

# Prompt Engineering for ChatGPT

Prompt engineering is the process of designing or crafting prompts for a specific application that are aimed to improve the performance of language models when they are presented with this prompt. This typically involves adding context, tailoring the prompt to introduce domain specific constraints or information that will be useful for the language model in carrying out the task. This often results in a more controlled output that fits the needs of the user better than a generic prompt that is less specific and clear.

I will be looking at the effects of persona-based prompts on a creative writing task and on the explanation produced for a request to explain a concept. Finally, I will make use of ChatGPT to refine a prompt for a use case and compare the results with a generic prompt for the same task.

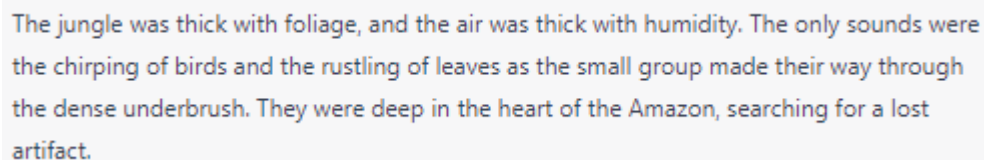
## Writing an extract from an Action/Adventure Book

The creative writing task that I have decided to go with is generating an extract from an action/adventure book. I have decided to leave the specifics of the book out, allowing ChatGPT to pick what sort of context we find ourselves in. There are 3 levels for our persona-based prompts, a generic prompt with no persona mentioned, a light persona with minimal details and a more detailed persona that outlines some elements of writing style and literary habits. These will allow us to compare and contrast the results for the different prompts.

I have added the generated responses with their corresponding prompts into the appendix where they take a page each to scale them to a size that they can be clearly seen. I will make use of snippets from the generated text to carry out my analysis here.

### Generic Prompt

The responses generated from the generic prompt were reasonable, but with some room for improvement. There was repeated use of words when setting the scene, which didn't feel very creative and exciting.



The jungle was thick with foliage, and the air was thick with humidity. The only sounds were the chirping of birds and the rustling of leaves as the small group made their way through the dense underbrush. They were deep in the heart of the Amazon, searching for a lost artifact.

There was no build up to the action, they heard a noise and then soon after a jaguar appeared, which Jack seemed to take down with ease.

Suddenly, there was a loud roar from up ahead. Jack stopped in his tracks, his hand gripping the hilt of his machete tightly. He signaled for the others to be quiet, and they all froze in place.

A few moments later, a massive jaguar burst out of the underbrush and landed right in front of them. Its eyes were fixed on Jack, and its powerful muscles rippled as it prepared to pounce.

We can see that this extract is decent, but some improvements to the language used and build up of tension would make it a better read.

### Mild Persona-based Prompt

This generated extract took a different perspective, there was some nice vivid imagery in the opening which helps to paint a picture in the reader's mind. This is an improvement on the previously generated extract which is not quite as descriptive.

Karl stared at the towering cliffs in front of him, their jagged edges etched against the deep blue sky. He could feel the heat of the sun beating down on his back, its intensity making him sweat even in the shade of the rocky overhang.

This vivid imagery continues through the extract with some imagery of the sky with Karl stood on the peak of this cliff.

At last, he reached the top of the cliff, gasping for breath as he surveyed the breathtaking view before him. The sun was setting over the horizon, painting the sky in shades of pink and orange. He felt a surge of pride and triumph, knowing that he had conquered the mountain and overcome his fears.

This piece is definitely an improvement on the last in terms of descriptive language, but lacks action as can be seen. Including some more features of the writing style we expect in the prompt should help to combat this.

### Persona-based Prompt

This final extract seems to be much more descriptive and makes use of vivid imagery to set the scene, which was not the case with the generic prompt.

The sun had set on the jungle, but the humidity and heat refused to relent. Sweat dripped down Jack's face as he trudged through the dense foliage, his boots squelching in the muddy ground beneath him. He wiped his brow with the back of his hand and took a swig from his canteen, wishing for a moment that he was back home in his comfortable bed instead of in this muggy, insect-infested wilderness.

I felt that there was a better build up to the action here with some suspense, though this could definitely be improved and altering the prompt would definitely be the way to adjust this.

Suddenly, he heard a rustling in the bushes to his left, and he froze. He knew better than to let his guard down in this dangerous environment. He slowly unsheathed his machete and crept towards the source of the noise, his heart pounding in his chest.

As he emerged from the thick foliage, he found himself face-to-face with a massive gorilla, its eyes fixed on him with a fierce intensity. Jack knew he was in trouble - he had heard stories of how these creatures were fiercely territorial and would attack anyone who crossed their path.

There are definitely areas where this extract could be improved, but I believe that it fairs better than the generic extract with regard to painting the scene and building up to the action.

## Conclusion


Overall, I found that ChatGPT does a good job with creative writing tasks. I did notice that there were a lot of repeated phrases such as “his heart pounding in his chest”, or a quest for a lost artefact. These I believe are introduced due to their abundance in many different sources of action/adventure writing. Making use of an engineered prompt can help to steer the model in the desired direction, leaving less of the generation up to popular tropes, ideas or phrases.


The quality of the persona-based prompt definitely seemed better than the generic prompt, though there was little difference in the length between the generic and the persona-based. The mild persona-based seemed to have the shortest response, but still decent quality with respect to the language used.

## Generating a simple explanation of dark matter

I wanted to explore the usage of persona-based prompts on a more trivial task, explaining a concept in simple terms. I have decided to set up the persona of a renowned astrophysicist who has experience explaining complex findings to non-technical audiences. I hope that this will make the response even more digestible and improve the quality over the generic response.

### Generic Prompt

 Explain dark matter in simple terms.

 Dark matter is a mysterious substance that makes up a significant portion of the matter in the universe. Scientists believe that dark matter is a type of matter that does not interact with light or other forms of electromagnetic radiation, so it cannot be seen directly.

However, we know that dark matter exists because of its gravitational effects on visible matter, such as stars and galaxies. The gravitational pull of dark matter is what holds galaxies together and allows them to spin at the speeds that we observe.

Despite its name, dark matter is not necessarily "dark" in the traditional sense. It simply refers to the fact that it does not emit or absorb light like visible matter does.

Scientists are still working to understand the nature of dark matter and what it is made of. There are many theories, but so far, none have been proven.

This explanation of dark matter seems to cover a lot of the basic principles. It is a mysterious substance, we know it exists because of the gravitational effect it has, and it is called dark as it does not emit or absorb light. The explanation is sufficiently simple and seems to give us a good idea of what dark matter is.

## Mild Persona-based Prompt

Now we will make use of some mild persona-based prompting to generate an explanation that would be given by a renowned astrophysicist.



Dr. Kim is a renowned astrophysicist.

Dr. Kim explains dark matter in simple terms:



Dark matter is a form of matter that does not emit, absorb, or reflect light or other forms of electromagnetic radiation, which is why it is "dark" and invisible to us. It interacts with other matter only through gravity, which means it can influence the motion of objects around it.

Scientists have discovered that the gravitational effects of dark matter can explain certain phenomena in the universe, such as the rotation of galaxies and the way light bends as it travels through space. In fact, dark matter makes up a significant portion of the matter in the universe, much more than the matter we can see.

Despite its name, dark matter is not necessarily "dark" in the sense that it is evil or ominous. It's simply a mysterious form of matter that we are still trying to understand.

We can see that the order of information is not the same. Here, the properties of dark matter are mentioned first, that it does not emit, absorb or reflect light and that we can detect the gravitational effect it has. There is more information regarding the effects of dark matter in the formation of galaxies and their rotation, which seems a little more complex.

Overall, this explanation seems to be good, but not noticeably superior to the previously given explanation.

## Persona-based Prompt

Finally, we will outline our character as a renowned astrophysicist with decades of experience, a commitment to honest and accurate results and plenty of experience explaining complex concepts to non-technical audiences. These are the characteristics we would want an individual to have if they were to explain dark matter in simple terms.

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Dr. Kim is a renowned expert in the field of astrophysics. Dr. Kim has spent decades studying the mysteries of the universe, and is known for her brilliant insights and her commitment to honest and accurate scientific research. If you have a question about the cosmos, Dr. Kim is the person to ask. She has plenty of experience presenting complex concepts to non-technical audiences while ensuring they can understand her findings.

Dr. Kim explains dark matter in simple terms:



Dark matter is a mysterious substance that we believe exists in the universe, but we can't see it directly with telescopes or other instruments. We know it's there because of its gravitational effects on visible matter, like stars and galaxies. In fact, dark matter makes up about 85% of all matter in the universe!

Despite its name, dark matter is not actually dark in the traditional sense. It simply does not interact with light or other forms of electromagnetic radiation, which makes it invisible to our instruments. Scientists are still trying to figure out what exactly dark matter is made of, but we do know that it plays a crucial role in shaping the universe as we know it. Without dark matter, galaxies would not have formed and the universe would look very different from what we observe today.

We can see that the generated response seems much less formal and intricate. The language used is much more simple and domain-agnostic. The explanation highlights why we can't detect it and gives us a figure for the percentage of matter in the universe that is actually dark matter, which is not present in the other explanations. It is clear that this explanation is much more suited for someone who has no background in astrophysics as we get high-level details of dark matter as well as more context regarding the amount of it and the effect it has, which is not as well defined in the other explanations.

## Conclusion

Looking at the returned explanations it is clear that ChatGPT performs quite well when it comes to conveying information in a simplified manner. The use of prompt engineering can help to give more control over the aspects of the generated response, such as the level of complexity and detail. The use of a character/persona can allow for better generated responses when that individual is someone who would typically be believed to give a good answer/response to the task.

## Extra: Prompt Engineering Prompt

Although I have covered the word limit on the assignment, I wanted to see how effective ChatGPT would be as a tool to refine a prompt to prompt itself for better answers. This can hopefully highlight the importance of prompt engineering for generating quality responses.

The prompt for refining a prompt was found [here](#). It involves giving ChatGPT a generic prompt and asking you questions in order to refine this prompt and slowly make it more targeted for the specific task, allowing the language model to have more context and constraints for generating a better response.

I will be looking at the generation of a job advert for a software engineering role. I will make use of a generic prompt, “Write a job advertisement for a software engineer role in a legaltech company”. Then I will make use of an engineered prompt and compare the quality. The outputs can be found in the appendix of this assignment.

We can see that the generic prompt generates a generic job advertisement, nothing special here. Making use of the prompt generator we can refine this generic prompt and incrementally add context regarding the business, products, benefits and perks, required skills and the company ethos. Although this can be done manually, it can be useful for ChatGPT to iteratively ask questions to improve the understanding it has of the task at hand, leading to better generated responses.

# Appendix

## Creative writing extracts

Prompt: Write an extract from an action/adventure book.



Write an extract from an action/adventure book.



The jungle was thick with foliage, and the air was thick with humidity. The only sounds were the chirping of birds and the rustling of leaves as the small group made their way through the dense underbrush. They were deep in the heart of the Amazon, searching for a lost artifact.



The leader of the group, a rugged adventurer named Jack, held a map in one hand and a machete in the other. He was constantly scanning the area for any signs of danger, his eyes darting back and forth as he hacked his way through the jungle.

Suddenly, there was a loud roar from up ahead. Jack stopped in his tracks, his hand gripping the hilt of his machete tightly. He signaled for the others to be quiet, and they all froze in place.

A few moments later, a massive jaguar burst out of the underbrush and landed right in front of them. Its eyes were fixed on Jack, and its powerful muscles rippled as it prepared to pounce.

But Jack was ready. With lightning-fast reflexes, he swung his machete at the jaguar, slicing through the air with a fierce determination. The jaguar dodged to the side, but Jack was faster. He swung again, and this time the machete connected with the jaguar's shoulder, causing it to roar in pain.

The jaguar leaped back, circling around the group as it prepared for another attack. But Jack was undeterred. He raised his machete high, ready to strike again.

The jungle was silent as the two predators faced off. The jaguar snarled, its eyes fixed on Jack. But Jack was focused, his mind sharp and his muscles taut.

And then, with a sudden burst of speed, the jaguar lunged forward, claws extended. But Jack was ready. He dodged to the side and swung his machete in a powerful arc, cutting through the jaguar's flank and sending it tumbling to the ground.


The jungle was filled with the sound of the jaguar's roar as it thrashed about on the ground, its life force ebbing away. Jack and his companions stood there, panting and sweating, their bodies covered in sweat and jungle grime.

But they had no time to rest. They had a mission to complete, and the jungle was full of danger. With a grim determination, Jack led the way deeper into the heart of the Amazon, searching for the lost artifact that could change the course of history.




Prompt: Karl is an experienced action/adventure writer.

Write an extract from his new book.

 A Karl is an experienced action/adventure writer.

Write an extract from his new book.

 Karl stared at the towering cliffs in front of him, their jagged edges etched against the deep blue sky. He could feel the heat of the sun beating down on his back, its intensity making him sweat even in the shade of the rocky overhang.

This was the moment he had been training for, the culmination of months of preparation and planning. He checked his equipment one last time, making sure his ropes were secure and his harness was tight.

With a deep breath, he stepped forward and began to climb.

His fingers dug into the rough stone, finding purchase in the tiny crevices and cracks. His muscles strained as he pulled himself up, each movement calculated and precise.

As he climbed higher, the world fell away beneath him, the distant sound of crashing waves echoing in his ears. He could feel the adrenaline coursing through his veins, his heart pounding in his chest.

At last, he reached the top of the cliff, gasping for breath as he surveyed the breathtaking view before him. The sun was setting over the horizon, painting the sky in shades of pink and orange. He felt a surge of pride and triumph, knowing that he had conquered the mountain and overcome his fears.

But his triumph was short-lived, for he knew that the true test still lay ahead. The real adventure was just beginning, and he was ready to face whatever challenges lay in his path.

Prompt: Karl is an action/adventure writer. He comes up with entertaining stories that are engaging, imaginative and captivating. These stories have the potential to capture people's attention and imagination. Karl's writing style has been known to keep readers guessing, sitting on the edge of their seat with anticipation and pivoting in interesting directions when the reader least expects it. He makes great use of language to paint vibrant scenes that almost come to life in the reader's mind.

Write an extract from his new book.



Here is an extract from Karl's new book:

The sun had set on the jungle, but the humidity and heat refused to relent. Sweat dripped down Jack's face as he trudged through the dense foliage, his boots squelching in the muddy ground beneath him. He wiped his brow with the back of his hand and took a swig from his canteen, wishing for a moment that he was back home in his comfortable bed instead of in this muggy, insect-infested wilderness.

But he had a job to do, and he wasn't one to back down from a challenge. He had to find the treasure that was rumored to be hidden somewhere deep within this jungle, and he was willing to risk everything to get his hands on it.

Suddenly, he heard a rustling in the bushes to his left, and he froze. He knew better than to let his guard down in this dangerous environment. He slowly unsheathed his machete and crept towards the source of the noise, his heart pounding in his chest.

As he emerged from the thick foliage, he found himself face-to-face with a massive gorilla, its eyes fixed on him with a fierce intensity. Jack knew he was in trouble - he had heard stories of how these creatures were fiercely territorial and would attack anyone who crossed their path.

But he also knew that he couldn't afford to let fear overcome him. He steeled himself and raised his machete, ready to defend himself against the beast.

The gorilla let out a deafening roar and charged at him, its massive arms swinging wildly. Jack dodged to the side and swung his machete with all his might, slicing through the air with a satisfying whoosh.

To his surprise, the gorilla stumbled back, clutching its chest. Jack realized that he had hit it with a glancing blow, and he knew that he had to finish the job before the creature regained its footing.

He lunged forward and plunged his machete deep into the gorilla's chest, feeling the blade bite into flesh and bone. The creature let out a final roar and collapsed to the ground, dead.

Jack wiped the sweat from his forehead and took a deep breath, feeling a sense of relief and satisfaction wash over him. He knew that this was just the beginning of his journey, and that he would face many more dangers before he found the treasure that he sought. But he was ready for whatever lay ahead, and he knew that he had the strength and courage to see it through.

## Prompt Engineering

Prompt: Write a job advertisement for a software engineer role in a legaltech company.



Write a job advertisement for a software engineer role in a legaltech company



Job Title: Software Engineer - LegalTech

Company: [Company Name]

Location: [Location]

Job Type: Full-time

Salary: Commensurate with experience

About the Company:

[Company Name] is a fast-growing legal technology company that provides innovative solutions to legal professionals. Our mission is to transform the legal industry by leveraging cutting-edge technology to streamline legal processes and improve access to justice.

Job Description:

We are seeking a talented and motivated software engineer to join our team. As a software engineer at [Company Name], you will work on developing and implementing software solutions that enable legal professionals to work more efficiently and effectively. You will be responsible for:

- Developing and maintaining our software applications and systems
- Writing high-quality, maintainable, and efficient code
- Collaborating with cross-functional teams to design, develop, and deploy software solutions
- Conducting unit and integration testing to ensure software quality
- Participating in code reviews and contributing to the continuous improvement of our development processes

Requirements:

- Bachelor's or Master's degree in Computer Science or a related field
- 3+ years of software engineering experience
- Proficiency in at least one programming language such as Java, Python, or C#
- Experience with web development frameworks such as Angular or React
- Familiarity with relational databases and SQL
- Strong problem-solving skills and attention to detail
- Excellent communication and teamwork skills

Preferred Qualifications:

- Experience with cloud computing platforms such as AWS or Azure
- Familiarity with agile development methodologies
- Knowledge of legal processes and procedures

If you are passionate about using technology to transform the legal industry and are looking for a challenging and rewarding opportunity, we encourage you to apply for this exciting role. Please submit your resume and a cover letter explaining why you are the ideal candidate for this position. We look forward to hearing from you!

Output generated after using the prompt found [here](#) and iteratively adding context to develop the prompt.



Certainly! Here is the final version of the prompt we worked on together:

"Write a job advertisement for a software engineer role in a legaltech company.

LegalTechAid is seeking an experienced software engineer to join our small team of experts in Dublin. Our mission is to empower people by providing accessible and affordable legal services through technology. As a software engineer, you will play a vital role in building and maintaining our products to help us achieve our goal.

Responsibilities:

- Design and implement high-quality software solutions using Python and other relevant technologies
- Collaborate with cross-functional teams to develop and maintain the company's products
- Participate in code reviews, testing, and debugging to ensure high-quality software delivery
- Continuously improve the development process by contributing to CI/CD pipelines and other automation tools

Requirements:

- Bachelor's degree in Computer Science or related field
- At least 3 years of experience in software development
- Proficient in Python and other programming languages
- Experience with Tensorflow, CI/CD pipelines, and other automation tools
- Strong problem-solving skills and ability to work in a team

We are committed to creating a diverse and inclusive work environment where everyone feels valued and respected. Our core values of teamwork, respect, and excellence guide us in everything we do. In addition to a competitive salary and health insurance package, we offer flexible working hours and opportunities for professional development.

As a software engineer at LegalTechAid, you will have the opportunity to take on a project lead role after completing several projects and getting relevant training in agile methods. We are committed to helping our employees grow and advance in their careers.

You will be working on a small team of experts from various backgrounds including legal and machine learning. If you are passionate about using technology to make a positive impact in people's lives and meet the requirements above, please apply with your resume and a cover letter.