » **Third agent:** Organizes outreach via email or social media, pulling real-time data via retrieval-augmented generation (RAG) to make the messages or posts relevant

- » **Fourth agent:** Collects campaign performance data, analyzes it, and reports key insights to the marketing team

Even in this simple example, you can see the strength and flexibility of agentic AI. Each agent works autonomously to accomplish tasks, but it collaborates with the other agents to complete the workflow as a whole. By combining the agents in the workflow, you automate a complex process that no single agent could handle on its own.

Integrating Workflows with Existing Business Tools

When automating business processes with workflows, you need to connect your AI agents to your existing business tools via their application programming interfaces (APIs). Agentic AI can help you handle complex, cross-departmental processes — such as customer relationship management (CRM), enterprise resource planning (ERP), and human resource management (HRM) — more efficiently than traditional AI systems.

REMEMBER

Integrating workflows with your existing business tools has two valuable advantages. First, you give the agents access to the most accurate and up-to-date information, eliminating data silos that may lead to missed opportunities or deficient decision-making. Second, you don't need to change your IT infrastructure — you need only connect the agents to it.

CASE STUDIES IN WORKFLOW AUTOMATION

The benefits of automating business workflows with agentic AI can be seen in two real-world examples:

- **Customer support automation:** A financial services company built a multi-agent AI customer support system. The agents respond automatically to frequently asked questions, significantly reducing the company's response time; manage customer interactions, escalating more complex queries to human agents; and track customer satisfaction.

(continued)

> - **Sales pipeline automation:** A software-as-a-service (SaaS) company automated its entire sales funnel using Integrail Studio. The workflow uses multiple AI agents to qualify leads, manage outreach, schedule appointments, and follow up with potential clients. Having AI handle administrative tasks enabled the sales team to focus on closing deals, which led to a 20 percent increase in sales conversions.

Optimizing Automated Workflows with Prompt Engineering

To make your automated workflows run as you intend, you must give them suitable input via prompts. This process is called *prompt engineering,* which is the art of crafting prompts (inputs) that produce the results you need. Prompts need to be precise enough to cause the AI model to return accurate, relevant, and contextually appropriate responses.

Prompt engineering is crucial in Agentic AI, where agents must interpret and act on each other's outputs. This requires precise, coordinated prompts that ensure seamless communication between agents and produce to a unified workflow.

Consider a customer support workflow that uses two agents: The initial agent filters common queries, while the second agent identifies when a more complex issue requires human intervention. You prompt the first agent to return specific types of information, such as product details or warranty policies, and prompt the second agent to assess the complexity of queries and decide when human support is needed.

TIP

Effective prompting is especially important when you are using RAG to incorporate real-time data into your AI outputs. By engineering suitable prompts, you can make your AI agents produce accurate and context-appropriate output based on the latest information available.

IN THIS CHAPTER

» **Creating AI agents without coding**

» **Building workflows that use multiple agents**

» **Incorporating RAG to add contextual intelligence**

» **Connecting an agent to external APIs**

» **Keeping app quality high and costs low**

Chapter **5**
Designing Agentic AI Applications

A gentic AI offers huge benefits to businesses. By creating workflows that incorporate well-chosen AI agents with carefully crafted prompts, you can automate entire business processes, boosting productivity and saving time, effort, and money. Better yet, you can quickly adapt these workflows by adding new agents to perform other tasks or scale them up to meet increased demand.

Until recently, creating such workflows would've been a coding job for programmers with advanced skills in data science and machine learning (ML). But now, a new tool — AI Studio by Integrail — enables non-developers to create AI applications by using a no-code, drag-and-drop interface. In this chapter, you find out about AI Studio and how to use it.

Building Agents without Coding

AI Studio is a software-as-a-service (SaaS) application that enables you to build AI workflows swiftly and easily by using a drag-and-drop interface. To create a workflow, you drag in the components you want to use, connect them using visual connectors, and set

parameters to control their behavior. Figure 5-1 shows you a screenshot of AI Studio in action.
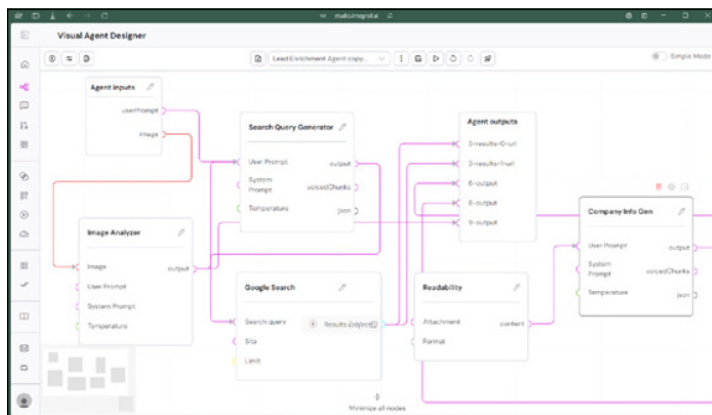

FIGURE 5-1: AI Studio enables you to create workflows by drag-and-drop.

To help you get started, AI Studio includes more than 100 pre-built templates and sample agents. The templates cover common use-cases, including automating customer support, generating leads, and managing workflow. You can customize a template to quickly meet your business needs or use a template to kick-start development of your own AI agent. For more information, check out `https://integrail.ai`.

Assembling Workflows Using Multiple Agents

To harness the full power of agentic AI, you want to create complex workflows that include multiple AI agents rather than a single AI model. When you use multiple agents, each agent can perform a specific function at which it excels. For example, you may create a workflow in which one agent takes care of customer inquiries, a second agent processes payment information, and a third agent generates reports. The AI agents work together to complete all the actions required in the workflow. This is similar to the way people may work together in a business team, each completing tasks for which (ideally, at least) they're best qualified.

TIP

AI Studio enables you to adapt and scale up your workflows. When a business process becomes more complex and requires more tasks to complete, you can edit its workflow and add more agents to handle those tasks. When a business process requires more resources, you can scale up its workflow by dragging in new agents and dropping them where needed.

Adding Contextual Intelligence by Incorporating RAG

RAG lets you add data from external data sources to the data on which the model was trained. Given that the training data may be out of date, adding dynamic, real-world data is a great way to improve the performance of the AI model, enabling it to make better decisions and to deliver more accurate output.

By using RAG, agents can pull real-time data from sources such as databases, cloud storage, or apps connected to the workflow via application programming interfaces (APIs). For example, in a customer support workflow, an AI agent tasked with responding to a customer inquiry could retrieve the customer's order history via RAG to assist in composing a helpful response.

REMEMBER

RAG is useful in multi-agent systems because it can provide real-time, contextually relevant information to AI agents. By adding RAG to a workflow, you ensure that the agents are making decisions based on up-to-date information, which helps make the agents' output more accurate and responsive.

Integrating External APIs into an Agent

If your company already uses business tools and systems, give your AI workflows access to some or all of them. For example, you may want to connect workflows to customer relationship management (CRM) software such as Salesforce, to an enterprise resource planning (ERP) system such as SAP, or to a human resource management (HRM) platform such as Workday.

AI Studio provides built-in integration capabilities that enable you to connect your AI applications to your existing platforms

via their APIs. You can integrate your Integrail AI agents with a wide variety of platforms, including OpenAI, Anthropic, OLLAMA, Google, Google Vertex, Microsoft, Fireworks, Telegram, ClickUp, and WIX. For example, the Microsoft integration enables your agents to manage documents, email messages, and collaboration in the Microsoft 365 apps, such as Word and Excel; automate team communication and project management in Microsoft Teams; and sync CRM or ERP data across Microsoft Dynamics.

Optimizing Costs While Ensuring Quality

AI Studio includes tools for cost optimization and quality assurance to enable you to make your AI applications efficient as well as effective:

Benchmarking

The Benchmark Tool built into AI Studio enables you to run benchmarks directly, comparing the performance of different AI models on accuracy, speed, and cost. The benchmark results enable you to select the most cost-effective model for each task, giving your business the highest possible return on investment (ROI). This tool is shown in Figure 5-2.
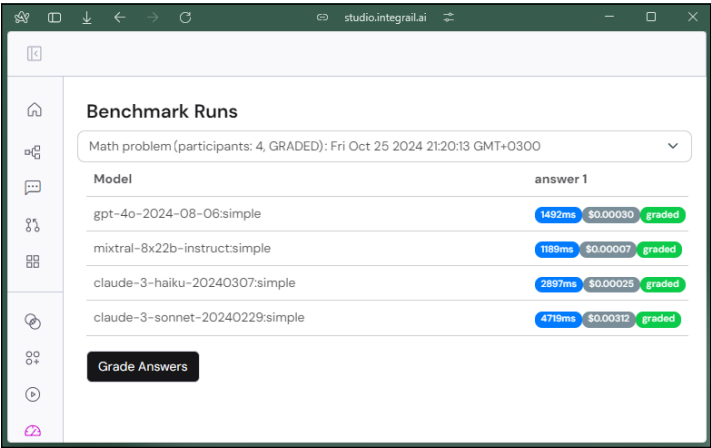

FIGURE 5-2: The Benchmark Tool in AI Studio lets you directly compare the performance of AI agents.

![WARNING] Keep a close eye on the costs of the AI models you choose. The costs may seem trivial when you're first experimenting with developing workflows but can start to bite when you scale up your AI applications to include many agents.

Monitoring

The Dashboard feature built into AI Studio gives you an easy way to keep an eye on your agents, their cost, and their statistics. Figure 5-3 shows the Dashboard. The Agent Executions feature lets you see execution information for the agent or agents you choose.
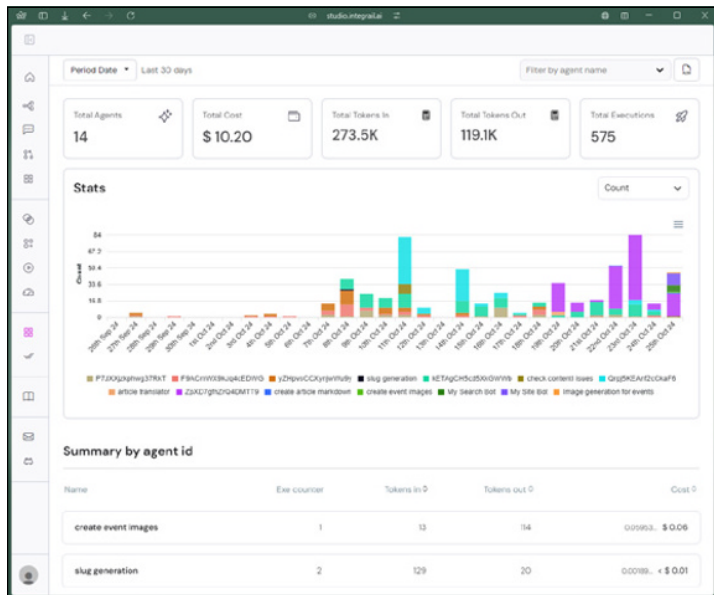

FIGURE 5-3: AI Studio's Dashboard lets you track your agents, their costs, and their statistics.

WHERE DO I RUN MY INTEGRAIL WORKFLOWS?

After you've created an Integrail account, you can deploy your AI apps securely in the Integrail AI Cloud. You can then run your AI workflows from anywhere you have an Internet connection.

Alternatively, you can deploy your AI apps on your own equipment. On-premises deployment may be a better choice for larger companies for policy or compliance reasons.

Chapter **6**

Ten Business Benefits of Agentic AI

B y using multiple agents that collaborate with each other, agentic artificial intelligence (AI) provides greater automation, intelligence, and efficiency than traditional single-agent AI solutions. Agentic AI can deliver business benefits such as the following:
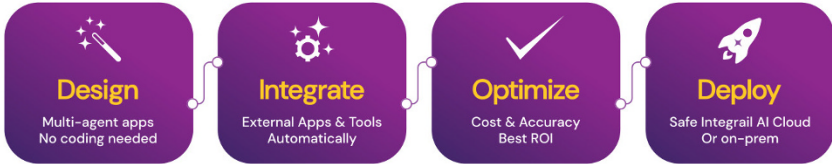
» **Create exactly the agents you need.** Agentic AI enables you to build custom agents tailored precisely to your company's needs and objectives rather than compromise with partial solutions. For example, a financial firm may build an agentic AI solution to reduce loan-processing times, while a manufacturing company could automate inventory management via agentic AI.

» **Make agents that are available 24/7 365.** The custom agents you create can run around the clock and around the calendar. Always-on agents are great for handling routine tasks quickly at low or no cost. For example, you may build agents to provide the first level of customer support, dealing with standard queries on their own but escalating more complex queries to a human support agent either in real time or via a queue system.

» **Reduce costs.** Agentic AI reduces your business's costs in several ways, such as by automating repetitive tasks, streamlining processes, and keeping staff numbers low.

>> **Save time and effort.** AI agents can remove the drudge work of repetitive tasks, freeing up you and your colleagues to focus on more strategic and complex work.

>> **Automate and streamline business operations.** You can use agentic AI to automate and streamline your business operations even when they involve various departments or computer systems. An added bonus is that implementing agentic AI forces you to scrutinize your business processes closely, which may result in you finding inefficiencies or duplication of effort that you can design out.

>> **Increase productivity.** Streamlining processes, as mentioned earlier in this list, can increase productivity as well as giving faster response times to business opportunities and stimuli.

>> **Generate competitive advantage.** Agentic AI may be able to help generate competitive advantage by enhancing decision-making, improving operational efficiency and delivering an improved customer experience through personalization.

>> **Scale your operations up swiftly with minimal hiring.** When your business hits a home run, you need to scale up operations quickly. Hiring new staff members involves both serious costs and the time needed for the new hires to get up to speed and become productive. By contrast, creating and deploying a new AI agent is swift, costs little, and does not leave the business overstaffed if you need to scale back.

>> **Use agents to identify and mitigate risk.** Agents may be able to identify risks by analyzing large amounts of data and identifying patterns that presage problems. For example, by analyzing shipping data and including the latest data through retrieval augmented generation (RAG), an agent may predict the risk of supply-chain disruptions and suggest how to mitigate the risk.

>> **Perform out-of-the-box and blue-sky thinking.** You can use agentic AI to question conventional wisdom and to suggest alternative perspectives to solving problems. By crunching huge amounts of data, agentic AI may be able to identify patterns and connections that would escape human analysis. You can include agentic AI in your brainstorming sessions to benefit from the different perspective and insights it can provide.

AI Studio

AI Studio allows you to design and build AI applications with ease: transform business workflows without needing coding skills or technical AI know-how.

No-code AI Apps

Design
Multi-agent apps
No coding needed

Integrate
External Apps & Tools
Automatically

Optimize
Cost & Accuracy
Best ROI

Deploy
Safe Integrail AI Cloud
Or on-prem

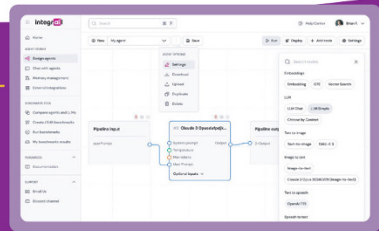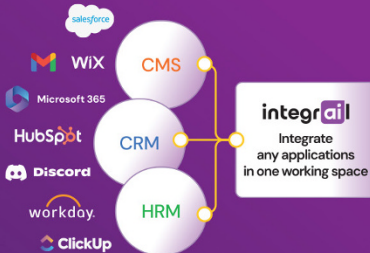Adopt AI tailored to your business with AI Studio.
Effortlessly implement solutions that integrate with existing tools, optimize for the best ROI, and deploy securely in the cloud or on-premises.

Design

Intuitive drag-and-drop

No coding needed

Fastest time to market

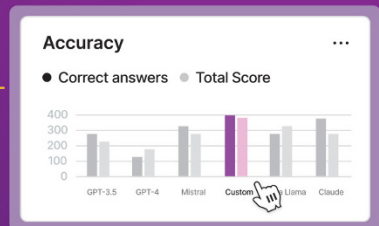## Integrate

Simple API integration

Any business applications

Enables full workflow automation

salesforce
M
WiX
Microsoft 365
HubSpot
Discord
workday.
ClickUp

CMS
CRM
HRM

integrail
Integrate
any applications
in one working space

Optimize

Easy Benchmarking Tool

Best model ROI

No hallucination

Accuracy
● Correct answers ● Total Score

400
300
200
100

GPT-3.5 GPT-4 Mistral Custom Llama Claude

Deploy

Flexible deployment options

Integrail AI Cloud or On-Premises

Support business growth

integrail
CLOUD

Build agentic AI applications without code

Discover how to leverage the power of agentic AI without any coding expertise. This book guides you through designing, building, and deploying multi-agent AI applications that can automate complex business workflows. Learn the fundamentals of AI agents, prompt engineering, and retrieval-augmented generation (RAG) and how to integrate AI models with your existing systems. Whether you're a business user or AI enthusiast, this book offers practical insights to help you unlock the full potential of AI.

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Inside…

- Introducing agentic AI
- Explaining AI agents
- Understanding AI models & LLMs
- Automating business workflows with AI
- Designing agentic AI applications
- Using retrieval augmented generation
- Utilizing effective prompt engineering

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