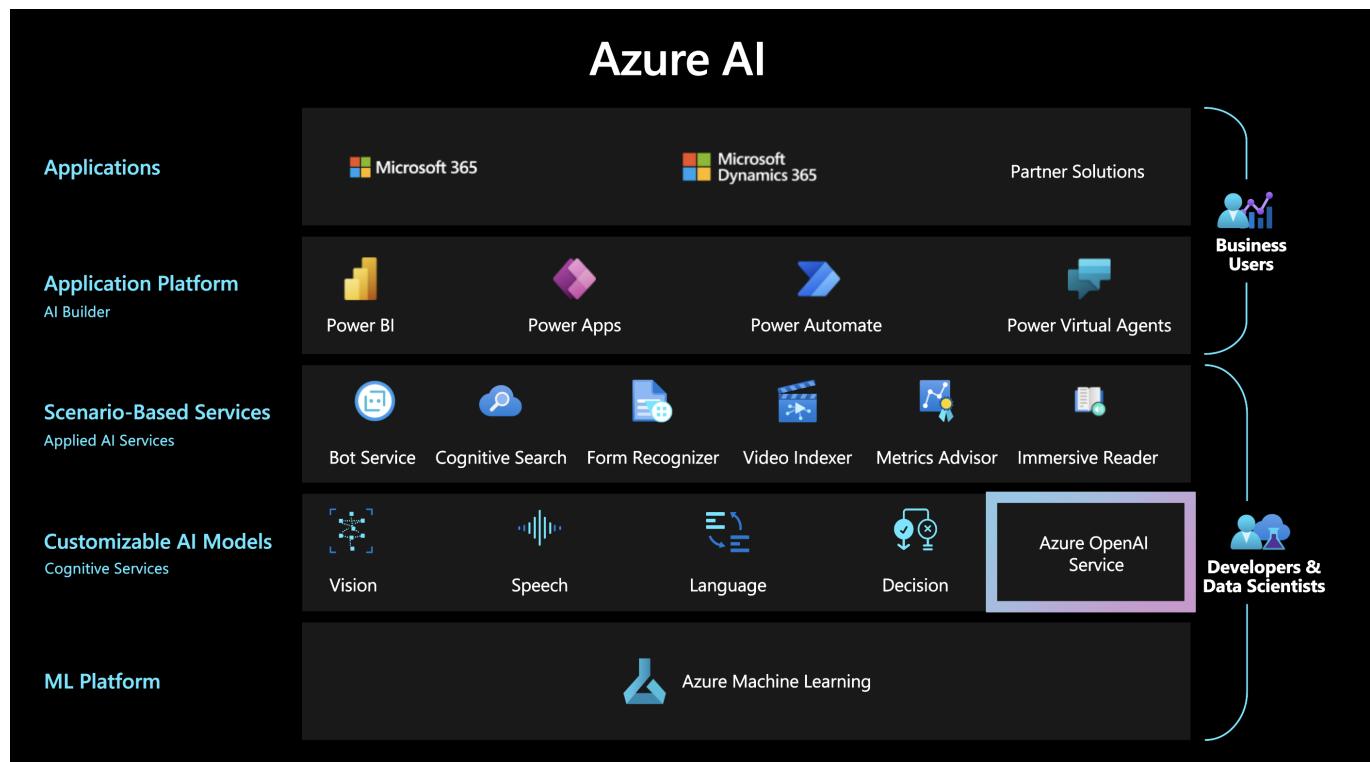


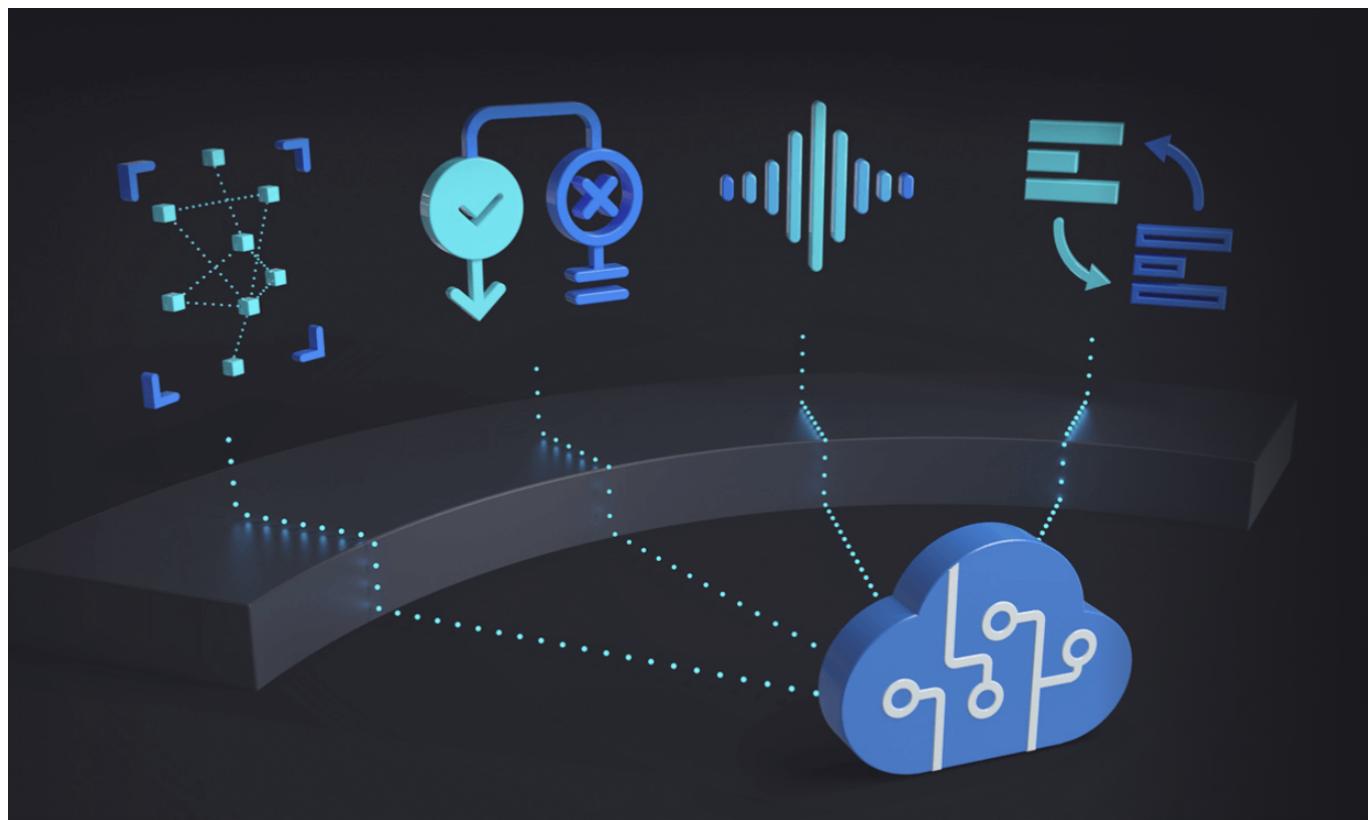
第三章. 结合 Azure AI 拓展你的技能

在前两章，我们学会了如何连接 Azure OpenAI Service，也认识了如何通过 Semantic Kernel 管理和组织不同的技能。生成式 AI 的出现，让人工智能真正具备了“智”的能力，基于不同的 Prompt 来给出答案。那么这些答案能满足行业的需要吗？例如我们需要让生成式 AI 提供新员工入职的注意事项，这个时候生成式 AI 给出的往往是一些错误的答案，因为生成式 AI 并没有你所在企业的员工手册。又例如我们问实时的新闻、我们问 ChatGPT：OpenAI 是否支持插件开发？它也会给出错误的答案。那么我们可以通过什么方法去组织语料来为生成式 AI 提供一些事实依据，从而做到符合真实的解答呢？本章希望通过 Azure 原有的 AI 能力结合 OpenAI 构建人工智能应用来提供解决方案。



Azure AI 有非常强大的人工智能功能，面向不同程度的人群，从开发层面有面向专业人工智能的科学家的 Azure 机器学习服务，有面向非专业人工智能开发人员的 Azure 认知服务，也有面向应用场景的聊天机器人，认知服务搜索，视频索引等，也有从商业应用的商业解决方案 Office 365 , Dynamics 365 , 以及低代码解决方案 Power Apps , Power BI , Power Automate 等。如果你希望打造基于云原生的人工智能企业级方案 Azure AI 绝对是一个最顶级的解决方案。

3.1 认识 Azure 认知服务



Azure 认知服务 (<https://azure.microsoft.com/zh-cn/products/cognitive-services/>) 使每个开发人员和数据科学家都能接触到 AI。借助领先模型，可以解锁各种用例。只需进行 API 调用，即可将查看、收听、朗读、搜索、理解和加速高级决策的功能嵌入到应用中。让所有技能级别的开发人员和数据科学家都能够轻松地向其应用添加 AI 功能。

在 Azure 上有不同的认知服务，主要集中在视觉和语音，语言，例如涉及语言内容的文本，知识，搜索以及实体提取都有，涉及视觉部分的分类，物体识别，还有语音部分的语音转文字，文字转语音的部分。

使用认知服务，你可以很快地使用微软已有模型进行开发，直接完成应用场景。特别当你的团队缺少机器学习 / 深度学习的工程师是相当有用的。

有人会说生成式 AI 的出现，直接取代了认知服务，实际上他们是可以互补的。我们可以结合 Azure 认知服务，完成多场景的人工智能应用。Azure OpenAI Service 已经添加进 Azure 认知服务中，结合微软不同的 AI 产品，可以打造一个完全 AI 的解决方案。

3.1.1 开通 Azure 认知服务

使用 Azure 认知服务很简单，以下是相关步骤

1. 你必须有 Azure 账号(如果你没有 Azure 账号可以通过 <https://azure.com/free> 注册，如果你是学生可以通过 <https://aka.ms/studentgetazure> 免信用卡注册)
2. 打开你的 Azure 门户，创建资源，点击 AI + Machine Learning 选择 Azure Cognitive Service

Create a resource

Get Started

Search services and marketplace

Recently created

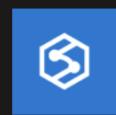
Popular Azure services See more in All services

Categories

AI + Machine Learning

Analytics

Blockchain



Azure Synapse Analytics

Create | Docs | MS Learn



Cognitive Services

Create | Docs | MS Learn

认知服务

3. 选择订阅并填写资源组，名字以及所在区域，就可以直接创建了

Create Cognitive Services

Basics Network Identity Tags Review + create

Get access to Vision, Language, Search, and Speech Cognitive Services with a single API key. Quickly connect services together to achieve more insights into your content and easily integrate with other services like Azure Search.

[Learn more](#)

Project Details

Subscription * ⓘ

Windows Azure MSDN - Visual Studio Ultimate

Resource group * ⓘ

AIGroup

[Create new](#)

Instance Details

Region ⓘ

South Central US

Name * ⓘ

kinfey-azurecognitiveservice



Location specifies the region only for included regional services. This does not specify a region for included non-regional services. Click here for more details.

Pricing tier * ⓘ

Standard S0

[View full pricing details](#)

By checking this box I acknowledge that I

[Review + create](#)

[< Previous](#)

[Next : Network >](#)

注意：Azure 认识服务是一个综合服务，你可以通过该服务完成视觉，语言，文本，决策等不同的功能，你也可以在 Azure 创建单一场景的认知服务，如

All services > Create a resource >

Create Language Understanding

Basics Network Tags Review + create

Language understanding (LUIS) is a natural language processing service that enables you to build your own custom model to understand human language programmatically or through the UI in the LUIS portal. After you are satisfied with your LUIS model, you publish it and query its prediction endpoint through your client application for an end to end conversational flow. To build, manage, train, test and publish your LUIS Model, you will need to create the below Authoring Resource. This also gives you 1,000 requests/month endpoint requests. If you want your client app to request beyond the 1,000 requests provided by the authoring, create the below Prediction Resource. If you know from the start you will be needing more than 1000 prediction requests as well as the authoring experience, create using the "Both" option. This will create two resources, one for each type.

Create options *

Both
 Authoring
 Prediction

Project Details

Subscription * ⓘ Windows Azure MSDN - Visual Studio Ultimate

Resource group * ⓘ Create new

3.1.2 在 .NET 中使用 Azure 认知服务

Azure 认知服务通过 REST API 给到不同的编程语言调用。对于 .NET，你可以使用不同场景的 SDK 或者通过 HttpClient 直接调用来使用不同功能的认知服务。

如我需要使用文本服务，检测文本的语言，就可以通过认知服务的 .NET SDK Azure.AI.TextAnalytics 去调用，步骤如下：

1. 创建一个.ipynb 的 Notebook 文件

```
#r "nuget: Azure.AI.TextAnalytics"
```

2. 引入相关的命名空间

```
using Azure;
using System;
using Azure.AI.TextAnalytics;
using System.Collections.Generic;
```

3. 获取 Azure 认知服务的 Key 和 Endpoint

Home > lukoicognitiveservice

lukoicognitiveservice | Keys and Endpoint

Cognitive services multi-service account

Search Regenerate Key1 Regenerate Key2

Overview Activity log Access control (IAM) Tags Diagnose and solve problems

Resource Management

- Keys and Endpoint** (highlighted)
- Pricing tier Networking Identity Cost analysis Properties Locks

Show Keys

KEY 1 (Copied) ⌂

KEY 2 ⌂

Location/Region (southcentralus)

Endpoint (https://lukoicognitiveservice.cognitiveservices.azure.com/)

4. 用变量设置 Key 和 Endpoint

```
string endpoint = "Your Endpoint";
string apiKey = "Your API Key";
```

5. 创建 TextAnalyticsClient 对象，绑定

```
var client = new TextAnalyticsClient(new Uri(endpoint), new
AzureKeyCredential(apiKey));
```

6. 加入字符串

```
string document =
"Este documento está escrito en un lenguaje diferente al inglés. Su
objetivo es demostrar cómo
+ invocar el método de Detección de Lenguaje del servicio de Text
Analytics en Microsoft Azure."
+ También muestra cómo acceder a la información retornada por el
servicio. Esta funcionalidad es"
+ útil para los sistemas de contenido que recopilan texto"
```

```
arbitrario, donde el lenguaje no se conoce"  
+ " de antemano. Puede usarse para detectar una amplia gama de  
lenguajes, variantes, dialectos y"  
+ " algunos idiomas regionales o culturales.";
```

7. 完成相关判断函数的调用

```
Response<DetectedLanguage> response = client.DetectLanguage(document);  
DetectedLanguage language = response.Value;
```

8. 查看结果

```
language.Name
```

具体执行你可以参考 [..../Code/03.ImportAzureAI/AzureCognitiveServiceForText.ipynb](#)

3.2 必应搜索的检索能力

你有在用必应搜索吗？通过必应可以搜索不同的新闻资料，图片，视频，文档等内容。通过 Azure 可以使用必应搜索的 API。使用必应搜索 API，可以生成联网应用和服务，用于查找网页、图像、新闻、位置以及其他不含广告的内容。通过使用必应搜索 REST API 或 SDK 发送搜索请求，可以获取 Web 搜索的相关信息和内容。在生成式 AI 的场景中，针对一些时效性的内容缺失，我们可以通过必应搜索 API 来提供数据。

你可以通过 Azure Portal 创建必应搜索的 API 服务 - Bing Search V7

Home > Create a resource > Marketplace >

Bing Search v7

Microsoft

Bing Search v7 Microsoft | Azure Service ★ 4.0 (2 ratings)

Plan: Bing Search v7 [Create](#)

[Overview](#) [Plans](#) [Usage Information + Support](#) [Ratings + Reviews](#)

The Bing Search APIs v7 adds intelligent search to your app, combining hundreds of billions of webpages, images, videos, and news to provide relevant results with no ad requirements. The results can be automatically customized to your users' locations or markets, increasing relevancy by staying local. Responses from the Bing Search APIs rank page results, including news, dictionary, computation, and time. Safe search levels are customizable for your users, keeping them from adult content, if required. Finally, the APIs return spelling suggestions for misspelled queries, and lists of related searches. Bring the power of Bing Search to your app today.

Legal Notice

Microsoft will use data you send to Bing Search Services to improve Microsoft products and services. Where you send personal data to this service, you are responsible for obtaining sufficient consent from the data subjects. The Data Protection Terms in the Online Services Terms do not apply to Bing Search Services.

Please refer to the [Search Services Terms](#) for details.

通过选择订阅，以及设定资源组，名字，以及价格，点击创建后就可以使用了

Home > Create a resource > Marketplace > Bing Search v7 >

Create a Bing search resource

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ Windows Azure MSDN - Visual Studio Ultimate

Resource group * ⓘ AIGroup [Create new](#)

Instance details

Name * kinfeysearch

Region Global

i This resource is a global resource that works across Azure regions.

Pricing tier * F1 (3 Calls per second, 1k Calls per month)

[View full pricing tier details](#)

Terms

Microsoft will use data you send to Bing Search Services to improve Microsoft products and services. Where you send personal data to this service, you are responsible for obtaining sufficient consent from the data subjects. The General Privacy and Security Terms in the Online Services Terms do not apply to this service.

[Learn more](#)

I confirm I have read and understood the notice above. *

[Review + create](#) [< Previous](#) [Next : Tags >](#)

调用必应搜索的 API 非常简单，直接通过 HttpClient 调用 API 节点就可以了

具体执行你可以参考 [..../Code/03.ImportAzureAI/BingForNews.ipynb](#)

3.3 利用 Azure Cognitive Search 管理非结构文档

3.3.1 认识 Azure Cognitive Search

Azure Cognitive Search（以前称为“Azure 搜索”）是一个云搜索服务，它为开发人员提供基础结构、API 和工具，用于基于 Web、移动和企业应用程序中的专用异类内容构建丰富的搜索体验。

搜索是将文本呈现给用户的应用的基础，其中常见的场景包括目录或文档搜索，在线零售应用程序，基于专属内容进行数据探索。创建搜索服务时，将使用以下功能：

1. 一个搜索引擎，用于根据包含用户自有内容的搜索索引进行全文搜索
2. 丰富索引编制、词汇分析以及用于提取和转换内容的可选 AI 扩充
3. 用于文本搜索、模糊搜索、自动完成、地理搜索等的丰富查询语法
4. 通过 REST API 和 Azure SDK 中的客户端库实现的可编程性
5. 数据层、机器学习层和 AI（认知服务）级别的 Azure 集成

Azure Cognitive Search 对于非结构文档的搜索有非常好的效果，通过它可以引入更多的非结构化数据作为预料引入到生成式 AI 模型场景，构造一个企业级应用的生成式 AI 方案。

从体系结构方面来讲，搜索服务位于外部数据存储（包含未编入索引的数据）与客户端应用（向搜索索引发送查询请求并处理响应）之间。

在客户端应用中，搜索体验使用 Azure 认知搜索中的 API 定义，可能包括相关性调整、语义排名、自动完成、同义词匹配、模糊匹配、模式匹配、筛选和排序。

在整个 Azure 平台上，认知搜索可以以“索引器”（自动从 Azure 数据源引入/检索数据）和“技能组”（引入认知服务（例如图像和自然语言处理）中的可消耗 AI，或者引入你在 Azure 机器学习中创建的或在 Azure Functions 内包装的自定义 AI）的形式与其他 Azure 服务集成。

如果你希望了解更多 Azure Cognitive Search 的搜索功能，可以查看 <https://learn.microsoft.com/zh-cn/azure/search/>

3.3.2 构建 Azure Cognitive Search

开启 Azure Cognitive Search 的步骤相对之前的步骤比较复杂，我们可以把它分成两部分进行处理

第一部分：在 Azure 上开启 Azure Cognitive Search

1. 打开 Azure 门户，选择创建资源，选择 Azure Cognitive Search 进行创建

Azure Cognitive Search

Microsoft | Azure Service

★ 3.8 (172 ratings)

Plan

Azure Cognitive Search ▼ Create

Overview Plans Usage Information + Support Ratings + Reviews

AI-powered cloud search service for mobile and web app development

Azure Cognitive Search (formerly Azure Search) is the only cloud search service with built-in artificial intelligence (AI) capabilities that enrich all types of information to easily identify and explore relevant content at scale. It uses the same integrated Microsoft natural language stack that Bing and Office have used for more than a decade, and prebuilt AI APIs across vision, language, and speech.

Azure Cognitive Search Features:

- Fully managed search as a service to reduce complexity and scale easily
- Auto-complete, geospatial search, filtering, and faceting capabilities for a rich user experience
- Built-in AI capabilities including OCR, key phrase extraction, and named entity recognition to unlock insights
- Flexible integration of custom models, classifiers, and rankers to fit your domain-specific needs

2. 选择 Azure 订阅，并选择资源组和创建文件名等，这里建议使用至少标准的价格模式，因为需要使用语义搜索这是最低配置

Create a search service

Basics Scale Networking Tags Review + create

Project Details

Subscription * Windows Azure MSDN - Visual Studio Ultimate

Resource Group * Create new

Instance Details

Service name * Enter service name

Location * West US 2

Pricing tier * Standard
25 GB/Partition*, max 12 replicas, max 12 partitions, max 36 search units
[Change Pricing Tier](#)

第二部分：在 Azure Cognitive Search 构建一个非结构化文档搜索

通过 Azure Cognitive Search 可以检索我们的非结构化文档，但这个需要结合我们不同的 Azure 功能，包括 Azure Blob Storage 和 Azure Cognitive Service。

1. 配置 Azure Blob Storage

选择 Azure 门户，点击存储账户



创建账户，除了资源组和名字，区域外，性能选择标准

The screenshot shows the "Create a storage account" wizard in the "Basics" step. The top navigation bar shows "Home > Storage accounts > Create a storage account". The "Basics" tab is selected. The "Subscription" dropdown is set to "Visual Studio Enterprise Subscription". The "Resource group" dropdown is set to "AIGroup" with an option to "Create new". The "Instance details" section includes fields for "Storage account name" (with a note about legacy types), "Region" (set to "(US) East US"), "Performance" (set to "Standard" which is recommended for most scenarios), and "Redundancy" (set to "Geo-redundant storage (GRS)"). At the bottom, there are "Review" and "Next : Advanced >" buttons.

创建成功后，进入新创建的存储账户，选择容器

kinfeyoaistorage Storage account

Overview

Resource group (move) AIGroup

Location South Central US

Primary/Secondary Location Primary: South Central US, Secondary: North Central US

Subscription (move) Windows Azure MSDN - Visual Studio Ultimate

Subscription ID 3579bf17-29da-4b2c-b302-55d72e92a513

Disk state Primary: Available, Secondary: Available

Tags (edit)

添加存储容器

kinfeyoaistorage | Containers

Storage account

Overview

Activity log

Tags

Diagnose and solve problems

Access Control (IAM)

Data migration

Events

Storage browser

Data storage

Containers

New container

Name * demodemo

Public access level Container (anonymous read access for containers and blobs)

All container and blob data can be read by anonymous request. Clients can enumerate blobs within the container by anonymous request, but cannot enumerate containers within the storage account.

选择创建好的容器，上传 ./Code/03.ImportAzureAI/data 中的 pdf 文件到容器中

Home > Storage accounts > kinfeyoaistorage | Containers >

oaistorage Container

Upload Authentication method: Access key (Switch to Azure AD User Account) Location: oaistorage

Search blobs by prefix (case-sensitive)

Name	Modified	Access tier	Archive status	Blob type	Size	Lease state
011.pdf	4/15/2023, 9:50:48 AM	Hot (Inferred)		Block blob	111.66 KiB	Available
012.pdf	4/15/2023, 9:50:48 AM	Hot (Inferred)		Block blob	92.16 KiB	Available

2. 配置 Azure Cognitive Service 请参考本章的 3.1.1 开通 Azure 认知服务

3. 在 Azure Cognitive Search 中选择导入数据，绑定 Azure Blob Storage 并设置索引

The screenshot shows the Azure Cognitive Search service 'lukaoisearch'. The 'Import data' button in the top navigation bar is highlighted with a red box. The main pane displays service details like Resource group (AIGroup), Location (South Central US), and Status (Running). A 'Tags' section is also visible.

选择存在数据，完成 Azure Blob Storage 绑定

The screenshot shows the 'Import data' configuration page. The 'Data Source' dropdown is set to 'Existing data source'. A table lists a single data source named 'kinfeyaoiodocdata' of type 'Azure Blob Storage' connected to 'oainstorage'.

注意: 因为需要设置语音搜索，所以必须绑定 Azure Cognitive Service

The screenshot shows the 'Attach Cognitive Services' configuration page. It lists a cognitive service resource named 'lukaoicognitiveservice' attached to the 'southcentralus' region. A note at the bottom states that the REGION in the table specifies the region only for included regional services.

设置搜索技能，具体字段设置如下，并设置名字

The screenshot shows the 'Skillset' configuration page. It includes fields for Skillset name ('azureblob-skillset'), Source data field ('metadata_storage_content_md5'), and various enrichment options like 'Enable incremental enrichment' and 'Indexer cache location'. The 'Field name' column lists 'people', 'organizations', 'locations', 'keyphrases', and 'language' corresponding to the checked cognitive skills.

索引设置如下

Field name	Type	Retrievable	Filterable	Sortable	Facetable	Searchable	Analyzer
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
content	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾
metadata_storage_cc	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾
metadata_storage_si	Int64	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
metadata_storage_la	DateTimeOffset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
metadata_storage_cc	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾
metadata_storage_na	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
metadata_storage_pa	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
metadata_storage_fil	String	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
metadata_content_ty	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾
metadata_language	String	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
metadata_creation_d	DateTimeOffset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
language	String	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾
keyphrases	StringCollection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾
locations	StringCollection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Standa... ▾

完成后继续添加 indexer 的名字并创建即可

注意： 如果你希望有了解更多的内容，建议你参考该链接 <https://learn.microsoft.com/zh-cn/azure/search/search-create-service-portal>

配置完成后在创建的 Azure Cognitive Service 添加 Semantic search , 选择 Free 就可以了

Home > lukaoisearch

lukaoisearch | Semantic search (Preview)

Search service

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Semantic search (Preview)

Semantic search uses deep neural networks to provide relevant results and answers based on semantics, not just lexical analysis. Additional charges may be applicable.

Availability

Semantic search requires the search service to be on Standard tier in the following regions: Australia East, Canada Central, East US, East US 2, North Central US, Southeast Asia, South Central US, West US, West US 2, North Europe, UK South, West Europe.

Settings

Semantic search (Preview)

Knowledge Center

Free
1,000 requests per month
\$0.00/month

Standard
250,000 requests per month
\$2.00 per 1,000 additional requests.
\$499.72/month

Select Plan

Learn more

这样就配置好 Azure Cognitive Search 。

3.3.3 验证创建的 Azure Cognitive Search

我们可以尝试验证刚创建好的 Azure Cognitive Search，步骤如下

1. 在 Azure Cognitive Search 中选择搜索浏览

The screenshot shows the Azure Cognitive Search service dashboard for a search service named 'lukaoisearch'. The 'Search explorer' button in the top navigation bar is highlighted with a red box. The dashboard displays various service details such as Resource group, Location, Subscription, Status, and Tags. A central callout text reads: 'Build a full-text search experience with AI and semantic search. Get started building a full-text search experience and learn how to integrate with your custom applications and other Azure services.'

通过搜索浏览就可以测试检索的结果，并可设置一些相关的参数

2. 语义全文检索，需要配置一些相关内容，需要开启语义搜索

The screenshot shows the 'Search explorer' interface for the 'lukaoisearch' service. On the left, there are sections for Index (set to 'kinfeyazureblob-index'), Query string (with examples), Query options (Preview), Semantic search (Preview), Spell correction (Preview), Request URL, and Results. On the right, a modal window titled 'New semantic configuration' is open, prompting for a 'Name' (left empty) and 'Title field' (set to 'metadata_storage_content_md5'). Below these are sections for Content fields (listing 'metadata_storage_content_md5', 'content', 'metadata_storage_name', and a placeholder 'Please select a field') and Keyword fields (listing 'metadata_storage_content_md5' and 'keyphrases'). At the bottom of the modal are 'Save' and 'Cancel' buttons.

3. 我们可以做一些测试，例如，新能源车的发展

Search explorer ...

lukaoisearch

Index

Query string API version

Query options (Preview)

Query language

Semantic search (Preview)
Semantic search uses deep neural networks to provide relevant results and answers based on semantics, not just lexical analysis. Additional charges may be applicable.
 On

Semantic configuration
The semantic configuration gives semantic search hints about which fields are most important for providing semantic results, answers and captions.

Spell correction (Preview)
Modifies the query terms with correctly spelled terms. No additional charges will apply. Supports English (US), German (DE), French (FR), Spanish (ES) and Dutch (NL).
 Off

Request URL

Results

```

1  {
2   "@odata.context": "https://lukaoisearch.search.windows.net/indexes('kinfeyazureblob-index')/$metadata#docs(*)",
3   "@search.answers": [],
4   "value": [
5     {
6       "@search.score": 3.7929528,
7       "@search.rerankerScore": 0.04084968566894531,
8       "@search.captions": [
9         {
10           "text": "那么下面呢，就系统地介绍一下新能源汽车发展有什么样的优势。首先呢，第一个新能源 汽车有良好的环保的这种效果，那么在这两张图",
11           "highlights": ""
12         }
13       ],
14       "content": "\n那么下面呢，就系统地介绍一下新能源汽车发展有什么样的优势。首先呢，第一个新能源\n\n汽车有良好的环保的这种效果，那么在这两"

```

3.3.4 用 .NET 调用 Azure Cognitive Search

你可以参考 [../Code/03.ImportAzureAI/AzureCognitiveSearchDemo.ipynb](#) 来了解具体的实现情况

3.4 本章小结

在生成式 AI 风行的年代，原有的 AI 技术不是被取代，而是会继续沿用补充生成式 AI 的不足。通过云原生的 AI 技术，可以整合更多的场景。本章为大家介绍了在 Azure 上的 AI 技术，希望大家可以结合生成式的 AI 完成更专业的行业应用。

相关资料

1. 关于 Azure Cognitive Services <https://learn.microsoft.com/en-us/azure/cognitive-services/>
2. 关于 Azure Bing Search API <https://learn.microsoft.com/en-us/azure/cognitive-services/bing-web-search/>
3. 关于 Azure Cognitive Search <https://learn.microsoft.com/zh-cn/azure/search/>