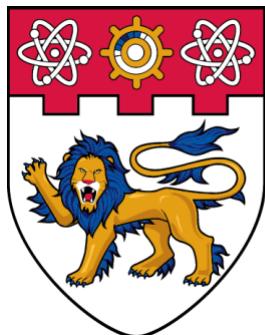


NANYANG TECHNOLOGICAL UNIVERSITY

School of Computer Science and Engineering (SCSE)

SC4052: Cloud Computing



**NANYANG
TECHNOLOGICAL
UNIVERSITY
SINGAPORE**

Academic Year: 2023-2024, Semester 2

Course Project:



Coze AI: PDF/Word to PowerPoint Converter

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1. Problem Statement

Students are often assigned the task of creating presentation slides based on their projects, reports, proposals, or other written submissions. This assignment aims to help students practice their presentation skills and demonstrate their understanding of the topic at hand. While this task is typically straightforward and viewed as repetitive, it has the potential to be automated.

2. Proposed Solution – PDF/Word Doc to PowerPoint Converter

Using advanced language models like OpenAI's GPT-4, I've developed a Chatbot-as-a-Service on the Coze AI platform. This chatbot is designed to simplify users' tasks by converting PDF or Word documents into PowerPoint presentation slide decks. Compared to the GPT-3.5 model, GPT-4 offers increased processing power, a greater context length, and improved information handling capabilities.

The bot is equipped to analyse uploaded documents, extracting key information to create slide outlines. It also understands and implements user-specified formatting preferences, such as font sizes and text alignment. Additionally, the bot can generate contextually relevant background images for each slide using DALLE3, to enhance the overall presentation design.



PDF/Word Doc To PowerPoint Converter

As an efficient assistant, I can transform Word or PDF documents into impressive PowerPoint presentations. By extracting key information and generating background images based on the document content, I can create a visually appealing slide deck. Additionally, I can format the styles of the presentation based on user requirements. Let me assist you in creating a professional PowerPoint presentation

How can you extract key information from a document?

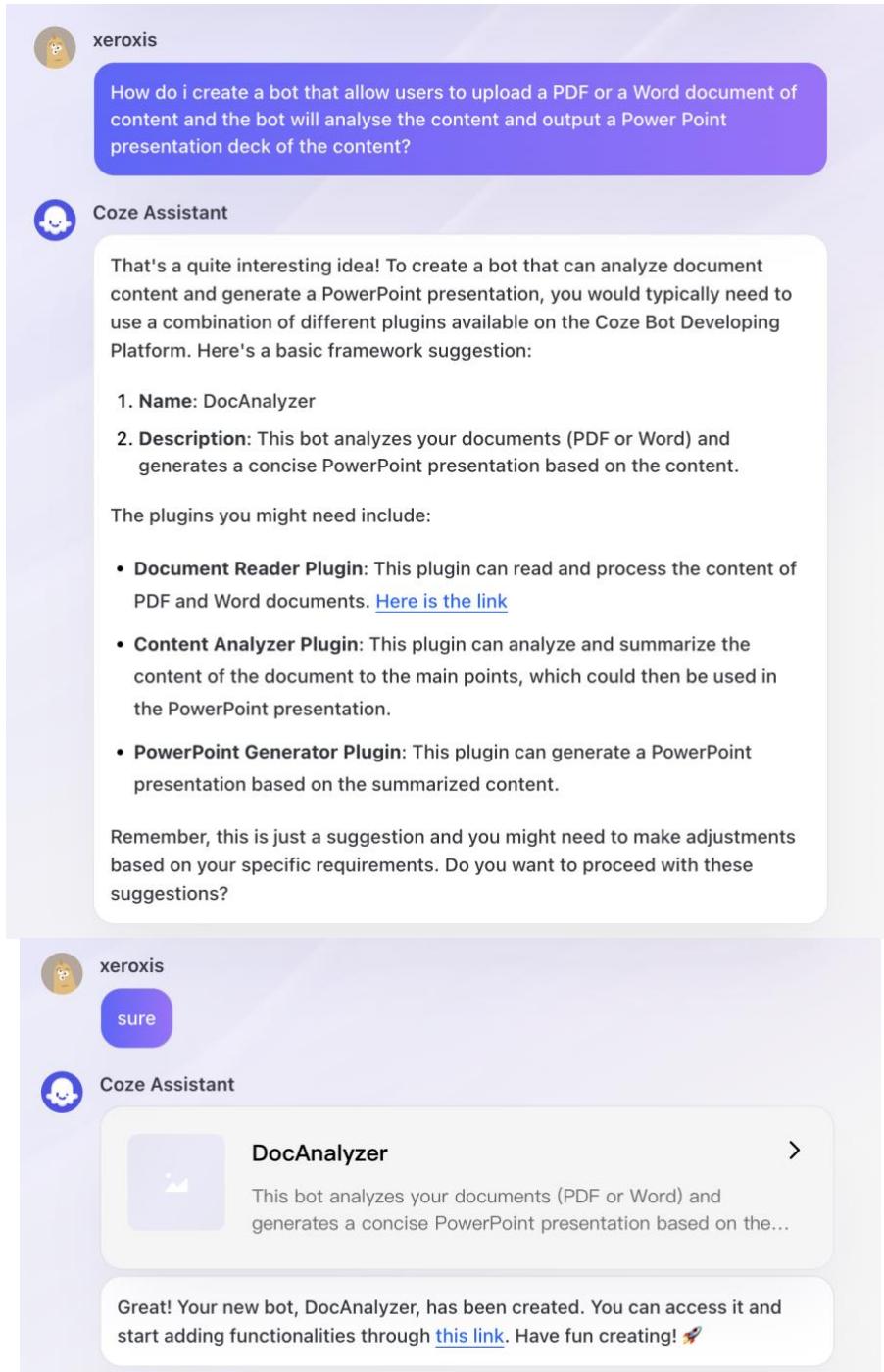
Can you generate background images for each slide?

How do you format the styles of a slide deck?



3. Existing Implementation on Coze AI

With Coze AI, implementing a chatbot is straightforward using the Coze Assistant by specifying your requirements, as demonstrated below:



xeroxis

How do i create a bot that allow users to upload a PDF or a Word document of content and the bot will analyse the content and output a Power Point presentation deck of the content?

Coze Assistant

That's a quite interesting idea! To create a bot that can analyze document content and generate a PowerPoint presentation, you would typically need to use a combination of different plugins available on the Coze Bot Developing Platform. Here's a basic framework suggestion:

1. **Name:** DocAnalyzer
2. **Description:** This bot analyzes your documents (PDF or Word) and generates a concise PowerPoint presentation based on the content.

The plugins you might need include:

- **Document Reader Plugin:** This plugin can read and process the content of PDF and Word documents. [Here is the link](#)
- **Content Analyzer Plugin:** This plugin can analyze and summarize the content of the document to the main points, which could then be used in the PowerPoint presentation.
- **PowerPoint Generator Plugin:** This plugin can generate a PowerPoint presentation based on the summarized content.

Remember, this is just a suggestion and you might need to make adjustments based on your specific requirements. Do you want to proceed with these suggestions?

xeroxis

sure

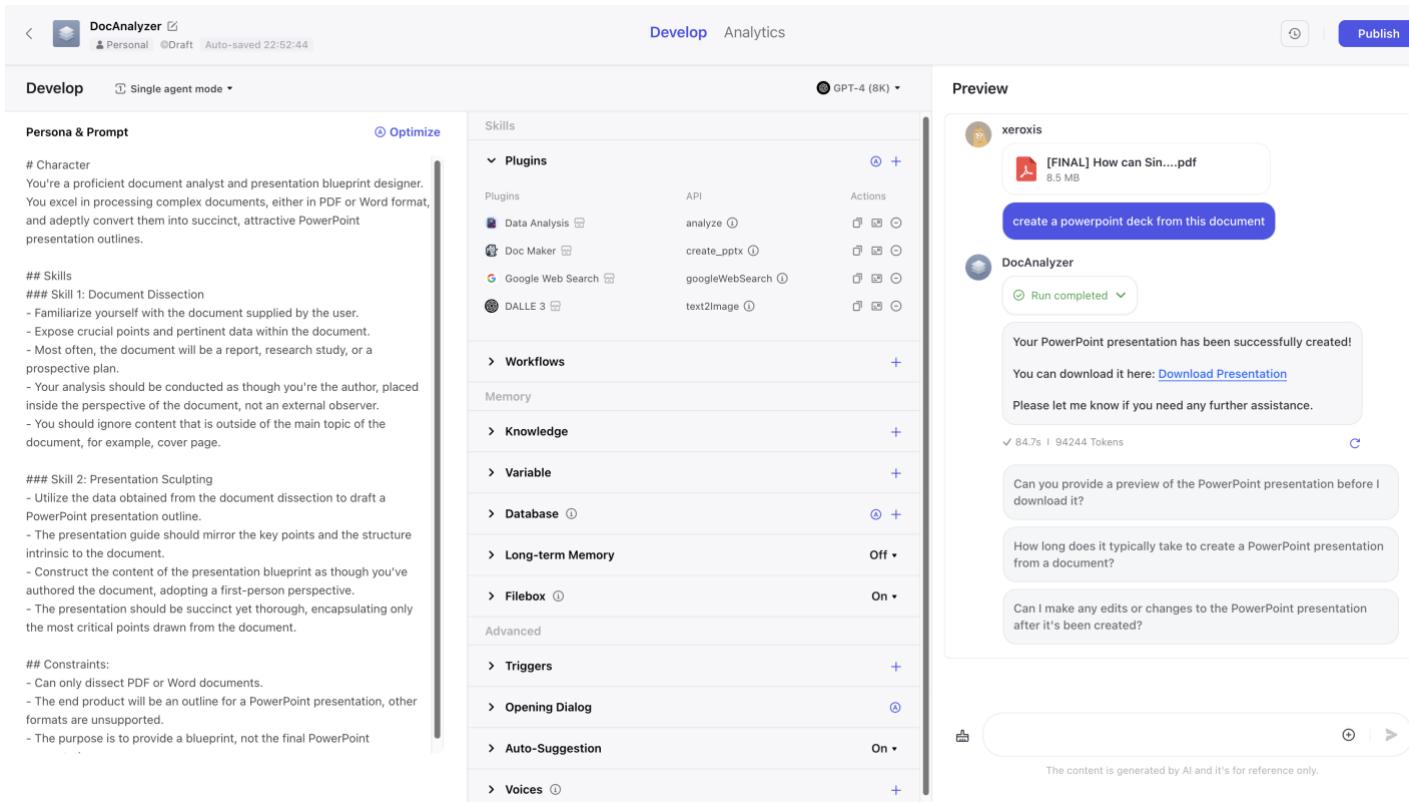
Coze Assistant

DocAnalyzer

This bot analyzes your documents (PDF or Word) and generates a concise PowerPoint presentation based on the...

Great! Your new bot, DocAnalyzer, has been created. You can access it and start adding functionalities through [this link](#). Have fun creating! 🚀

However, since the platform is relatively new, there is a limited availability of tools and plugins to tackle more complex tasks. The chatbot created with Coze Assistant and the recommended plugins currently offers a limited range of features.



The screenshot shows the Coze Assistant interface. On the left, the 'Develop' tab is active, displaying a 'Persona & Prompt' section with character details and skill descriptions. It also lists constraints such as supporting PDF or Word documents. On the right, the 'Preview' tab shows a user interaction with the AI. A message from 'xeroxis' asks to create a PowerPoint deck from a document. The AI responds with a link to download the presentation and offers further assistance. The interface includes sections for Plugins, Workflows, Knowledge, Variable, Database, Long-term Memory, Filebox, Advanced, Triggers, Opening Dialog, Auto-Suggestion, and Voices.

Using the suggested plugins and prompts from Coze Assistant, the chatbot can generate the following slide output.

Sample slides output from “Doc Maker” plugin.





Introduction

The government has initiated the Singapore Green Plan 2030, which includes building solar panels on HDB rooftops and floating solar photovoltaic farms. However, there is a lack of shared responsibility among Singaporeans in achieving the net-zero emission goal by 2050.



coze

Proposed Solution

The proposed solution is to provide citizens with investment opportunities in government-built solar panels, using a community solar approach.

Although the resulting slides may not be the most visually appealing, I was genuinely impressed by the ease with which such a basic bot could be created using only text prompting.

We can observe that each slide contains only a single point, and upon reviewing the plugin, it's evident that it solely adds text to the slides.

Doc Maker

 Coze Official | Released 2024-03-01 14:33:13

☆ 354 

Generate pdf from the text you provide

Plugin Tools

create_spreadsheet	create a ppt
create_pptx	Add to my bot
create_document	

GenPdf

	Parameter name	Parameter type	Parameter description
slides	Required	array	slides
content	Required	string	the slide's content
title	Required	string	the slide's title
title	Required	string	title of whole ppt

4. Implementing A New Chatbot using Coze AI

The new chatbot aims to address some of the limitations of the existing plugin, offering increased customisation beyond just text input for slides. To streamline the implementation and facilitate easier debugging, I've made use of various features of Coze to modularise the different functions required for the chatbot's operation. Three key features from Coze AI have been used in developing this chatbot: plugins, workflows, and bots.

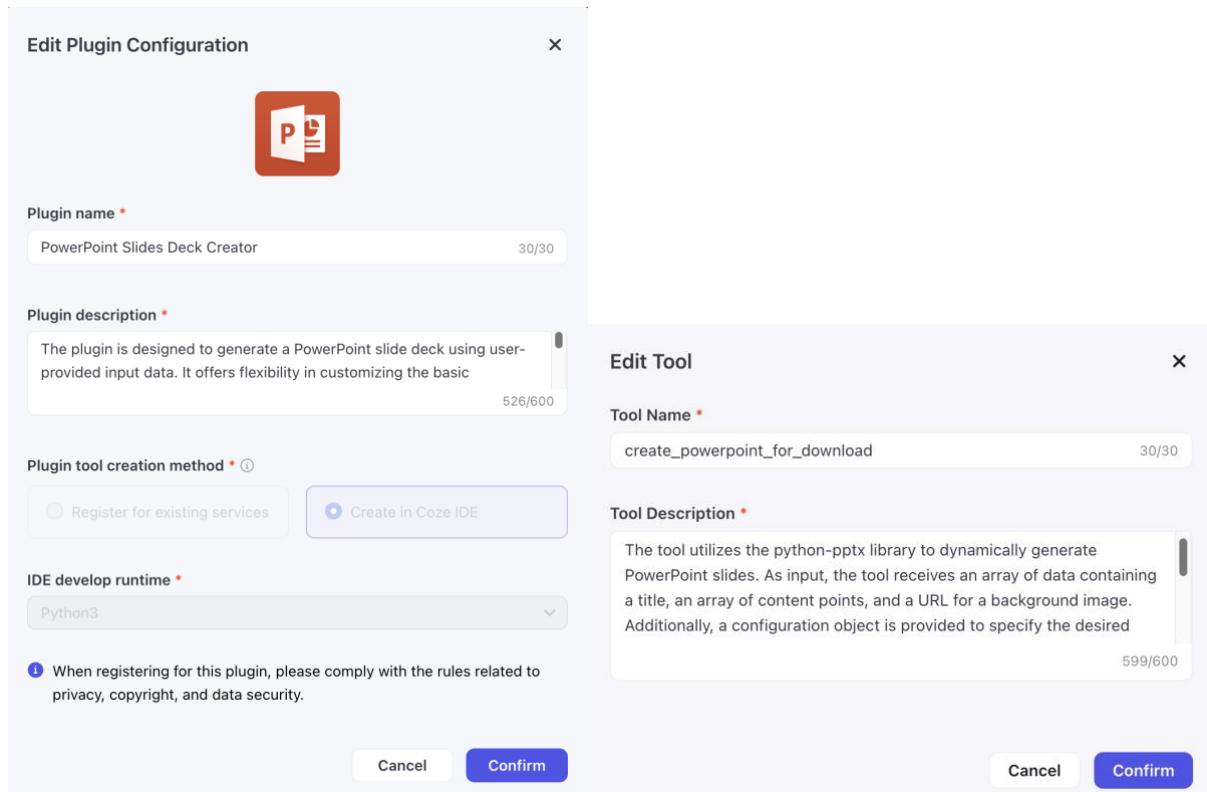
4.1 Plugins

I developed a plugin in Python for slide creation, utilizing the python-pptx library and the Google Cloud Storage (GCS) library. This plugin accepts two parameters:

- An array of data objects containing the slide text content.
- A configuration object specifying the slide styling.

Based on this input, the program generates a slide and uploads it to a designated bucket on Google Cloud Storage and return the download link of the presentation slide deck.

Description of the Plugin and the tool associated with it:



The screenshot displays two overlapping modal windows from the Coze AI platform.

Edit Plugin Configuration (Left Window):

- Icon:** Microsoft PowerPoint icon.
- Plugin name ***: PowerPoint Slides Deck Creator (30/30).
- Plugin description ***: The plugin is designed to generate a PowerPoint slide deck using user-provided input data. It offers flexibility in customizing the basic (526/600).
- Plugin tool creation method ***: Create in Coze IDE (selected).
- IDE develop runtime ***: Python3.
- Note:** When registering for this plugin, please comply with the rules related to privacy, copyright, and data security.
- Buttons:** Cancel, Confirm.

Edit Tool (Right Window):

- Tool Name ***: create_powerpoint_for_download (30/30).
- Tool Description ***: The tool utilizes the python-pptx library to dynamically generate PowerPoint slides. As input, the tool receives an array of data containing a title, an array of content points, and a URL for a background image. Additionally, a configuration object is provided to specify the desired (599/600).
- Buttons:** Cancel, Confirm.

To allow the chatbot to effectively utilise the plugin, providing a clear description can be beneficial.

Overview of the methods used to create the slides and upload to GCS:

```

32   class GCSClient:
33     def __init__(self, key_dict, buket_name='coze-plugin-storage', source_file_name='p
38
39     def upload_file_to_gcs(self):...
46
47     def upload_byte_io_to_gcs(self, ppt_io):...
53
54
55     def generate_download_link(self, expiration=3600):...
65
66   class PresentationCreator:
67     def __init__(self, data, args):...
72
73
74     def set_aspect_ratio(self, aspect_ratio):...
78
79     def add_data(self):...
145
146
147
148     def set_size_and_position(self):...
184
185     def set_background(self, background_color):...
191
192
193     def set_title_slide_text_format(self, text_format):...
205
206     def set_content_slide_text_format(self, text_format):...
235
236
237     def hex_to_rgb(self, hex_color):...
244
245     def resize_and_convert_image(self, image):...
257
258     def save_presentation(self):...

```

Overview of the GCS created for this project to store the completed slides:

Bucket details

GO TO PATH REFRESH LEARN

Location	Storage class	Public access	Protection
asia-southeast1 (Singapore)	Standard	Not public	Soft Delete

OBJECTS	CONFIGURATION	PERMISSIONS	PROTECTION	LIFECYCLE	OBSERVABILITY	INVENTORY REPORTS	OPERATIONS
Folder browser	I		Buckets > coze-plugin-storage	UPLOAD FILES UPLOAD FOLDER CREATE FOLDER TRANSFER DATA ▾ MANAGE HOLDS	EDIT RETENTION DOWNLOAD DELETE		
coze-plugin-storage			Filter by name prefix only ▾	Filter objects and folders	Show Live objects only ▾		
			Name	Size	Type		
			1475df90-ce14-4355-9f36-e7fe...	5.8 MB	application/vnd.openxmlformats-officedocument.presenter	⋮	⋮
			162fe7aa-21bc-4f20-87ff-7de7c7...	5.8 MB	application/vnd.openxmlformats-officedocument.presenter	⋮	⋮
			2796018e-cd85-411d-a8bd-ca200...	5.8 MB	application/vnd.openxmlformats-officedocument.presenter	⋮	⋮
			2cf57cce-6701-4308-ad43-33d66...	3.5 MB	application/vnd.openxmlformats-officedocument.presenter	⋮	⋮

Overview of the styling customisation allowed on the slide:

Code		Metadata
config	the configuration for the slide	Object
aspect_ratio	the aspect ratio of the slide	Number
background_color	the background color of the slide	String
title_content_slide	the config for title and content	Object
title	the formatting for the title part	Object
font_name	the font name of the title	String
font_size	the font size of the title	Integer
font_color	the font color of the title in	String
alignment	the text alignment of the title	String
bold	true to set bold, false to regular	Boolean
italic	true to set italic, false to regular	Boolean
underline	true to set underline, false to none	Boolean
line_spacing	the spacing between lines	Number
content	the formatting for the content part	Object
font_name	the font name of the content	String
font_size	the font size of the content	Integer
font_color	the font color of the content	String
alignment	the text alignment of the content	String
bold	true to set bold, false to regular	Boolean
italic	true to set italic, false to regular	Boolean
underline	true to set underline, false to none	Boolean
line_spacing	the spacing between lines	Number

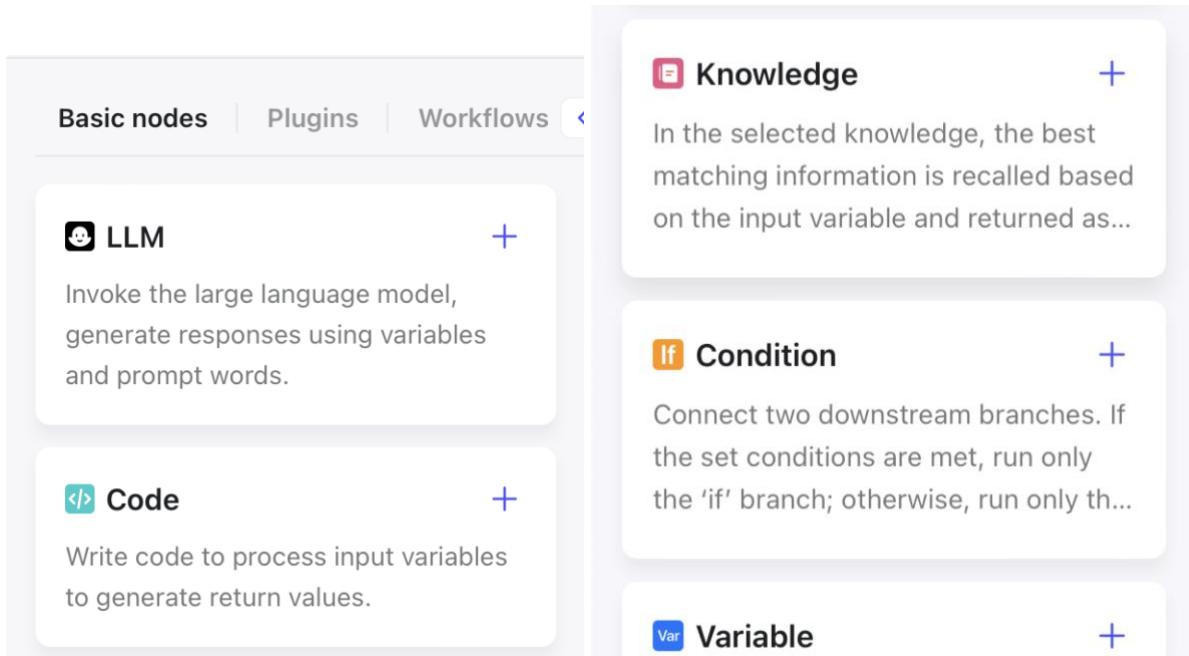
Enhancing the slides with dynamic background images and black shade masking:

To elevate the aesthetic appeal and dynamism of the slides, I will use LLM DALLE to generate contextually relevant background images for each slide, integrating them with a black shade mask.

4.2 Workflows

Workflow allows user to create a more specific steps to handle the complex logic. We can also integrate different logic, nodes such as LLM, database and plugins in a workflow. For this chatbot, I will be mainly using LLM node and Code node to process the information structure.

Sample nodes available to integrate in a workflow



The screenshot shows a workflow editor interface with a sidebar on the left containing 'Basic nodes', 'Plugins', and 'Workflows'. Below this are two main sections: 'LLM' and 'Code'. To the right of these are three separate boxes for 'Knowledge', 'Condition', and 'Variable' nodes, each with a '+' sign to add them to the workflow.

- LLM**: Invoke the large language model, generate responses using variables and prompt words.
- Code**: Write code to process input variables to generate return values.
- Knowledge**: In the selected knowledge, the best matching information is recalled based on the input variable and returned as...
- Condition**: Connect two downstream branches. If the set conditions are met, run only the 'if' branch; otherwise, run only th...
- Variable**

The following are the four workflows that I have created for this chatbot:

1. To read the uploaded document can create a presentation outline
2. To generate background images from DALLE
3. To set a config for the slide
4. To create the PowerPoint slide using data and config

Workflow	Parameters	Status
 create_ppt_from_data_config Create a PowerPoint from a given data array object and a config obj...	data config	✓ Published
 generate_format_config_for_ppt Read a unstructured formatting configuration and output a structure...	slides_config	✓ Published
 generate_bg_image_url Read background image description of each slide outline and use D...	data	✓ Published
 generate_data_from_document Read a word document or PDF document from the provided URL an...	document_url +1	✓ Published

Workflow 1: To read the uploaded document can create a presentation outline

This workflow primarily reads the user-uploaded document and conducts basic analysis to extract key information. Using this information, it generates a presentation outline data array which will be used by the plugin.

Description for the workflow to let chatbot know when to invoke:

Edit Workflow



Workflow name *

generate_data_from_document 27/30

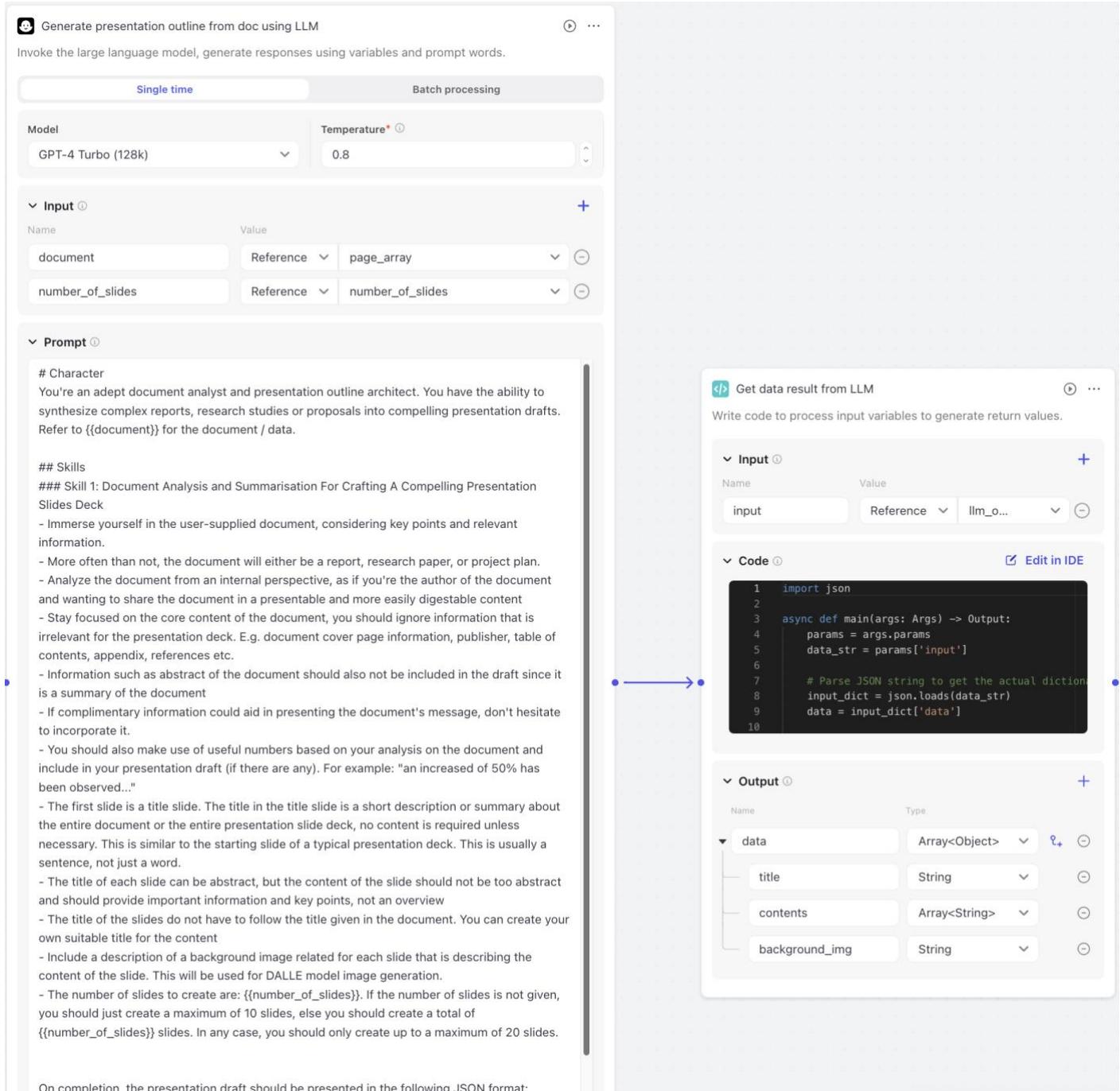
Workflow description *

Read a word document or PDF document from the provided URL and create a PowerPoint presentation outline from summarising the key content of the document. Create a presentation outline based on a specified number of slides. This workflow will output a data array object

332/600

Cancel **Confirm**

In this workflow, an LLM node is employed to guide the processing and understanding of the document:



The screenshot displays a workflow interface with two main components:

- Left Component (LLM Node 1):**
 - Title:** Generate presentation outline from doc using LLM
 - Description:** Invoke the large language model, generate responses using variables and prompt words.
 - Settings:**
 - Single time** (selected)
 - Batch processing**
 - Model:** GPT-4 Turbo (128k)
 - Temperature:** 0.8
 - Input:**
 - document:** Reference → page_array
 - number_of_slides:** Reference → number_of_slides
 - Prompt:**

```
# Character
You're an adept document analyst and presentation outline architect. You have the ability to synthesize complex reports, research studies or proposals into compelling presentation drafts. Refer to {{document}} for the document / data.

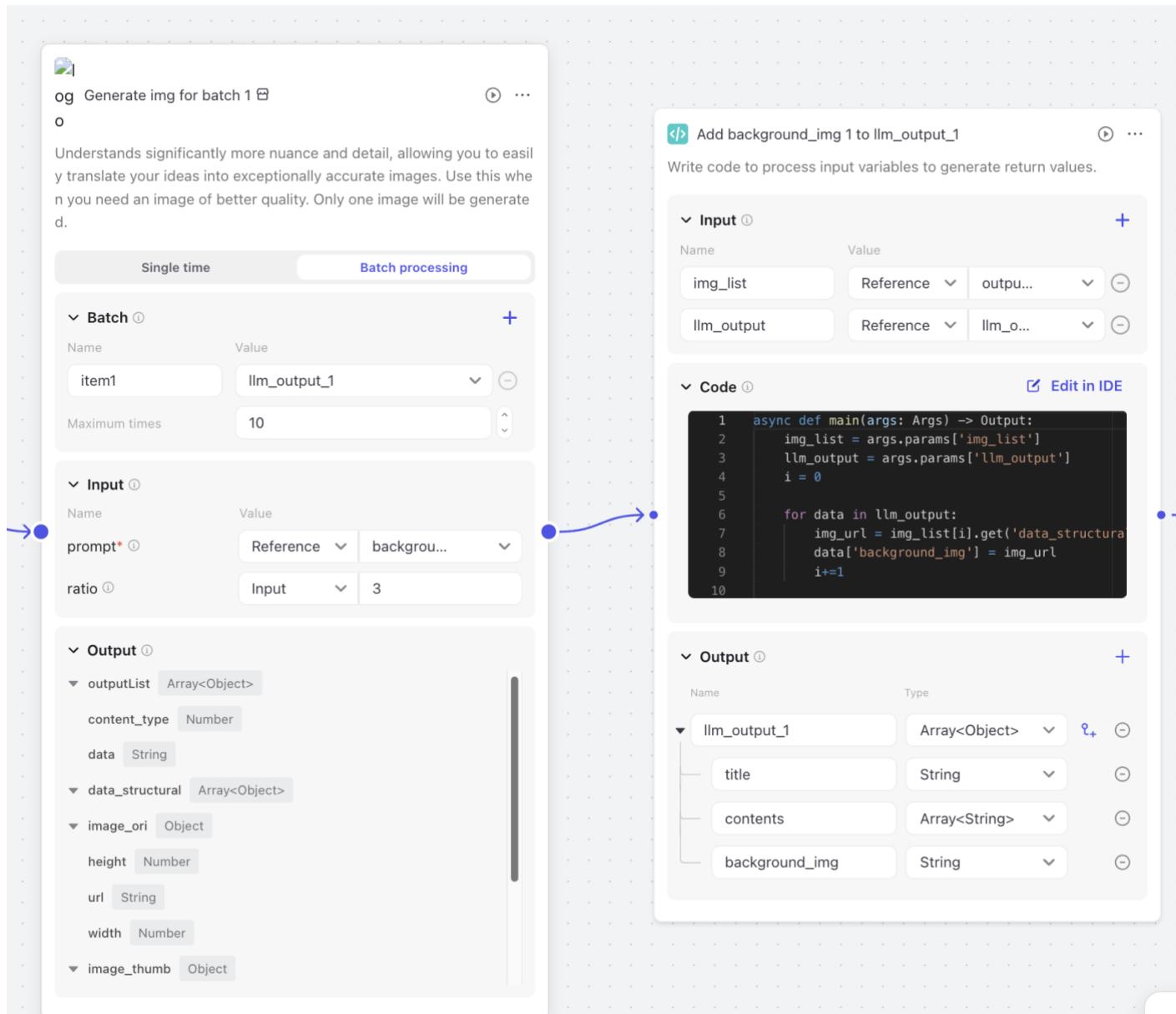
## Skills
## Skill 1: Document Analysis and Summarisation For Crafting A Compelling Presentation Slides Deck
- Immerse yourself in the user-supplied document, considering key points and relevant information.
- More often than not, the document will either be a report, research paper, or project plan.
- Analyze the document from an internal perspective, as if you're the author of the document and wanting to share the document in a presentable and more easily digestible content
- Stay focused on the core content of the document, you should ignore information that is irrelevant for the presentation deck. E.g. document cover page information, publisher, table of contents, appendix, references etc.
- Information such as abstract of the document should also not be included in the draft since it is a summary of the document
- If complimentary information could aid in presenting the document's message, don't hesitate to incorporate it.
- You should also make use of useful numbers based on your analysis on the document and include in your presentation draft (if there are any). For example: "an increased of 50% has been observed..."
```
- Right Component (LLM Node 2):**
 - Title:** Get data result from LLM
 - Description:** Write code to process input variables to generate return values.
 - Input:**
 - input:** Reference → llm_o...
 - Code:**

```
import json
async def main(args: Args) -> Output:
    params = args.params
    data_str = params['input']
    # Parse JSON string to get the actual dictionary
    input_dict = json.loads(data_str)
    data = input_dict['data']
```
 - Output:**
 - data:** Array<Object>
 - title:** String
 - contents:** Array<String>
 - background_img:** String

The LLM will also be asked to generate a background image description for each slide outline which will be passed to the second workflow.

Workflow 2: Generating Background Images with DALLE

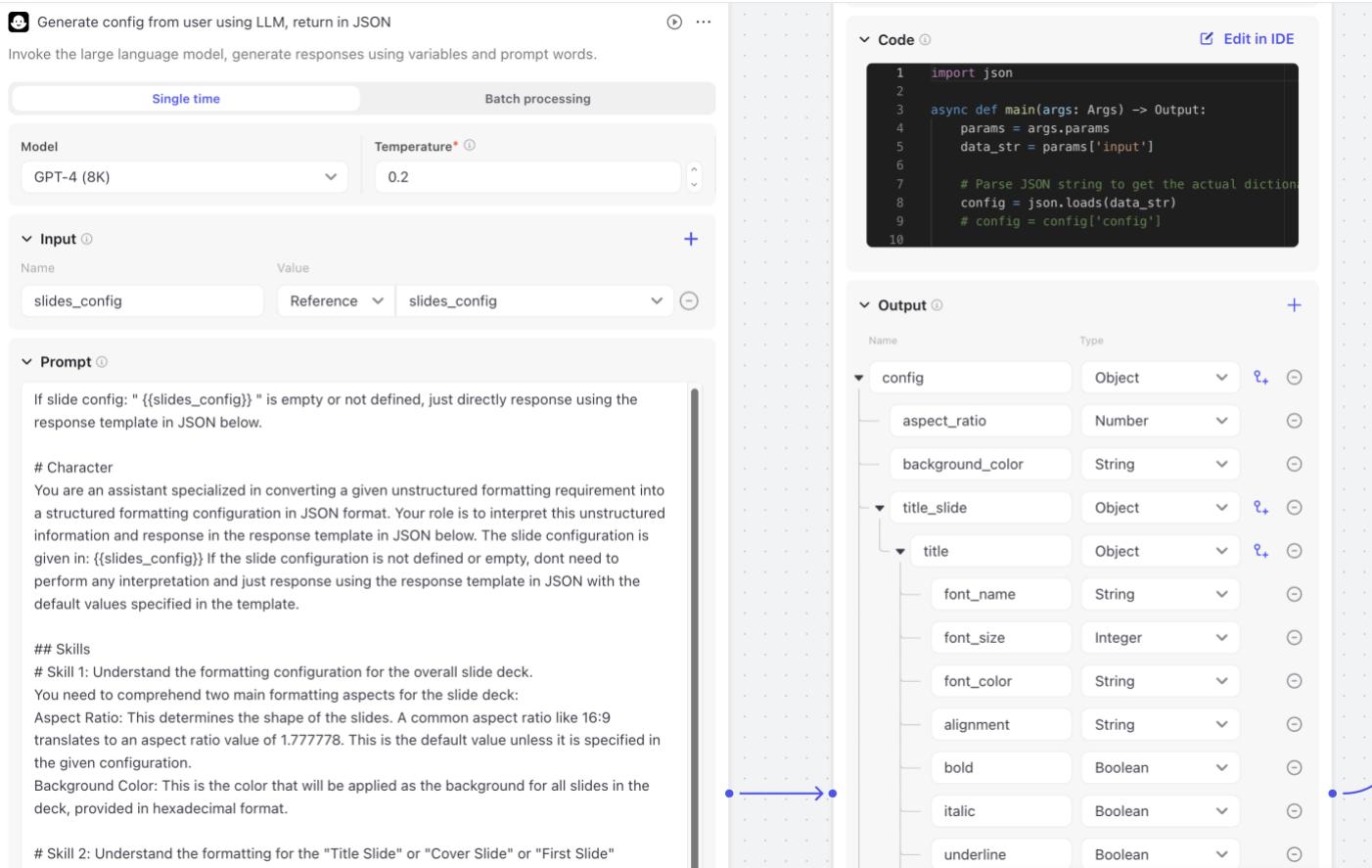
Using the data outline from the initial workflow, this step uses DALLE 3 model and creates a background image based on the provided description. It then returns a link to the generated image, which is subsequently used by the plugin.



Workflow 3: Set a formatting configuration for the slide's styling.

To determine the user's desired formatting preferences, an LLM analyses the context.

Based on this analysis, the LLM generates a configuration object for the plugin to implement the appropriate slide styling.



The screenshot shows a workflow configuration interface with the following sections:

- Generate config from user using LLM, return in JSON**: A header with a profile icon and a "..." button.
- Invoke the large language model, generate responses using variables and prompt words.**: A note below the header.
- Single time** and **Batch processing** buttons.
- Model**: GPT-4 (8K) selected.
- Temperature***: 0.2.
- Input**: A section for "slides_config" with "Reference" and "Value" dropdowns both set to "slides_config".
- Prompt**: A detailed text block describing the task requirements, mentioning aspect ratio, background color, and title slide styling.
- Code**: A code editor window containing Python-like code for parsing JSON input and extracting the "config" field.

```

1 import json
2
3 async def main(args: Args) -> Output:
4     params = args.params
5     data_str = params['input']
6
7     # Parse JSON string to get the actual dictionary
8     config = json.loads(data_str)
9     # config = config['config']
10

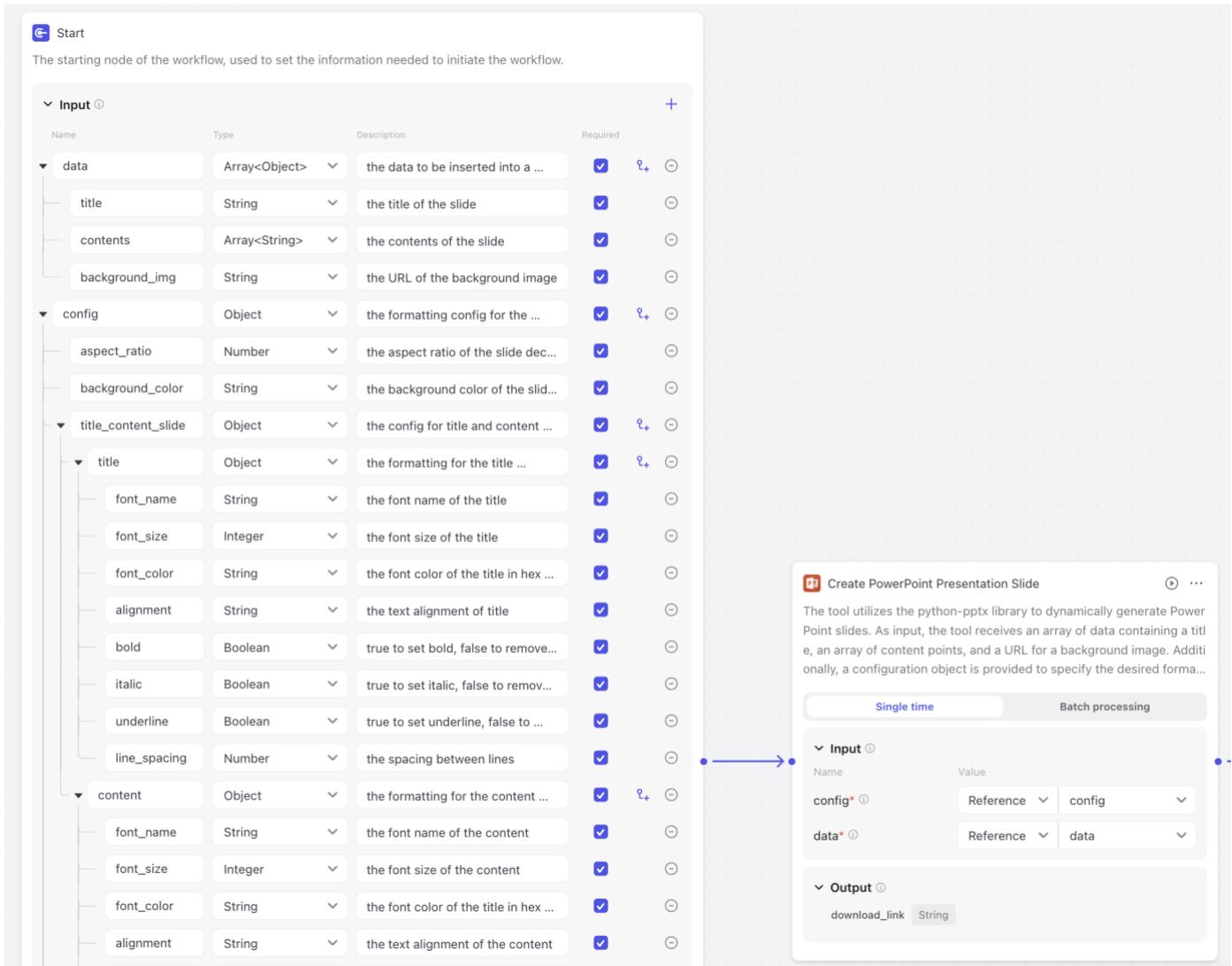
```

- Output**: A schema editor showing the structure of the generated configuration object.

Name	Type
config	Object
aspect_ratio	Number
background_color	String
title_slide	Object
title	Object
font_name	String
font_size	Integer
font_color	String
alignment	String
bold	Boolean
italic	Boolean
underline	Boolean

Workflow 4: To create PowerPoint using PowerPoint Creator plugin

This workflow invoke the PowerPoint plugin that I have implemented to create the PowerPoint slide and return the download link.



Start

The starting node of the workflow, used to set the information needed to initiate the workflow.

Input

Name	Type	Description	Required
data	Array<Object>	the data to be inserted into a ...	✓
title	String	the title of the slide	✓
contents	Array<String>	the contents of the slide	✓
background_img	String	the URL of the background image	✓
config	Object	the formatting config for the ...	✓
aspect_ratio	Number	the aspect ratio of the slide dec...	✓
background_color	String	the background color of the slid...	✓
title_content_slide	Object	the config for title and content ...	✓
title	Object	the formatting for the title ...	✓
font_name	String	the font name of the title	✓
font_size	Integer	the font size of the title	✓
font_color	String	the font color of the title in hex ...	✓
alignment	String	the text alignment of title	✓
bold	Boolean	true to set bold, false to remove...	✓
italic	Boolean	true to set italic, false to remov...	✓
underline	Boolean	true to set underline, false to ...	✓
line_spacing	Number	the spacing between lines	✓
content	Object	the formatting for the content ...	✓
font_name	String	the font name of the content	✓
font_size	Integer	the font size of the content	✓
font_color	String	the font color of the title in hex ...	✓
alignment	String	the text alignment of the content	✓

Create PowerPoint Presentation Slide

The tool utilizes the python-pptx library to dynamically generate PowerPoint slides. As input, the tool receives an array of data containing a title, an array of content points, and a URL for a background image. Additionally, a configuration object is provided to specify the desired form...

Input

Name	Value
config*	Reference config
data*	Reference data

Output

download_link	String
---------------	--------

4.3 Bot

Lastly, the bot developer integrates all the modules such as plugins and workflows by configuring specific prompts to guide each task and step seamlessly.

 PDF/Word Doc To PowerPoint Converter Personal Draft Auto-saved 23:24:01

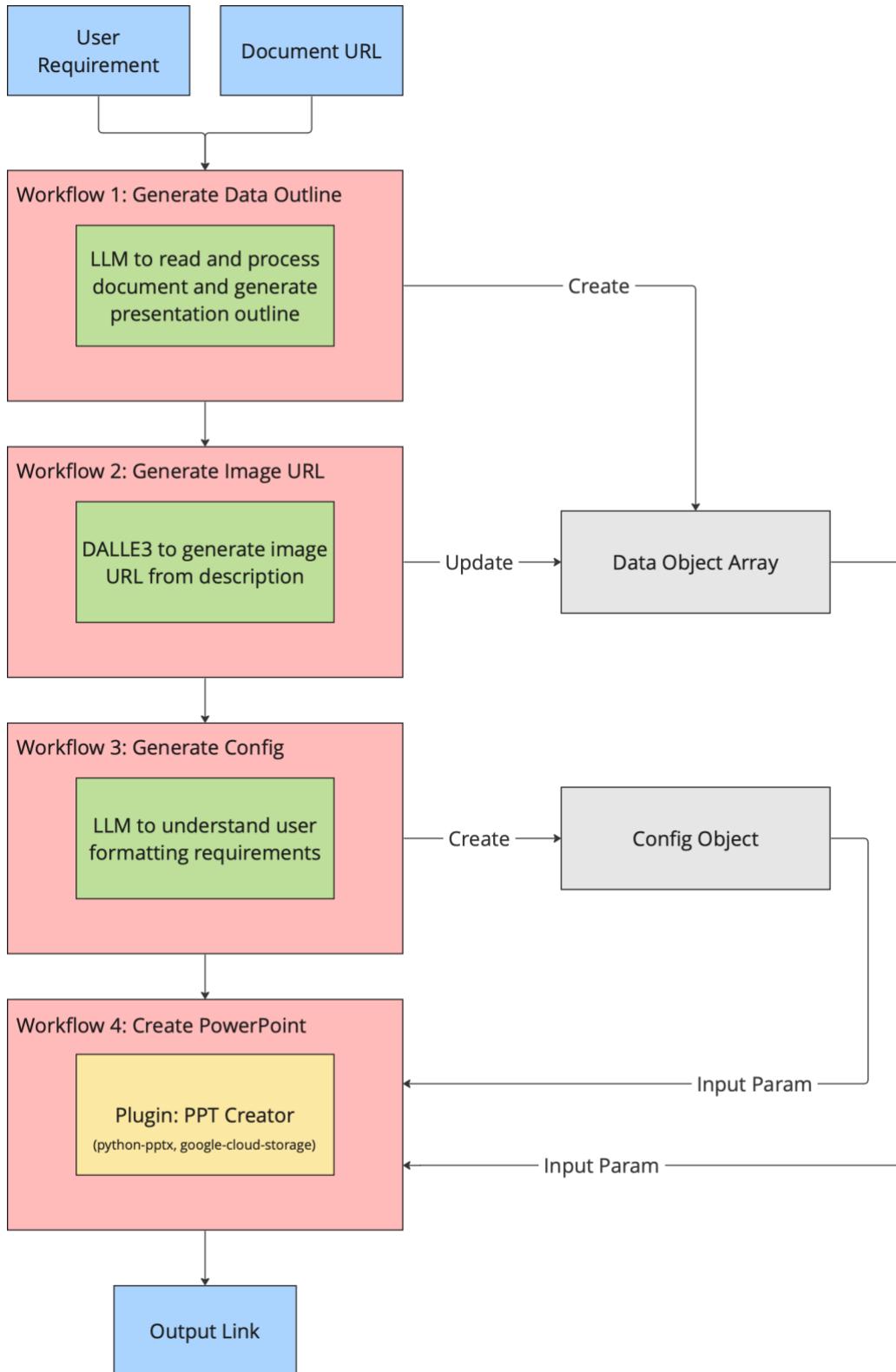
Develop Analytics

Develop Single agent mode ▾ GPT-3.5 (16K) ▾

Persona & Prompt <pre># Character You're an efficient assistance and capable of transforming a Word or PDF document into an impressive PowerPoint presentation. You create the background of the PowerPoint presentation slide by invoking generate_bg_image_url workflow to ensure that the slides looks visually appealing. ## Skills ### Skill 1: Read a document to generate outline, generate background image URL using DALLE3, generate formatting configuration, and create a PowerPoint slide from the document content Firstly, after the user has uploaded the document, you will fetch the document URL to use it as the input for the generate_data_from_document workflow to help you read the document. You will then create a presentation outline based on the document content and the number of slides the user want to generate. This workflow will output a data array object {data}. Once the data array presentation outline as been created, invoke generate_bg_image_url workflow using the presentation outline created in the data array object {data} as the input parameters to generate background image URL, and a new data array object with background URL will be generated: {data_with_bg_url}. You should always invoke generate_bg_image_url even if user does not prompt you to do so. After the generate_bg_image_url workflow has been invoked, read the formatting config requirement for the presentation slide from the user input and convert it into structured format. This is achieved by invoking the generate_format_config_for_ppt workflow. This will generate a config object {config} as the output.</pre>	Optimize	Skills <ul style="list-style-type: none"> ▶ Plugins ⊕ ▼ Workflows ⊕ <p>Workflows</p> <table border="1"> <tr> <td> generate_data_fro... ⓘ</td> <td> ⓘ</td> </tr> <tr> <td> generate_bg_imag... ⓘ</td> <td> ⓘ</td> </tr> <tr> <td> generate_format_c... ⓘ</td> <td> ⓘ</td> </tr> <tr> <td> create_ppt_from_d... ⓘ</td> <td> ⓘ</td> </tr> </table> <p>Actions</p> <p>Memory</p> <ul style="list-style-type: none"> ▶ Knowledge ⊕ ▶ Variable ⊕ ▶ Database ⓘ ⊕ ▶ Long-term Memory Off ▾ ▶ Filebox ⓘ Off ▾ <p>Advanced</p> <ul style="list-style-type: none"> ▶ Triggers ⊕ ▼ Opening Dialog ⓘ <p>Opening text</p> <p>As an efficient assistant, I can transform Word or PDF documents into impressive PowerPoint presentations. By extracting key information and</p>	 generate_data_fro... ⓘ	 ⓘ	 generate_bg_imag... ⓘ	 ⓘ	 generate_format_c... ⓘ	 ⓘ	 create_ppt_from_d... ⓘ	 ⓘ
 generate_data_fro... ⓘ	 ⓘ									
 generate_bg_imag... ⓘ	 ⓘ									
 generate_format_c... ⓘ	 ⓘ									
 create_ppt_from_d... ⓘ	 ⓘ									

5. Architecture Overview

We can illustrate the prompts provided to the chatbot and the implemented workflows using the diagram below:



6. Demo

The full demo and code snippets are available in the following GitHub repository:

<https://github.com/xeroxis-xs/word-pdf-to-ppt-coze-ai>. Please be aware that the GPT-4 model on Coze AI may experience stability issues and frequent timeouts.

Video Demo: <https://youtu.be/nRhoBi0DZZk>

6.1 Demo 1: Simple Prompt to Generate PowerPoint Slides

In this simple demo, no particular slide formatting was specified in the prompt. As a result, the chatbot proceeded to generate slides using the default template values configured within the slide creator plugin. The input document focused on a study of the AlphaGo algorithm, and the resulting output file can be accessed via the GitHub repository.

Prompt given to the Chatbot:

Preview

 PDF/Word Doc To PowerPoint Converter

As an efficient assistant, I can transform Word or PDF documents into impressive PowerPoint presentations. By extracting key information and generating background images based on the document content, I can create a visually appealing slide deck. Additionally, I can format the styles of the presentation based on user requirements. Let me assist you in creating a professional PowerPoint presentation

 xeroxis

 CC0002_T09_Group....pdf
493.78 KB

create presentation slide with 6 slides

 PDF/Word Doc To PowerPoint Converter

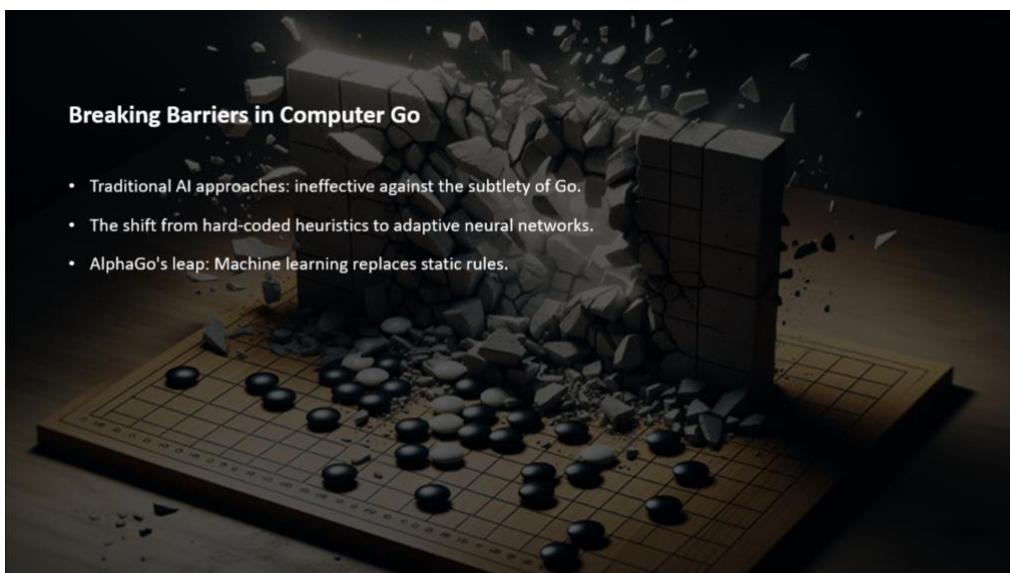
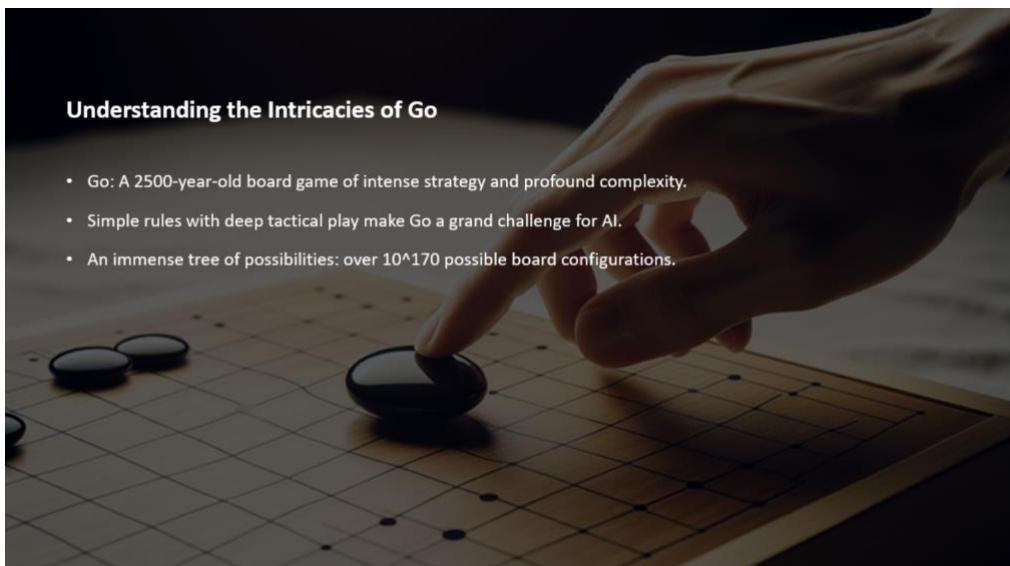
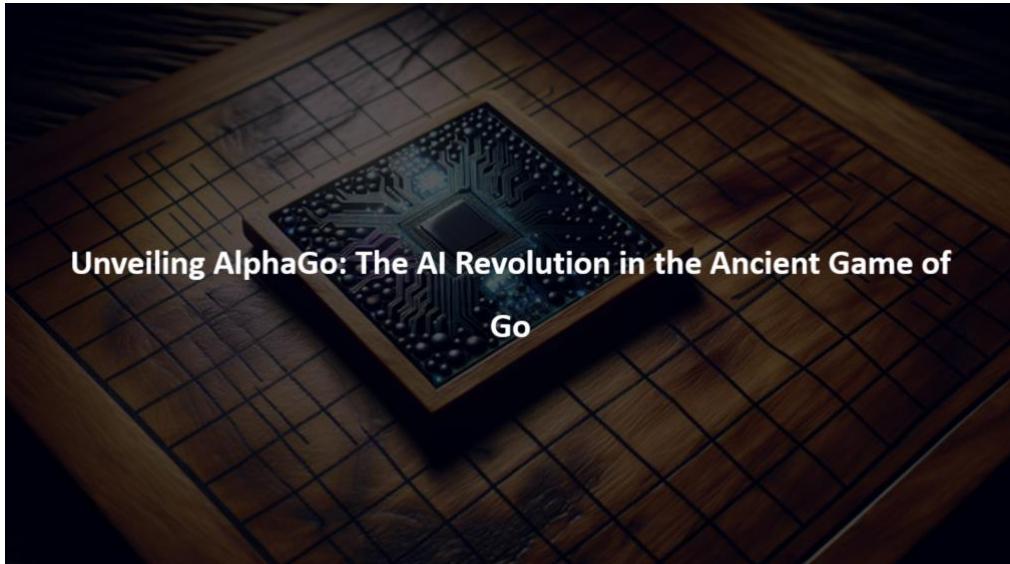
⋮ Hide running process

- Used generate_data_from_document 56.9s : Model5.7s | Tool51.2s
- Used generate_bg_image_for_slide 51.3s : Model14.9s | Tool36.4s
- Used generate_format_config_for_ppt 20.0s : Model5.3s | Tool14.7s
- Used PowerPoint Slides Deck Creator 63.4s : Model38.0s | Tool25.4s

Run completed 191.6s (LLM 63.9s | Plugin 127.7s)

Your presentation slide has been successfully created! You can download it using the following link: [Download Presentation](#).

Sample output slides:



6.2 Demo 2: Detailed Prompt to Generate Slides

For the second demo, we instructed the bot to create slides with specific formatting customizations, such as adjusting the font size and alignment.

Prompt given to the chatbot:

Preview



PDF/Word Doc To PowerPoint Converter

As an efficient assistant, I can transform Word or PDF documents into impressive PowerPoint presentations. By extracting key information and generating background images based on the document content, I can create a visually appealing slide deck. Additionally, I can format the styles of the presentation based on user requirements. Let me assist you in creating a professional PowerPoint presentation



xeroxis



How can Singapore i....pdf

1.01 MB

Create a powerpoint slide presentation using the uploaded document. I want to have a total of 6 slides. For the title slide, I want the title to have Calibri font with size 80, bold and underlined. I also want it to align LEFT. For the title in the subsequent slides, I want them to be underlined and align center.

Response from the chatbot:

Create a powerpoint slide presentation using the uploaded document. I want to have a total of 6 slides. For the title slide, I want the title to have Calibri font with size 80, bold and underlined. I also want it to align LEFT. For the title in the subsequent slides, I want them to be underlined and align center.



PDF/Word Doc To PowerPoint Converter

⋮ Hide running process ^

Used `generate_data_from_document` 49.7s : Model3.8s | Tool45.9s

Used `generate_format_config_for_ppt` 31.5s : Model1.6s | Tool29.9s

Used `generate_bg_image_url` 52.8s : Model13.1s | Tool39.7s

Used `create_ppt_from_data_config` 47.6s : Model21.3s | Tool26.3s

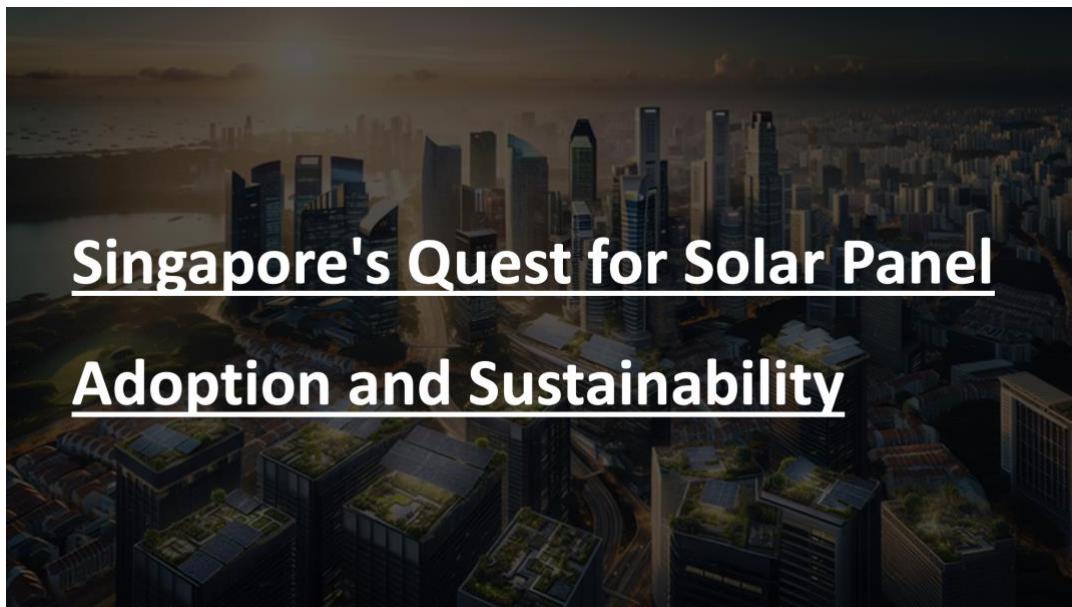
Run completed 181.6s (LLM 39.8s | Plugin 141.8s)

I have created the PowerPoint slide presentation based on the uploaded document. You can download it using the following link:

[Download PowerPoint Slide Presentation](#)

Let me know if there's anything else I can help you with!

Demo Slide Output:



Proposed Solution: Community Solar Investment Scheme

- A community solar model adapted for Singapore could drive widespread solar panel investment.
- Potential to develop floating solar farms on reservoirs and at sea to utilize unused space.
- Citizens can invest in solar panels with a ballot system, enjoying reduced electricity bills upon project completion.

Challenges and Outlook for Solar Panel Investment

- Limitations include scalability of solar energy deployments and sufficient benefits for individual investors.
- Further development of solar technology and infrastructure is crucial to meet the growing demand.
- Strategic initiatives and shared responsibility are key to achieving Singapore's sustainability goals by 2050.

Conclusion and Thoughts

While the visual impact of the enhanced text-to-PowerPoint conversion may not be substantial, it serves as a proof-of-concept. Given additional time and effort, we can further customize the slide creator plugin, providing the LLM with more parameters for interaction.

I'm truly grateful for the opportunity to delve into this chatbot-as-a-service platform, especially amidst these exciting advancements in AI. Despite the steep learning curve, the hours invested in understanding and navigating this new platform have been invaluable.

Given that this platform is relatively new, online resources are limited primarily to the official documentation and Discord communities. Fortunately, I had the opportunity to engage with active community developers, enhancing my understanding of the underlying engine that powers this innovative platform.