Demystifying Azure AI

Implementing the Right AI Features for Your Business

Kasam Shaikh

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Kasam Shaikh
Kalyan, Maharashtra, India

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This book is dedicated to my father, the late Mr. Ahmed Kasam Shaikh, who is always a source of inspiration for me. And to my mentor, Mr. Sabarinath Iyer.

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About the Author

Kasam Shaikh, cloud advocate, is a seasoned professional with 13 years of demonstrated industry experience working as a cloud architect with one of the leading IT companies in Mumbai, India. He is recognized as an MVP by an online tech community, and he is also a global Azure AI speaker, and author of two best-selling books on Microsoft Azure and AI. He is the founder of the Azure INDIA (az-INDIA) community, and Dear Azure, an online community for learning Azure AI. He owns a YouTube channel and shares his experience at his website, https://www.kasamshaikh.com.

About the Technical Reviewer

Adwait Churi is a seasoned professional, an AI speaker, reviewer, and trainer, with a keen interested in cloud technologies. He has more than 13 years of software industry experience in team building, training, development, support, and Agile practices. He is a Center Of Excellence member with Cloud Research and Development and has architected business-critical applications in the banking, financial services, and insurance fields, as well as learning management systems, health care, and hospitality domains.

He is passionate about advancing technologies including cloud, integration, microservices, securities, Extract-Transform-Load, and Dev-Ops.

His day-to-day work helps organizations in software application architecture and designing, presales, performance engineering, project management, and software development.

Adwait provides training courses on Microsoft BizTalk Server, MuleSoft, and Microsoft Azure. He can be reached on LinkedIn at `www.linkedin.com/in/adwait-churi-b079a1106` or on Twitter at `@adwaitchuri`.

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I am highly thankful to Apress for believing in me and trusting me with this opportunity.

CHAPTER 1

Working with Azure Cognitive Search

I would like congratulate you for starting with the toughest part of learning: starting! The fact that you are reading this book means you have taken the very first step to begin learning. I will ensure that this learning journey of Microsoft Azure AI will be a beneficial one. In this first chapter, I will introduce the recent most powerful service offered by Microsoft Azure for AI with cloud search, Azure Cognitive Search.

Introduction to Azure Cognitive Search

Azure Cognitive Search is a cloud search service powered by artificial intelligence (AI) for mobile, web, or your inline business application development. Formerly known as Azure Search, this the only cloud search service that transforms your unstructured data into an identifiable, searchable format with its built-in AI capabilities, saving lots of time for an organization building a complex search solution.

Approximately 83 percent of organizations have their data in unstructured, nonmaintainable formats. Later they must invest resources in developing a data search system. Azure Cognitive Search helps enrich these unstructured data stored in the form of PDF documents, images, word processing documents, and so on, into a structured, indexed, ready-to-search format.

K. Shaikh, *Demystifying Azure AI*, https://doi.org/10.1007/978-1-4842-6219-1_1

Here are few notable features of Azure Cognitive Search.

- Fully managed search as a service to ease the complexity and scale effortlessly.
- Autocomplete, geospatial search, filtering, and faceting capabilities for a rich user experience
- Built-in AI capabilities including optical character recognition (OCR), key phrase extraction, and named entity recognition.
- Seamless integration of custom models, classifiers, and rankers to fit your domain-specific requirements.

It is important to note that when I say search on cloud, that doesn't mean search all of the data on the cloud, but your data on the cloud. This means data you provide to the service to enrich it with AI cognitive and custom AI skills, to make it presentable. It follows a simple pattern, as shown in Figure 1-1.

Figure 1-1. *Service pattern view*

- **Ingest:** The unstructured data in any format to be seeded to Azure Cognitive Search by any Azure Store.
- **Enrich:** Cognitive skills or custom skills are applied to the data.
- **Explore:** A searchable data set is ready to explore.

Before I start with the exercise of creating this service, let's cover this pattern in more detail.

Ingest

In this phase, the unstructured data are provided to Azure Cognitive Search from an available Azure Store. The following data formats are supported:

- `.pdf`, `.rtf`, `.doc`
- `.jpg`, `.xml`, `.json`
- `.ppt`, `.tif`, `.png`
- `.html`, `.xls`, `.bmp`

These are the available data sources:

- Blob storage
- Azure SQL
- Cosmos DB
- Azure tables
- MySQL
- Azure Files
- ADLS Gen2

Figure 1-2 defines the ingest form.

Figure 1-2. *Ingest form in pattern*

Note These formats and sources are available at the time of writing. More formats and sources could be added in the near future.

Document cracking takes place here once seeded. It converts the unstructured data into text, images, and metadata. These data are then passed to Cognitive Services for further enrichment as required. This is explained visually in Figure 1-3.

Figure 1-3. *Document cracking explained*

Enrich

This is the most important phase of applying cognitive or custom skills to the data (Figure 1-4). You can apply a set of Azure Cognitive Services to data to transform it into smart, searchable output. This is the same integrated cognitive stack that has been used by Microsoft Bing and Microsoft Office for more than a decade and is used for AI services across vision, language, and speech.

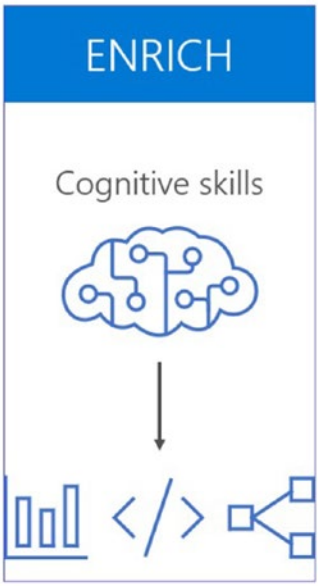

Figure 1-4. *Enrichment form in pattern*

Some of the cutting-edge AI services that are added for enrichment are listed in Table 1-1.

Table 1-1. *Azure Cognitive Services*

AI Skills	Azure Cognitive Service	Performs Action
Key phrase extraction	Text Analytics	Returns a list of key phrases from unstructured data
Organization entity extraction	Entity Recognition	Returns "Organization" entity category
Location entity extraction	Entity Recognition	Returns "Location" entity category from unstructured data

(*continued*)

Table 1-1. (*continued*)

AI Skills	Azure Cognitive Service	Performs Action
Person entity extraction	Entity Recognition	Returns "Organization" entity category from unstructured data
Landmark detection	Computer Vision	Returns landmark details from unstructured data
Language detection	Text Analytics	Returns language details
Celebrity recognition	Computer Vision	Returns with celebrity details if recognized from the data
Sentiment analysis	Text Analytics	Returns sentiments of the data content
Face detection	Facial Recognition	Returns facial details
Tag extraction	Text Analytics	Extracts tags from the data
Printed text recognition	OCR	Read the text from images
Custom skills	All Azure Cognitive Services	

Figure 1-5 presents the overall flow of this pattern, on applying AI skills to enrich the data ingested into the service.

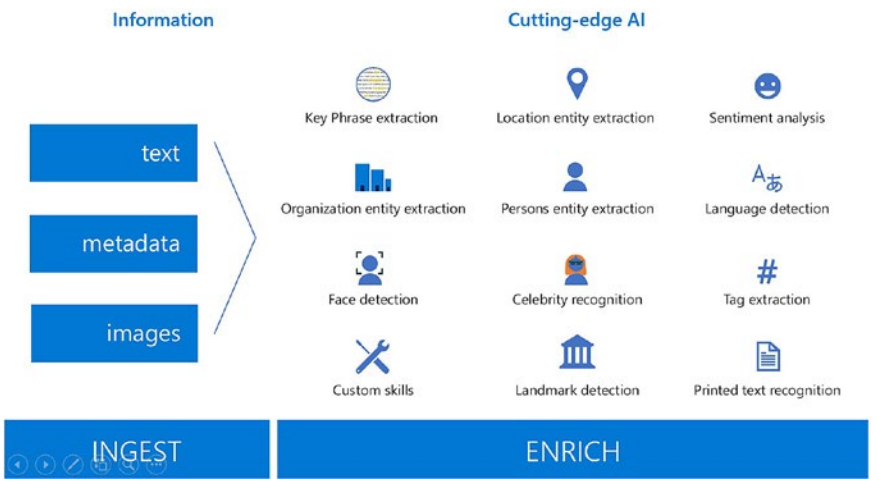

Figure 1-5. *Enrich ingested data with Azure Cognitive Services*

Now, even the images resulting from document cracking on ingested data can be further refined to extract printed text on images, face detection, object detection, and so on, and added as the part of text for further fnrichment skill sets. You can also add custom skills to the merged text. An enriched sample skill set is presented in Figure 1-6.

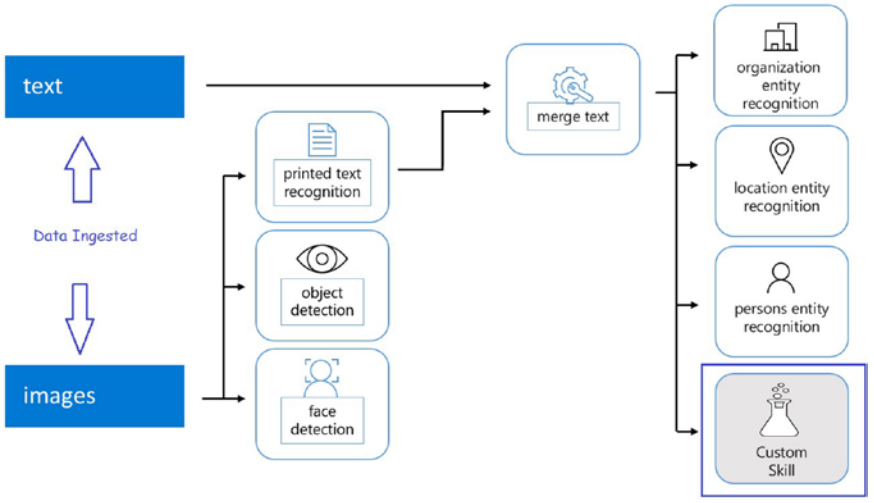

Figure 1-6. *View of enriched sample skill set*

Note You can add custom skills and empower more refinement of data. This is not covered in this book.

Explore

Finally, after ingest and enrich, the unstructured data are now ready for the explore phase. The data are now available for search operations like full-text search, highlighted text search, filter, facet, and many more smart forms of search operations.

The complete pattern is shown in Figure 1-7.

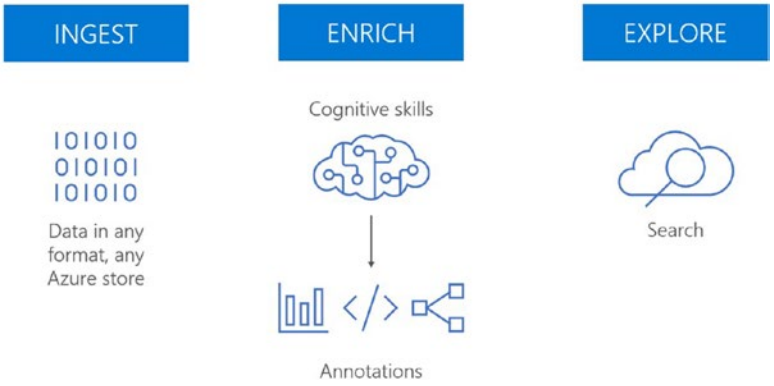

Figure 1-7. *Pattern of Azure Cognitive Search*

The pattern flow can be a bit confusing, but it is clearer in graphic format. Now that I have introduced the way it works, we can explore the pattern flow in action. I will introduce new terms and concepts as we encounter them.

Creating Azure Cognitive Search

Let's get started with the service. Throughout the book, I will be using Azure Management Portal for the exercises to make your reading easier. You can explore the other available methods on your own, like REST application programming interfaces (APIs), software development kits (SDKs), Azure Resource Manager (ARM), or Powershell.

Prerequisites

For all the exercises, you need a valid Azure subscription. You can also create a free Azure account for a one-month trial to explore the offerings of Azure.

Assuming you have a valid Azure subscription, let's start working with Azure Cognitive Search. Open Azure Management Portal, (`https://portal.azure.com`) and click Create A New Resource either on the home screen or the left menu (Figure 1-8).

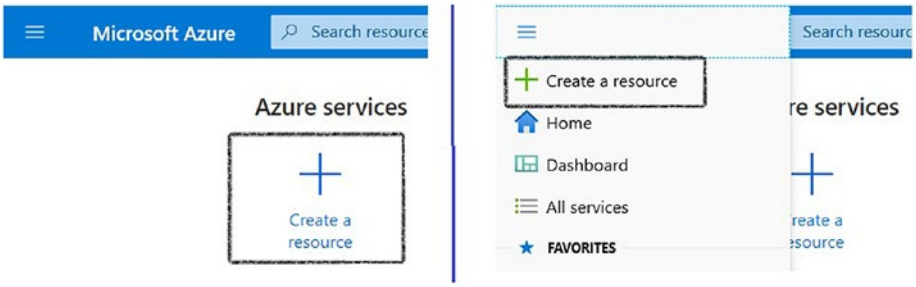

Figure 1-8. *Starting creation of an Azure resource*

Enter Azure Cognitive Search in the search bar and click Search. This will open the service window. Click Create to proceed, as shown in Figure 1-9.