

# Cognitive Mining AI Solution

Scope and use-case  
definition

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# Scope

## Use-case definition

1. Uncover latent insights from all your content.
2. Identify and explore relevant content at scale.
3. AI capabilities such as OCR, translation, key phrase extraction, location, people, and organization detection.

### 01 Objective and Executive Summary

### 02 Ingestion

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## 01 Objective and Executive Summary

Businesses collect a staggering amount of data every day, largely in unstructured formats. Across industries, companies stand to benefit greatly if they can harness and refine this untapped resource. To do so, they need to extract structured data from unstructured content to make it more consumable by business systems, from search to analytics. This is where **Cognitive Mining** comes in.

**Cognitive mining** refers to the orchestration of a series of AI services to uncover latent insights in vast amounts of data. **Cognitive Mining** makes it easier to bring the benefits of AI, whether by enhancing search functionality in business applications or improving business processes through automation.

Conceptually, it is easy to see that **Cognitive Mining** can help any company needing to explore or surface a large amount of information quickly, repeatedly, and accurately. It can save hundreds of manual hours, enabling users to make informed decisions quickly and turn their attention to higher-value activities.

To get started, business leaders must identify concrete use cases that tie to their business objectives. This document will

## 02 Ingestion

Cognitive mining starts with ingesting structured and unstructured data. Documents qualify as unstructured data, including images, videos, audio files, PDFs, Word docs, PowerPoints, spreadsheets, emails, web files, rich text formats, and JSON files, among many others.

1. Could you share a rough estimate on the unstructured documents that would be part of the cognitive mining solution?
  - a. .pdfs
  - b. .docs
  - c. .docx
  - d. .jpg
  - e. .ppt
  - f. .xls
  - g. .png
  - h. .rft
  - i. .json
  - j. .html
  - k. .xml
  - l. Video
  - m. Audio
  - n. Other?
2. Structured Data?
  - a. Data bases? Could you share the type and size?
  - b. File Store?
  - c. Blob Store?
3. Could you share a rough estimate on the expected monthly increments?
  - a. Structured
  - b. Unstructured

## 03 Enrichment

Next, data must be enriched in order to extract information, find patterns, and gain understanding. Language and vision AI services can be leveraged to uncover valuable information.

- Natural language processing services can understand written and spoken human language to interpret sentiment, detect and translate languages, or extract words, phrases, people, locations, and organizations.
- Computer vision services can analyze images or videos to detect and classify faces, landmarks, celebrities, or other objects. They can also caption images and transcribe handwriting.

Below you'll find a set of questions regarding AI skills that could be integrated as part of the solution. The sum of all the AI skills will consolidate the final Cognitive Mining Solution.

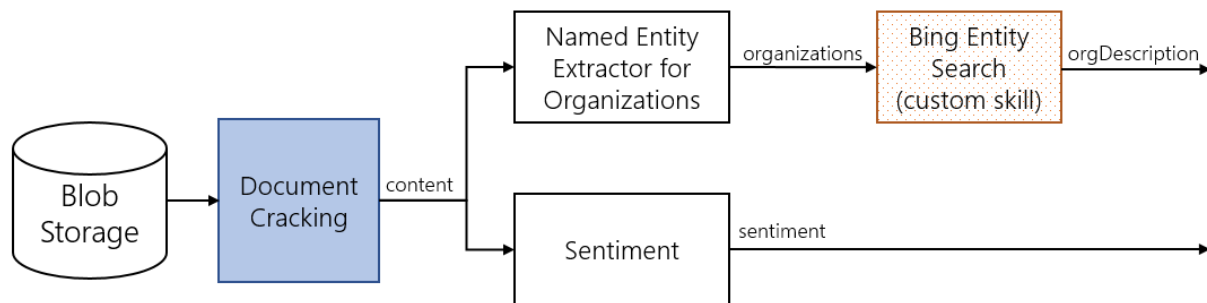
## Begin with the end in mind

A recommended initial step is deciding which data to extract from your raw data and how you want to use that data in a search solution. Creating an illustration of the entire enrichment pipeline can help you identify the necessary steps.

Suppose you are interested in processing a set of financial analyst comments. For each file, you want to extract company names and the general sentiment of the comments. You might also want to write a custom enricher that uses the Entity Search to find additional information about the company, such as what kind of business the company is engaged in. Essentially, you want to extract information like the following, indexed for each document:

Record-text	companies	sentiment	company descriptions
sample-record	["Microsoft", "LinkedIn"]	0.99	["Microsoft Corporation is an American multinational technology company ...", "LinkedIn is a business- and employment-oriented social networking..."]

The following diagram illustrates a hypothetical enrichment pipeline:



- Based in the previous example, for your organization, which of the following AI skills do you envision being enabled? Please, answer YES, NO, and if possible, provide an example:
  - a. **OCR:** Optical character recognition. Detects embedded printed and handwritten text, extract recognized words into machine-readable character streams, and enable searching.
  - b. **Image Analysis:** This skill uses an image detection algorithm to identify the content of an image and generate a text description.

- c. **Face detection:** Detect and compare faces, organize images into groups based on similarities, and identify previously tagged people in images. Features:
  - i. Face verification checks the likelihood that two faces belong to the same person.
  - ii. Face detection finds faces in an image and predicts facial attributes like age, gender.
  
- d. **Phrase Extraction:** This skill uses a pretrained model to detect important phrases based on term placement, linguistic rules, proximity to other terms, and how unusual the term is within the source data.
  
- e. **Entity Recognition:** This skill uses a pretrained model to establish entities for a fixed set of categories: people, location, organization, emails, URLs, datetime fields.
  
- f. **Object Detection:** Enable the identification of particular objects (i.e. named images).
  
- g. **Language Identification:** This skill uses a pretrained model to detect which language is used (one language ID per document). When multiple languages are used within the same text segments, the output is the LCID of the predominantly used language.
  
- h. **Language Translation:** This skill uses a pretrained model to translate the input text into a variety of languages for normalization or localization use cases.
  
- i. **Sentiment Analysis:** This skill uses a pretrained model to score positive or negative sentiment on a record by record basis. The score is between 0 and 1. Neutral scores occur for both the null case when sentiment cannot be detected, and for text that is considered neutral.
  
- j. **Bing Search:** Enrich data by integrating the top results for a particular entity (i.e. companies) from a search engine.
  
- k. **Video indexer:** Extracts metadata such as spoken words, written text, faces, speakers, celebrities, emotions, topics, brands, and scenes from video and audio files.
  
- l. **Custom Skill:** Is there any custom and particular need you might want to include that we have not considered here? Please, describe it.

## 04 Exploration

Finally, once enrichment is complete, your organization can explore this newly structured data in end-user applications. The data could be pulled into a search index, which is often referred to as a “cognitive search” application. It could also be pulled directly into business apps like customer relationship management (CRM), enterprise resource planning (ERP), and robotic process automation (RPA).

- How do you envision obtaining the results from the Cognitive Mining Solution? Through a searchable website? An app?
- Should search results be scored?
  - a. Scoring refers to the computation of a search score for every item returned in search results. The score is an indicator of an item's relevance in the context of the current search operation. The higher the score, the more relevant the item. In search results, items are rank ordered from high to low, based on the search scores calculated for each item. We can customize the calculation through a scoring profile. Scoring profiles give greater control over the ranking of items in search results. A scoring profile is part of the index definition, composed of weighted fields, functions, and parameters.

### Example scenario:

A contract management provider has issues with accurately parsing contracts into clause sections and extracting key metadata within scanned legacy contract PDF's and Word documents. Document search is another problem, as legal language is much different than the normal day-to-day language, so finding similar words or phrases can be notoriously difficult. Using cognitive search with custom skills increased the quality of their offering. For their customers, it saved legal professionals significant time reviewing and managing lengthy contracts manually; reduced risk by identifying risky language and important phrases (like text associated to GDPR for example) as well as finding contract obligations that are coming due.

