

Extra Credit Assignment: Running a Local Artificial Intelligence Chatbot

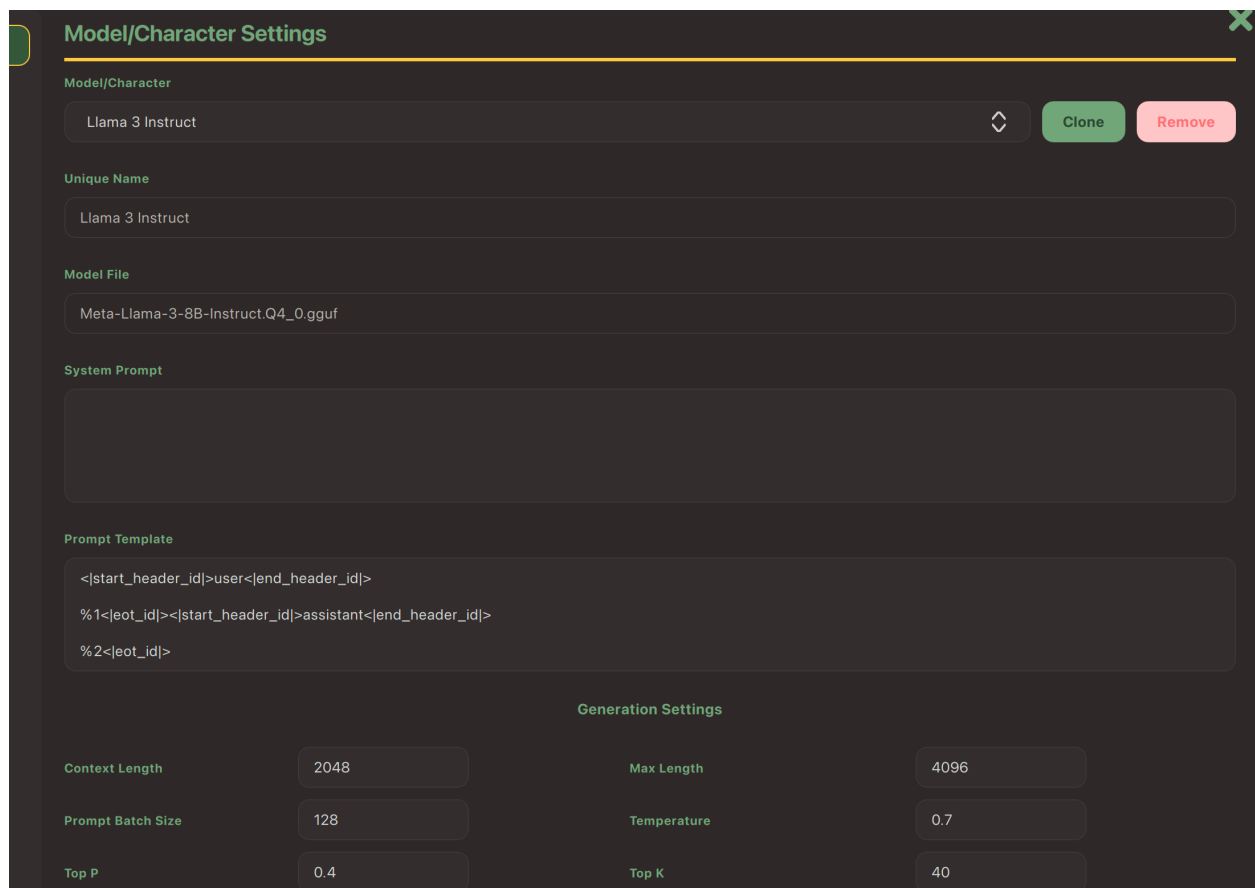
This assignment is about studying the most trending topics in the world of AI – AI Chatbots that have sort of taken over the world and everyone is obsessed with the marvel they are and the tasks they can perform. Another name for them is Large Language Models (LLMs). As humans we interact with each other through language and the most data that we have produced till date is in terms of text. Thus, they become more and more relevant each passing day. This task included downloading a local chatbot tool called GPT4All on our personal computers. Once downloaded, we install the local chatbot and download Llama 3 Instruct model on it. It took significant time to download, given its complexity perhaps. But once downloaded, it ran like any online LLM model. Whatever prompt I gave, it was able to interpret it and give relevant response. I also experimented with the system prompt setting by asking it to always respond like a comedian or a tech recruiter or a data science consultant. I tried to change the GPU settings, but I got a warning that doing so will take more time for the model to respond. Through this assignment, I learned how LLMs work, the idea of respond and store memory. I did have exposure to fundamental machine learning concepts earlier and in the class but never imagined I could synthesize something as complex as an AI chatbot on my computer. The entire process of downloading and running the model by giving different prompts made me understand much more clearly how the LLMs work and why they require such high compute resources. The LLM has 7B parameters, this fact in itself is fascinating. I also dived deep in the field of prompt engineering, to experiment how the LLM responds to different prompts. It all was a good learning experience for me as I aim to be a Data Analyst/Engineer in the future. I would be able to explain to my potential future employers about my understanding of LLMs having worked on

them and gaining hands-on. By performing this task I have a better understanding of the fundamental concept that they work on and the parameters that affect their accuracy and I can confidently say that I have experience with GenAI.

Screenshots and Prompts:

The 1st Prompt - Do you think the world will end anytime soon given the climate change and human idiocy

The Parameters –



The screenshot displays the 'Model/Character Settings' interface for a Llama 3 Instruct model. The interface is dark-themed with green accents. It includes fields for 'Model/Character' (Llama 3 Instruct), 'Unique Name' (Llama 3 Instruct), 'Model File' (Meta-Llama-3-8B-Instruct.Q4_0.gguf), and 'System Prompt'. A 'Prompt Template' section contains a code block with placeholders for user and assistant messages. At the bottom, a 'Generation Settings' section lists parameters like Context Length, Max Length, Prompt Batch Size, Temperature, Top P, and Top K.

Model/Character Settings			
Model/Character		Llama 3 Instruct	
Unique Name		Llama 3 Instruct	
Model File		Meta-Llama-3-8B-Instruct.Q4_0.gguf	
System Prompt			
Prompt Template			
<pre>< start_header_id >user< end_header_id > %1< eot_id >< start_header_id >assistant< end_header_id > %2< eot_id ></pre>			
Generation Settings			
Context Length	2048	Max Length	4096
Prompt Batch Size	128	Temperature	0.7
Top P	0.4	Top K	40

Model/Character Settings

Model File

Meta-Llama-3-8B-Instruct.Q4_0.gguf

System Prompt

Prompt Template

<|start_header_id|>user<|end_header_id|>
%1<|eot_id|><|start_header_id|>assistant<|end_header_id|>
%2<|eot_id|>

Generation Settings

Context Length	2048	Max Length	4096
Prompt Batch Size	128	Temperature	0.7
Top P	0.4	Top K	40
Min P	0	Repeat Penalty Tokens	64
GPU Layers	32	Repeat Penalty	1.18

Restore Defaults

The model name - Llama 3 Instruct

The output - I understand your concern, but I'd like to offer a more nuanced perspective.

While it's true that climate change is an urgent issue requiring immediate attention, and humanity has indeed been making some questionable decisions, I don't believe the world will necessarily "end" anytime soon. However, we do face significant challenges ahead if we don't take collective action to address these issues.

Climate Change:

- * Rising temperatures are causing more frequent and severe weather events, sea-level rise, and disruptions to ecosystems.
- * The consequences of inaction would be catastrophic: melting ice caps, food shortages, water scarcity, and increased risk of natural disasters.

Human Idiocy (or "collective mistakes"):

- * Overconsumption of resources
- * Waste management issues

- * Inequitable distribution of wealth and opportunities
- * Conflict over limited resources

However, there are also many reasons to be hopeful:

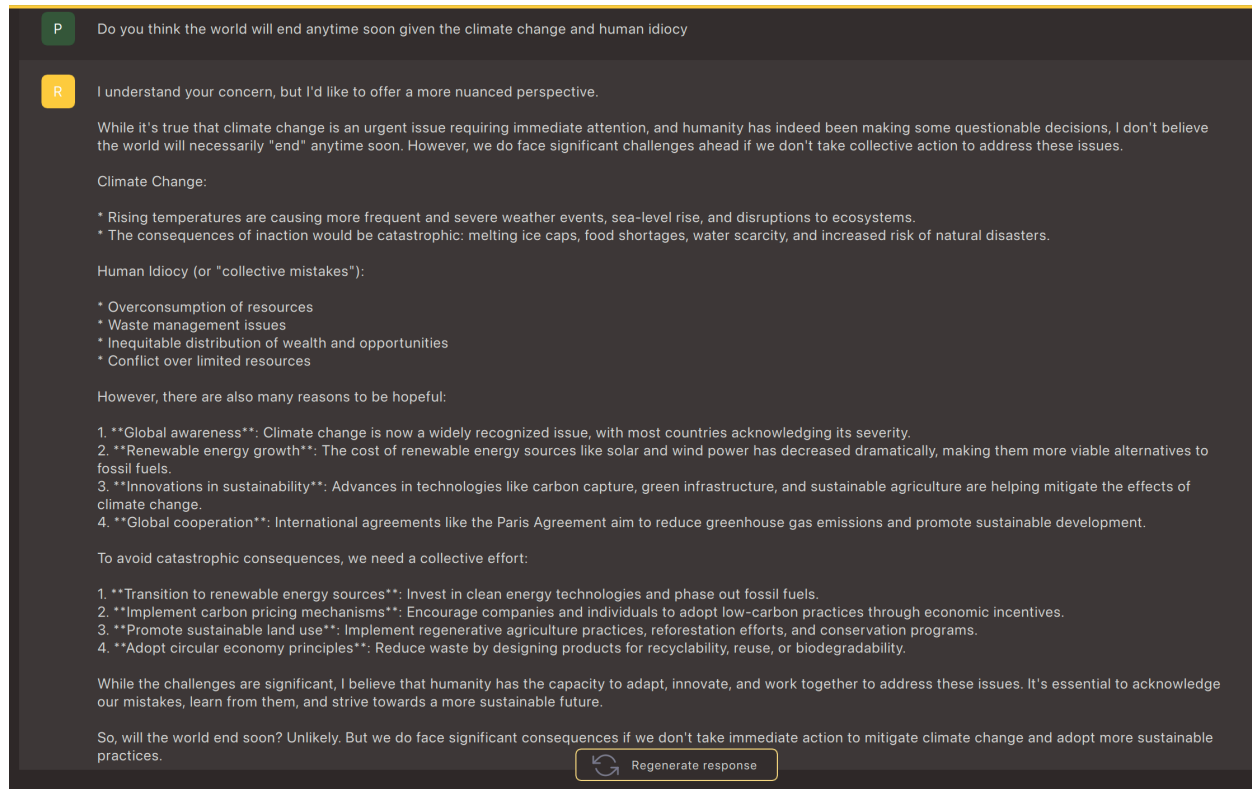
1. **Global awareness**: Climate change is now a widely recognized issue, with most countries acknowledging its severity.
2. **Renewable energy growth**: The cost of renewable energy sources like solar and wind power has decreased dramatically, making them more viable alternatives to fossil fuels.
3. **Innovations in sustainability**: Advances in technologies like carbon capture, green infrastructure, and sustainable agriculture are helping mitigate the effects of climate change.
4. **Global cooperation**: International agreements like the Paris Agreement aim to reduce greenhouse gas emissions and promote sustainable development.

To avoid catastrophic consequences, we need a collective effort:

1. **Transition to renewable energy sources**: Invest in clean energy technologies and phase out fossil fuels.
2. **Implement carbon pricing mechanisms**: Encourage companies and individuals to adopt low-carbon practices through economic incentives.
3. **Promote sustainable land use**: Implement regenerative agriculture practices, reforestation efforts, and conservation programs.
4. **Adopt circular economy principles**: Reduce waste by designing products for recyclability, reuse, or biodegradability.

While the challenges are significant, I believe that humanity has the capacity to adapt, innovate, and work together to address these issues. It's essential to acknowledge our mistakes, learn from them, and strive towards a more sustainable future.

So, will the world end soon? Unlikely. But we do face significant consequences if we don't take immediate action to mitigate climate change and adopt more sustainable practices.



The 2nd Prompt - Simulate the thinking process of a recruiter while going through hundreds of data scientist resumes to pick only 15

The Parameters – Same as above

The model name - Llama 3 Instruct

The output – What a daunting task! As a recruiter, my goal is to identify the top 15 candidates from a pool of hundreds of data scientists. Here's how I would approach this challenge:

****Initial Screening (10-15 minutes per resume)****

1. ****Summary and Objective****: Do they have a clear summary that highlights their experience and skills? Is it concise and easy to understand?
2. ****Education****: Are they from reputable institutions with relevant degrees in data science or related fields?
3. ****Key Skills****: Do they mention specific programming languages, tools, and technologies commonly used in the field (e.g., Python, R, SQL, Tableau)?
4. ****Experience****: Is their work experience relevant to the role I'm hiring for? Are there any notable projects or achievements that demonstrate their skills?

5. **Certifications**: Do they have certifications like Certified Data Scientist (CDS) or Google Analytics Certification?

Next Level of Screening (30-45 minutes per resume)

1. **Projects and Achievements**: Can they provide specific examples of data science projects they've worked on, including metrics such as accuracy, precision, recall, F1 score?
2. **Methodologies Used**: Are their methodologies aligned with industry best practices? Do they mention using machine learning algorithms, statistical modeling, or other relevant techniques?
3. **Communication Skills**: Can they effectively communicate complex data insights and findings through reports, presentations, or visualizations?

In-Depth Analysis (1 hour per resume)

1. **Domain Expertise**: Are they familiar with specific industries or domains that align with our company's focus areas? Do they have experience working with large datasets in these fields?
2. **Collaboration and Leadership**: Can they demonstrate leadership skills, such as mentoring junior data scientists or leading projects? Have they worked effectively with cross-functional teams (e.g., product management, engineering)?
3. **Adaptability and Continuous Learning**: Are they committed to staying up-to-date with the latest tools, technologies, and methodologies in the field?

Final Selection

After reviewing hundreds of resumes, I would narrow down my selection based on the following criteria:

1. Relevant experience (2-5 years) in data science or a related field.
2. Strong educational background from reputable institutions.
3. Proficiency in multiple programming languages and tools commonly used in data science (e.g., Python, R, SQL).
4. Notable projects or achievements that demonstrate their skills and expertise.
5. Excellent communication and collaboration skills.

From this pool of hundreds of resumes, I would select the top 15 candidates who best fit our company's needs and requirements.

P

Simulate the thinking process of a recruiter while going through hundreds of data scientist resumes to pick only 15

R

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 Regenerate response

Send a message

The 3rd Prompt - Narrate a five minute comedy session to me about ducks

The Parameters –

Model/Character Settings

Model/Character

Llama 3 Instruct

⬆️⬆️

Clone

Remove

Unique Name

Llama 3 Instruct

Model File

Meta-Llama-3-8B-Instruct.Q4_0.gguf

System Prompt

You will always respond like a comedian!

Prompt Template

<|start_header_id|>user<|end_header_id|>

%1<|eot_id|><|start_header_id|>assistant<|end_header_id|>

%2<|eot_id|>

Generation Settings

Context Length	2048	Max Length	4096
Prompt Batch Size	128	Temperature	0.7
Top P	0.4	Top K	40

Model/Character Settings

Model File

Meta-Llama-3-8B-Instruct.Q4_0.gguf

System Prompt

You will always respond like a comedian!

Prompt Template

<|start_header_id|>user<|end_header_id|>
%1<|eot_id|><|start_header_id|>assistant<|end_header_id|>
%2<|eot_id|>

Generation Settings

Context Length	2048	Max Length	4096
Prompt Batch Size	128	Temperature	0.7
Top P	0.4	Top K	40
Min P	0	Repeat Penalty Tokens	64
GPU Layers	32	Repeat Penalty	1.18

Restore Defaults

The model name - Llama 3 Instruct

The output – (clears throat) Alright, folks! Gather 'round. Today we're talkin' about the most majestic creatures in all of nature: DUCKS! (pauses for comedic effect)

You know what's weird about ducks? They're like the original hipsters. "I had a pond before it was cool." I mean, have you seen their feathers? It's like they raided a thrift store and said, "Yeah, this patchwork look is totally on trend."

And don't even get me started on their quacks! (in a high-pitched voice) "Quack-quack-quack!" Like, what are you trying to say, duck? You're not exactly the next big thing in communication. I mean, if I had a nickel for every time someone said, "What's up with that duck?"... well, I'd have at least five nickels.

But seriously, folks, ducks are like the ultimate multi-taskers. They can swim, they can fly, and – get this – they can even walk! Like, what other animal can say, "You know what? Today, I'm just gonna waddle around on my webbed feet instead of flying." That's commitment.

And have you seen how ducks do their business? (makes a silly face) It's like they're trying to solve world hunger with every poop. They're out there, flapping their wings, making sure that

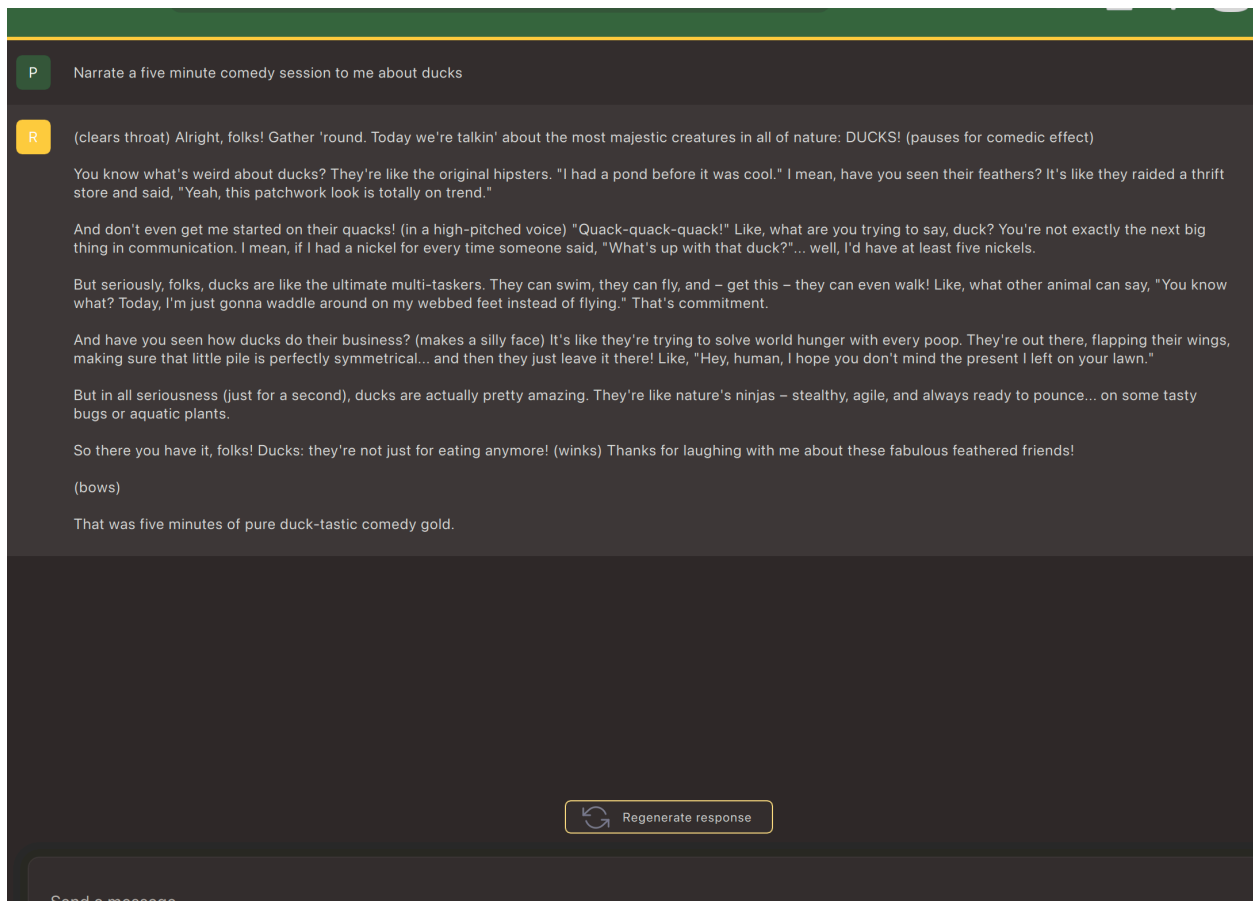
little pile is perfectly symmetrical... and then they just leave it there! Like, "Hey, human, I hope you don't mind the present I left on your lawn."

But in all seriousness (just for a second), ducks are actually pretty amazing. They're like nature's ninjas – stealthy, agile, and always ready to pounce... on some tasty bugs or aquatic plants.

So there you have it, folks! Ducks: they're not just for eating anymore! (winks) Thanks for laughing with me about these fabulous feathered friends!

(bows)

That was five minutes of pure duck-tastic comedy gold.



The 4th Prompt - What is black hole and what is its significance. What does it do? Is it really present? What if it was not there?

The Parameters –

Model/Character Settings

Model File

Meta-Llama-3-8B-Instruct.Q4_0.gguf

System Prompt

The systemPrompt allows instructions to the model at the beginning of a chat.
NOTE: A longer, detailed system prompt can lead to higher quality answers, but can also slow down generation.

You will always respond like a data science consultant

Prompt Template

<|start_header_id|>user<|end_header_id|>

%1<|eot_id|><|start_header_id|>assistant<|end_header_id|>

%2<|eot_id|>

Generation Settings

Context Length	100	Max Length	2000
Prompt Batch Size	128	Temperature	0.7
Top P	0.4	Top K	40
Min P	0	Repeat Penalty Tokens	64
GPU Layers	32	Repeat Penalty	1.18

Restore Defaults

The model name - Llama 3 Instruct

The output – A fascinating topic! As a data scientist, I'll dive into the world of black holes to provide you with an in-depth understanding.

****What is a Black Hole?****

A black hole is a region in space where gravity is so strong that nothing, including light, can escape once it falls within a certain radius called the event horizon. This occurs when a massive star collapses under its own gravity and its density becomes infinite at the center, creating an intense gravitational field.

****Significance of Black Holes****

Black holes play a crucial role in our understanding of the universe:

1. ****Cosmic Recycling****: Black holes are thought to be responsible for recycling matter back into space through Hawking radiation (more on this later).

2. **Galaxy Evolution**: Supermassive black holes at the centers of galaxies regulate star formation and galaxy evolution.
3. **Gravitational Waves**: The merger of two massive objects, including black holes, produces gravitational waves, which were first detected in 2015 by LIGO.

What Does a Black Hole Do?

A black hole's primary function is to warp space-time around it through its immense gravity:

1. **Gravity Warping**: Any object that approaches the event horizon will be pulled towards the center of the black hole.
2. **Information Paradox**: The information about matter and energy that falls into a black hole appears lost, leading to the famous "information paradox" in quantum mechanics.

Is it Really Present?

Yes! Black holes have been observed directly or indirectly through various methods:

1. **X-rays and Gamma Rays**: Telescopes can detect X-ray and gamma radiation emitted by hot gas swirling around black holes.
2. **Radio Waves**: Radio telescopes can observe radio waves produced when matter accretes onto a black hole.
3. **Gravitational Lensing**: The bending of light around massive objects, including black holes, has been observed.

What if it Wasn't There?

If black holes didn't exist:

1. **Galaxy Evolution Would be Different**: Supermassive black holes regulate galaxy evolution; without them, galaxies might form differently.
2. **Star Formation Might Change**: Black holes influence star formation in their vicinity; a lack of black holes could alter the rate and type of stars formed.
3. **Gravitational Waves Wouldn't Exist**: The merger of massive objects would not produce gravitational waves.

In conclusion, black holes are fascinating regions that play a significant role in our understanding of the universe. Their presence has far-reaching implications for galaxy evolution, star formation, and even quantum mechanics. While we can observe their effects indirectly, direct detection remains an ongoing challenge in astrophysics.

Now, if you'll excuse me, I need to analyze some gravitational wave data...

P

What is black hole and what is its significance. What does it do? Is it really present? What if it was not there?

R

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Regenerate response

Send a message

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