Taki
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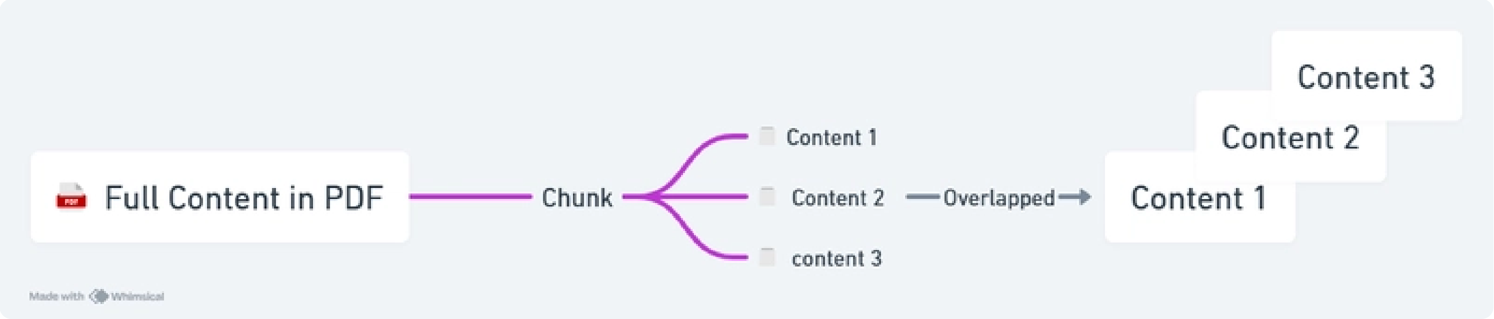
What is Chunk Size and Chunk Overlap

#langchain #rag #ai #programming



What is Chunk Size?

The chunk size refers to **the maximum number of characters or tokens** allowed in a single chunk. For example, if the chunk size is 300, each chunk will have up to 300 characters.

Example:
Imagine this text:

> Chunking is the process of breaking a large piece of text into smaller, manageable pieces to make it easier to process and analyze.

if the **chunk size** is 40 characters:

- Chunk 1: "Chunking is the process of breaking a"
- Chunk 2: "large piece of the text into smaller,"
- Chunk 3: "manageable piece to make it easier"
- Chunk 4: "to process and analyze."

Notes: you can use tool to count of tokens Tokenizer or you can use tiktoken like that:

```
import { encoding_for_model } from "tiktoken";
const text = "Chunking is the process of breaking a large piece of text into smaller, mai
const tokenizer = encoding_for_model("gpt-3.5-turbo");
const tokens = tokenizer.encode(text);

console.log(`Total count of tokens: ${tokens.length}`);
```

What is Chunk Overlap?

Chunk Overlap refers to the **number of characters or tokens shared between consecutive chunks**. Overlapping ensures that important context is not lost when diving the text into smaller parts.

Example:
Using the same text:

> Chunking is the process of breaking a large piece of text into smaller, manageable pieces to make it easier to process and analyze.

With a **chunk size of 40 and an overlap of 10**:

- Chunk 1: "Chunking is the process of **breaking a**"
- Chunk 2: "**breaking a** large piece of the **text into**,"
- Chunk 3: "**text into**, manageable **piece**"
- Chunk 4: "**piece** to make it easier to **process**"
- Chunk 5: "**process** and analyze."

Here, "breaking a" is part of both Chunk 1 and Chunk 2, ensuring that no context is lost between chunks.

What should you use overlap?

- **Long sentences:** Prevents sentences from being split in a way that loses meaning.
- **Preserving context:** Ensures context is maintained for task like embedding or searching.

How to Chunk Text Programmatically (with Langchain):

```
import { RecursiveCharacterTextSplitter } from "langchain/text_splitter";

const text = "Chunking is the process of breaking a large piece of text into smaller, ma
const splitter = new RecursiveCharacterTextSplitter({
  chunkSize: 40,      // Maximum size of each chunk
  chunkOverlap: 10,   // Overlap between chunks
});

const chunks = await splitter.splitText(text);
console.log(chunks);
```

output:

```
[
  'Chunking is the process of breaking a',
  'a large piece of text into smaller,',
  'smaller, manageable pieces to make it',
  'make it easier to process and analyze.'
]
```

Why Chunking Matters

- For Embedding Models: Many models have a token limit, so chunking ensures the text fits.
- Improves Retrieval: Overlapping chunk helps capture text, making retrieval results more accurate.
- Scalability: Large texts are broken into smaller pieces, allowing efficient processing.

How to set Chunk Size and Chunk Overlap

- **Chunk Size:** Aim to fit within the model's token limit (e.g., Open AI models like *text-davinci-003* or *gpt-3.5-turbo* typically have token limits ranging from 4000 to 6000) but small enough for efficient processing. **Common values range from 200 to 500 tokens per chunk for embedding tasks.**
- **Chunk Overlap:** Generally, overlap is set to **10%-20% of the chunk size** to ensure continuity. This overlap ensures that the last few tokens of one chunk carry over to the next

chunk, preserving context for embedding or search tasks

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