The Data Sessions: Future Directions in Prompt Engineering

Overview

It's a beautiful day to be alive. And today we are going to be talking about future directions in prompt engineering in another session of our data sessions. The main objective of this course is to introduce you to the future perspective and directions in prompt engineering by sharing with you the main prompt engineering models that are going to be followed moving forward and how can we use them and leverage them your daily tasks. So initially speaking, we're going to be talking about the main aspects of prompt engineering such as giving you a quick definition and showing you what it is how it works and why we need to use it. Then we're going to cover prompt engineering workflow. So what are the main workflows of prompting engineering and the steps taken in order to create a great prompt for your A I tool or model? Then we're going to explain perhaps these steps in a more detailed manner and then cover data generated by a prompt by looking at the different data types that can be generated by a very well crafted prompt. Next, we're going to talk about the future directions in prompt engineering by covering what are the adaptive prompting techniques and the multimodal prompting techniques that are very, very critical integration of a great super well crafted prompt that will yield amazing, amazing results. Finally, we're going to cover the difference between the adaptive and the multimodal prompt engineering in a very, very easy to understand manner by comparing their benefits and how they both operate side by side. All right. So let's dive in to the next section.

Prompt Engineering Definition

So, what is prompt engineering, and how can we define it in a very easy-to-understand manner? Simple, but concrete. The definition of prompt engineering can be thought as the following. It is the practice of crafting and optimizing statements, also known as prompts, to guide the responses of an AI model in a particular direction. The goal is to write a great prompt, a great statement, a great input, if you will, that will be given to an AI model to get the results that we want. The objective is to get some results. Those results can be text, images, audios, video. But the idea here is to write a great prompt that contains all the necessary inputs in order to give us a great response. So let's dive a little bit deeper. In this diagram, I will lay out the different inputs and the different main data points that are going to play a role in the creation of an amazing prompt that will yield great results for your AI tools. We start with an input, a text. For example, what is AI? What is prompt engineering? What is data science? A very simple to-the-point prompt that contains the following points. A tone, so we have to specify the tone, write in a friendly tone an input about data science. The length. Write 50 words, definition of data science in a friendly tone. In the context, based on the above article, write a quick and easy-to-understand 50 words article with a friendly tone. And finally, the format, write easy-to-understand bullet points that are covering the different aspects of data science in a 50-words format using a very friendly tone. So you can combine all of these variables in a very easy-to-understand manner, and then these variables are going to be given to an AI model. That AI model will, of course, yield and give you an output that will represent exactly what you need. If it's an image, you're going to get an image, and if it's a text, you're going to get a text. So it's a very easy diagram just to give you the steps, the process,

so you can have a visual representation of how prompt engineering can work in a real-world environment.

Prompt Engineering Workflow

Now let's speak about prompt engineering workflow. What is the main workflow of this process, and how can we make it easy and easy to understand for all the stakeholders involved? The process goes as follows. We identify what the AI needs to solve, so we have to sit with the team and sit with all the stakeholders to understand exactly what are we trying to solve, what is the goal here, the objective, what is the main of using this AI tool. Once we identify the main problem statement and what you're trying to solve, the next step is to write a clear context-rich prompt. Whenever you hear this keyword context-rich, remember that we're talking about a contextual manner to give the AI. What kind of context are we talking about? Are we trying to output some data? Are we trying to get some data generated by AI? Are we trying to get some images for our website? Are we trying to get an audio file for for a movie? What is the main purpose of us writing this prompt? And what is the context that we want this prompt to be written under? Next, use the AI to see the output. So once we give the AI, the input, we have to take a look at the output and understand if the output makes sense to us. Did we miss something? Is everything easy to understand? Did we solve our problem? The fourth step, improve prompt based on the output. So once we see the output, we are going to compare the expected output with the current output. So what did we expect to get? Does it make sense to get what we got? Can we improve it and make it easy? And finally, repeat the testing process and refine it until satisfied. So we keep asking the AI tool again and again and again until we get a great output that satisfies our need and our purposes. So this is a five-step process that starts with identifying what we are trying to solve, then we write a clear context-rich prompt, then we use AI to see the output to understand exactly what we're trying to solve here and see if we saw it using the tool. Of course, the fourth step is to improve the prompt based on the output. Did we forget about the context? Do we need to add a more perhaps descriptive word? Are the number of words actually the ones that we need? It's a repetitive process. And finally, we repeat this action, we repeat this loop until we get exactly what we want and we're happy with the results. All right? Now, let's take a look at the different data types that can be generated by an AI system using a great well-crafted prompt. First, text. So this is the perhaps widely used AI systems where we can get some text by asking the computer or the AI system for a text, and we get the text. A very simple example is give me a definition of data science and then we get a quick, easy to understand definition using various tools out there in the marketplace. Next one is images. So if we want an image, we can use many, many AI image-based tools to get us a great image for many, many purposes. Next is audio. So we have so many audio AI generated tools that can easily provide us with some audio. And by explaining what we want, we can easily get a song that can be used in a video game, a soundtrack that can be used in a movie easily using these amazing AI tools. We can get designs nowadays. We have a lot of tools in the marketplace where we can describe a design and the AI tool will generate the design for us easily based on our description. Next is videos. This is a very advanced technology because thanks to this technology we can describe and explain to the AI what we need in terms of video, explaining the main aspects of that video, the main sections of that video, and then we can get that video in an easy manner. One of the examples is if we have a text and we want an AI model to describe that text or convert

it to different languages, we can just prompt that text and get some results. And finally, code. By describing the problem statement that we have, we can get the code easily. Perhaps if you're trying to do some data science work, you can ask the AI tool for some data Python-based code and you're going to get that output easily without any issues. So the main spectrum of data types covered by the AI system using a great prompt is huge and tremendous. You can get some text, images, audio, design, videos, and finally code. All right.

Adaptive Prompting

So now let's speak about adaptive prompting, and what is adaptive prompting? Adaptive prompting is when AI, like a chatbot, learns from your past chats to make future chats better and easy to understand. You can think about it like a friend who learns more about you to have better conversation over time. So when you speak to a friend, the more conversation that you conduct with that specific individual, the easier it is for the friend to interact with you because the communication style is easy and it's better. So, adaptive prompting is a great technique where the AI tool will based on historical data, based on your interaction with the tool, specify the output and generate the output based on your needs, preferences, and your style of writing. So this is a great, great, great, great prompt engineering technique. Now let's talk a little bit about the benefits. Why would we use adaptive prompting, and how can it solve our daily problems easily without any issues? One, personalized learning. So thanks to adaptive prompting, we can easily personalize the learning experience for our students by generating text based on their needs, based on what they understand, based on what they don't understand, so we can personalize the learning process by asking the right questions to give our students or our learners and very, very easy output based on the level of understanding of a topic or perhaps a concept. All right, next, immediate feedback. So because the adaptive prompting technique learns from the previous chats and historical data, we can easily give the AI system an output that will enable us to get the latest or perhaps context-based output in there. So the way that I want you to think about this is once you get an output from the model, you can easily refine that output by asking another question, and the AI model will understand exactly what you need and come up with a better result for you. Next, increased engagement. Because of the adaptive prompting ability, we can easily increase the engagement of anybody that is using the tool because it understands easily what you need, it understands your communication styles and how to keep engaged in a very, very good environment. And then pace adjustment. In this one, we are trying to easily differentiate between perhaps advanced students, intermediate students, students that just started learning a concept, so we can easily use it for e-learning, for corporate training, for education, for many, many purposes, where we can easily create a course that can serve many, many, many target audiences. And finally, improved learning outcome by creating different learning paths for the audience that we are targeting using adaptive prompting. All right, so these are the main benefits that I want you to be thinking about moving forward, and they are very, very impressive because once we have a very personalized learning experience, we can solve many, many problems related to learning and related to sharing knowledge inside your organizations or inside your workplace. All right, now let's speak a little bit about adaptive prompting in terms of a diagram perspective. How does it work under the hood, and how can we make it easy to understand and understand its capabilities? We started with the context of the prompt. So we have some context, perhaps an article, a book,

many, many inputs that you have from previous conversations that you input to the prompt easily. So we have some context. Then that context is given to the AI model, any model out there. Then you can ask the AI model, can you tell me more about the product A? So in this case, we assume that we are given the AI model, an e-commerce website, and we are asking the model, can you please tell me more about the product A? Once we ask the model, we're going to get the details, the product title, the product description, the product price, number of sales, anything that we need in order to understand product details of product A. Then we can also ask the following prompt. How does product A compare to product B? So this is really good for comparison websites out there because we can compare 2-3 products easily without any issues by asking the AI model the following question, compare product A to product B. Once we do that, we get a comparison, we get the benefits of product A and the benefits of product B and how are they doing in terms of a predefined attribute. Then, what's the best product for graphic design? So let's say we are selling laptops in our e-commerce website. We can easily ask the AI model what is the best product, the best laptop for our graphic design, and then we're going to get the best one and why and how can it be used for graphic design. This is just an example of the potential and the future prospects of adaptive prompting that is very, very amazing because from just one context, we can come up with many, many, many different prompts that can give us a great way to understand the knowledge and to understand exactly our website, our technical stack, our goods, our services, and this can be applied to any, any, any context out there. So, very easy diagram. We start with the context, we have the AI model, and then we have our prompts. And finally, we have the results, as you can see.

Multimodal Promting

Now let's talk about multimodal prompting and how can we use this advanced prompt engineering technique to come up with a very great prompt to help our AI model results in great output? We will start by a quick definition. How do we define multimodal prompting? Multimodal prompting is easily when you use an AI system and you give it, you give it an input in different types of data. In this case, we can talk about text, images, audio to understand the question and give a better answer. You can think about it as a way to enhance the accuracy of your prompt and give it as much context as possible to enable you to easily understand what is the context and what is the problem that we are trying to solve here using prompt engineering. If we think about this from a logical perspective, it's like a person using their eyes and ears to understand what's happening around them and making sense of the world around them, in a room, in a city, in a house, in a classroom, you can easily understand using the human senses, and that's what we mean by multimodal prompting. We're giving the AI model with very multi-dimensional data points or data types, in this case, in the form of text. To explain the problem statement, images are a great visual representation of what we're trying to output. And finally, audio that represents any type of audio file that are a great way to express what are we trying to get out from the AI model. Great, great advanced model here that looks at the future. And let's take a look at what are some of the benefits of multimodal prompting. We start by the first benefit, which is multiple data types enhance accuracy. If we think about this, we are giving the model text, images, or just we are providing multiple data types, and this will obviously enhance the accuracy of our model, and we are going to get amazing results in this case, not only because we're giving it a lot of data, in this case, the

larger the data equals a great output, a great accuracy, but also because we are giving it different types. In this case, text to describe an issue, a problem, ask a question, image, it can be a diagram, it can be a web design, it can be anything that will represent what you're looking for. And an audio can be an audio file, a podcast, a recording, anything that is going to help in your answer and help the AI model come up with a great, great output for you. They can handle intricate queries effectively. If we think about this, we are able to handle complex queries, complex issues easily without any issues because we're not only asking the AI model that we are prompting a question using text, but we will also add in images to it, audio to it, widgets, so we're adding so many data types in this case, so many data files, if you will, that enable us to get a great, great result. And we can describe the situation by giving so much input to get the best possible output. So, handle complex queries effectively using multimodal prompting. Next, combines the advantages of different data types. If you think about this from a very, very straightforward perspective, because we're giving the AI model the text representation of the issue, an image, which is a visual representation, and also an audio file, in this case, that is a great audio representation of what you're trying to get in this case, we are getting the advantages of all of these data types. It takes a straightforward and images representation of the issue and an audio describes the problem into more detail, and that's thanks to the advantages of AI that we have nowadays and create a great output for us and avoid so many back-and-forth if you were using, in this case, adaptive models or any simplistic models in other cases. So, combining text input with audio input with image input, and we can get the best out of both worlds, in this case, image, audio, and text to get the really great output and avoid that text-based interaction between the AI model and the user that is using the model. So, think about the advantages here. And, of course, as you know, an image brings its advantages, and audio brings its advantages, and also a text input brings its advantages. Next, we're going to broaden the range of AI use cases. So in this case, not only we're going to be limited to audio output, image output or text output, but we're going to combine all of them. Think about an AI model that takes any type of data files that you have and it gives you a great output that can easily be more than enough to satisfy any one of your problem statements or daily tasks that you are trying to do. In this case, by thinking about the multimodal prompting technique, we can get that. We just need to make sure that we are giving the model text, image, and audio in this case. All right. Now let's take a look at the multimodal prompting using a very simplistic diagram. We start by asking the model a simple question, what is blockchain technology? So in this case, we're trying to understand blockchain technology, what it is, and how can we understand it. And of course, we have to provide the model itself. Text, audio, and an image in this case. We can provide the model an article about blockchain, a podcast that speaks about blockchain, and finally, a visual representation of blockchain diagram. So, this is a great example in our case. Next, we're going to provide all this data, or perhaps this very complex prompt to our AI model. So we process the input and we get some great output. In this case, if we think about text-based AI, so if we ask the model for some definitions in this case, so can you please define blockchain technology for me, going to get a great definition in this case about blockchain and how does it work and why do we need it. Next, image-based AI. Let's say we want to get a visual representation of blockchain using a very simplistic flow chart. We can, of course, get it in a great, easy-to-understand diagram, as well as audio-visual representation, in this case, by asking the model, provide me with a great tutorial for blockchain technologies. We can easily get a video tutorial that defines and

encapsulates blockchain technologies. So as you can see from the diagram, we can cover all aspects of data types, text, image, audio, easily without any issues using the multimodal prompting technique that combines all of these layers easily without any problems, in this case. We just need to make sure that we have a simple prompt, text content, audio content, and image content given to the AI models so we get great output at the end of the day.

Comparison Adaptive vs. Multimodal Prompting

In this section, we are going to talk about adaptive prompting and multimodal prompting and compare them side by side to understand their differences, their advantages, and how do they differ from each other from an intellectual perspective. So let's start and speak about adaptive prompting. First, we can easily adjust prompts based on responses. So thanks to its adaptivity and in this case context-based approach, once we see an output that we don't like, we can ask the AI model to refine the output, to create an output that is easy to understand by understanding and taking into account the historical data that we already provided in the responses. Next, personalize the AI interactions. So, thanks to its adaptivity, we can easily personalize the AI interactions by fitting it to different users. In this case, if we're dealing with students, we can fit them to students. If we're dealing with uh coworkers, we can fit them to coworkers. If you're dealing with customers, we can fit it to customers. Depending on your needs and depending on the situation itself, we can easily come up with a very personalized AI interaction that doesn't take into account a very generic approach. However, it will take a more adaptive custom-fitted approach in this case. It definitely improves over time with learning. So the longer the historical data provided to the AI model, the better the prompt would be, the better output will be because adaptive prompting in this case, takes into account all the questions that were that were asked before and all the data that we provided to the model previously. So we can easily without any issue get the data, get the output because the model already knows the style of writing that we usually understand and the kind of output that we like. Thanks to the refining process, the feedback loop process, that is the base of the adaptive prompting methodology. And then it's very ideal for dynamic response needs. So in an e-learning environment, in a dynamic corporate training environment, adaptive prompting is the future of prompt engineering because it can change depending on the situation, on the need, and of course on the level of the user. So if somebody is learning a new technique, new concept, the adaptive prompting technique can be easily adjusted to that different user, and we can get amazing dynamic results. All right. Now let's take a look at multimodal prompting. We start with this model uses different types of data as inputs. As you know, this model takes direct images or just takes many different data types, if you will, and these data types, they give it many, many, many opportunities of creativity, of creating an output that is dynamic, that is great, that gives us an amazing result at the end of the day. Next, we get a detailed output. From the first attribute, if you remember, we already get the text and the images and the audio. So we are going to get at the end of the day a detailed output because the context itself is multi-dimensional. Not only we are giving the model some text, but also it including images and audios as inputs for our prompt, all right? We create a model that will enhance AI's world understanding. So in this case, because we're giving the AI model text, audio, video, we give it many different data types, many different data points, and these data points can enable the AI model to understand the world better because we're not only giving it articles and books and internet content, but we're also giving it images, diagrams,

visualizations, and also audio files in many, many formats which creates a great understanding of the world and how it works for different concepts and use cases. And we are always making AI more versatile for applications across different industries and scenarios. So not only we can generate visuals and audio files and text, but we can generate them all together using the same model thanks to multimodal prompting. So the main difference is that the first one is adaptive, it takes a feedback loop approach, and the second one takes a more context-heavy approach that relies heavily on different data types, and it brings to the table a multi dimensional prompting technique which looks ahead, which looks at the future.

Summary

Now this is the end of our session. I will be giving you a quick summary of the main points and subsections that we covered in this one. We started our session by explaining prompt engineering and giving it a quick definition as the ability to craft and create easy-to-understand context space prompts that will result in a high-level quality and accuracy of an output. We spoke about the different aspects of prompt engineering that should be taken into account, and the different results that we get from a prompt. In this case, we spoke about text content, video content, audio content, code, designs, as well as various ways that AI can be used and generative AI can be used to get amazing content using well-crafted, well-written prompts. We also spoke about prompt engineering workflow, and we defined it as the step-by-step guide to create a very creative, easy-to-understand prompts. The step one was the creation of an input layer that takes into account clarity and context. Then, coming back with a great result, assessing the result, and then making sure that we fine-tune the result and come back with another input layer to make sure that we refine the output for our model. We thought about this as a loop where we give the AI model some input, we analyze the output, and then refine it in the next input to make sure that we get the result that we're looking for, and we keep the historical data all together, in this case. We also looked a little bit at the future aspect of prompt engineering by covering two main models. The first one in this case was adaptive prompting. That took a look at how we can use historical data and historical prompts in order to come up with the best possible output, or the user, that is. Once the AI model takes into account the historical prompts, the way that we create that communication channel, the way that we write, the way that we give feedback to the model, the model itself will fit perfectly to our needs and will give us a great, great result. We also looked at the adaptive prompting benefits. How can they be used in e-learning, personalizing the learning experience, as well as improving the user engagement and creativity in this case. Finally, in the adaptive prompting section, we took a look at the diagram that took into account our context and prompt was given to an AI model, and then we get different results, such as product description, comparison of products A and B. And then we looked at product recommendation in a very simple, easy-to-understand workflow that explains adaptive prompting. We also in this session looked at multimodal prompting, what it is, how do we define it, and the different benefits of multimodal prompting. We started by defining it as a prompt that takes into account text, images, and audio files in order to give the AI model as much context, or you can also think about it as much data as possible to get a great result. We also looked at the benefits, such as creating a real-word representation of an AI model that takes into account the different applications, and a high accuracy and quality of the

results. We finally took a look at an example which was the definition of blockchain by giving the AI model a quick input, which is what is blockchain, and also giving it an image, giving it an audio file, and giving it a visual representation of blockchain. This resulted in the definition of blockchain in a great easy-to-understand visual representation of blockchain and in a quick video tutorial of blockchain in this case. Then finally, we took a look at adaptive and multimodal prompting by taking a look at these two methodologies side-by-side and looking at the future of prompt engineering from that perspective. We defined the main attributes that enable us to understand both of them and at the same time compare their strength and how we can implement them in a very easy manner in our daily activities and daily workplaces. This enabled us to be there, print, and see what they bring to the table if implemented correctly in an environment. That was it for our session. Thank you very much for your time. Have a wonderful day, and see you very soon!