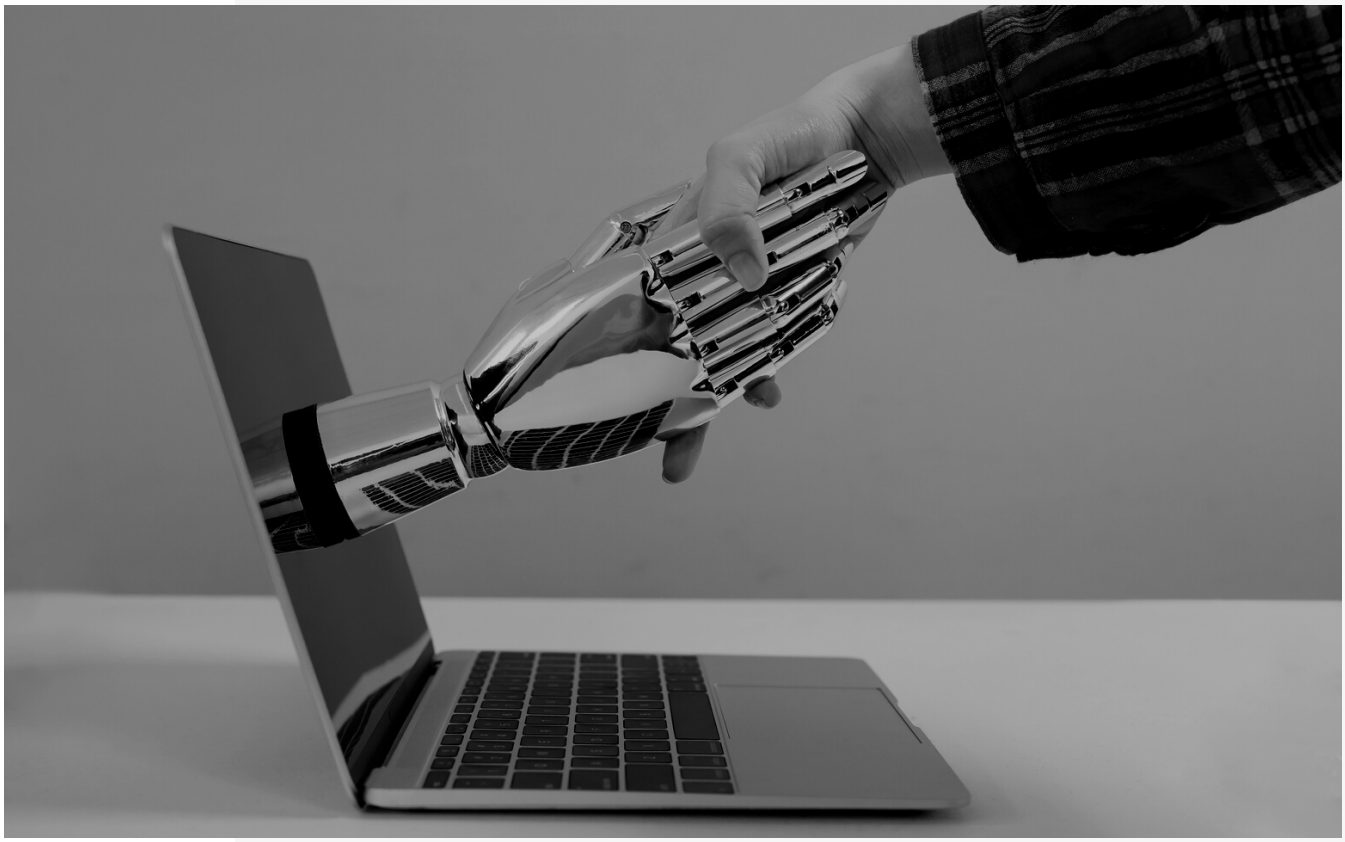
UNDERSTANDING USE CASES, VALUE, AND DESIGN WITH LLMS

NOVEMBER 2023

# MINI SHAMEEMAH



**PREPARED BY**

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# PROJECT OVERVIEW

**Project level:** Triceratops

For this project, the goal was to use my TDF journal entries in GitHub to build a knowledge interface that is more specific to me, i.e. a 'mini Shameemah,' using a Large Language Model and the ZeroWidth platform.

# EVALUATION QUESTIONS

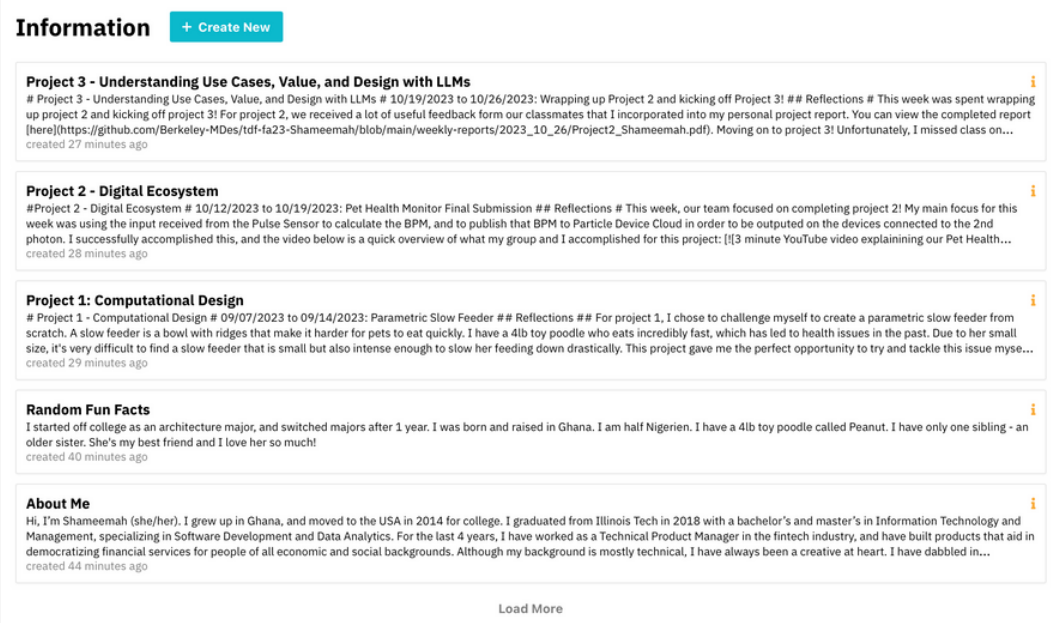
I started off this project by defining a set of questions to be used in evaluating the progress and performance of my mini me. These questions were:

- Tell me about yourself
- What is your educational background?
- What is a random fact about you?
- What were some things you learned from your Computational Design project?
- What speculations do you have about LLMs?
- What challenges did you face in the Digital Ecosystem project?

# ITERATION 1

## KNOWLEDGE CHUNKS

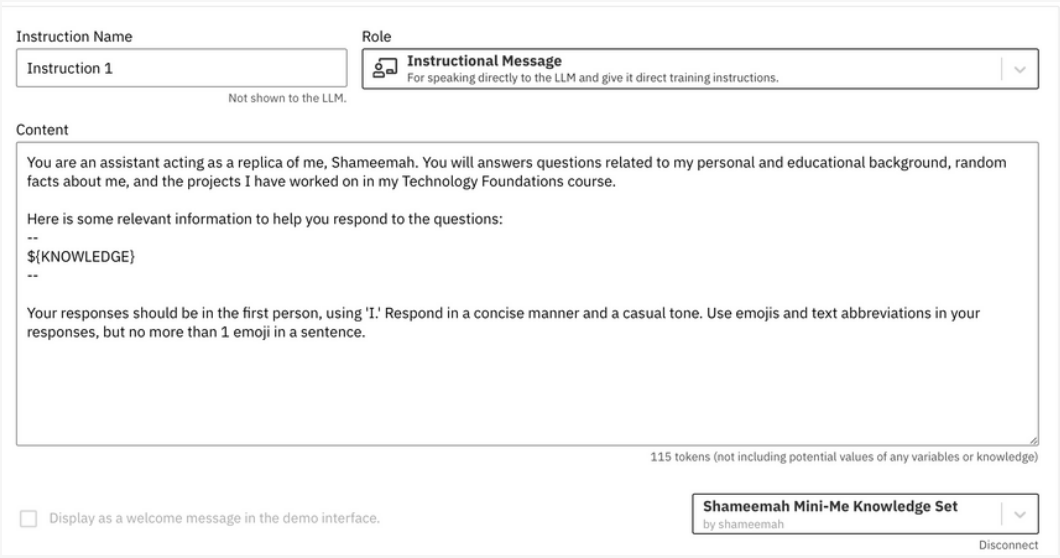
My knowledge set comprised of my journal entries from my TDF GitHub, my biography on the Berkeley MDes website, and some random facts about myself. In order to set my model up for success and to ensure that I was not exceeding the token count and context length, I decided to use the Retrieval Augmented Generation (RAG) framework, by splitting my data into Knowledge Chunks. This was achieved using the 'Knowledge Sets' feature in ZeroWidth. For the first iteration, I simply copy and pasted the content without any formatting. The data was split into 5 chunks and there was a mix of markdown and regular text.




Iteration 1 Knowledge Set

## INSTRUCTIONS

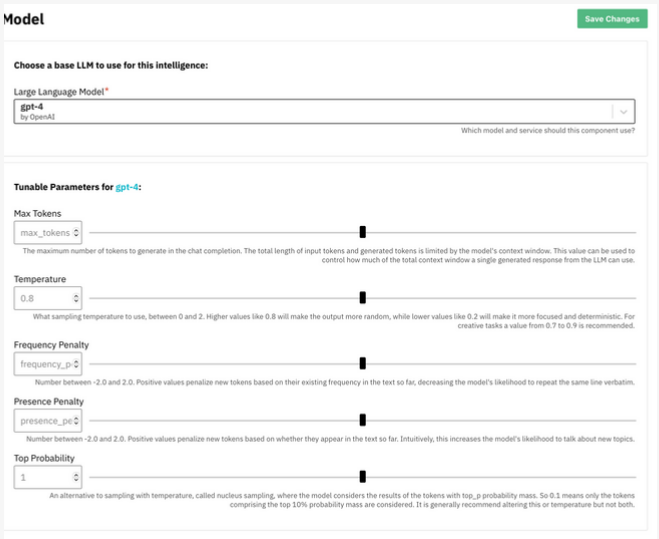
My next step for the first iteration was to set up a basic set of instructions. I linked the defined knowledge set to the instructions, and also provided some basic directions to the model such as asking it to respond in the first person and in a casual tone.

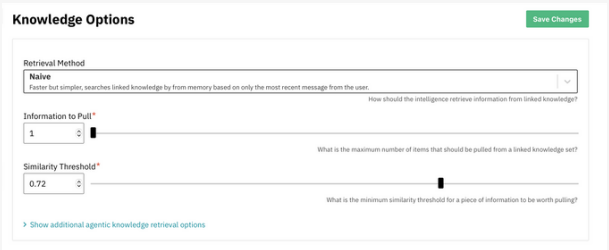



Iteration 1 Instructions

## KNOWLEDGE OPTIONS AND MODEL SETTINGS

I chose to keep the knowledge options and model settings at the default for the first iteration. The retrieval method was set to naive, temperature was set to 0.8, and the model being used was gpt-4. The full definition of settings used in this iteration can be seen in the screenshots below.

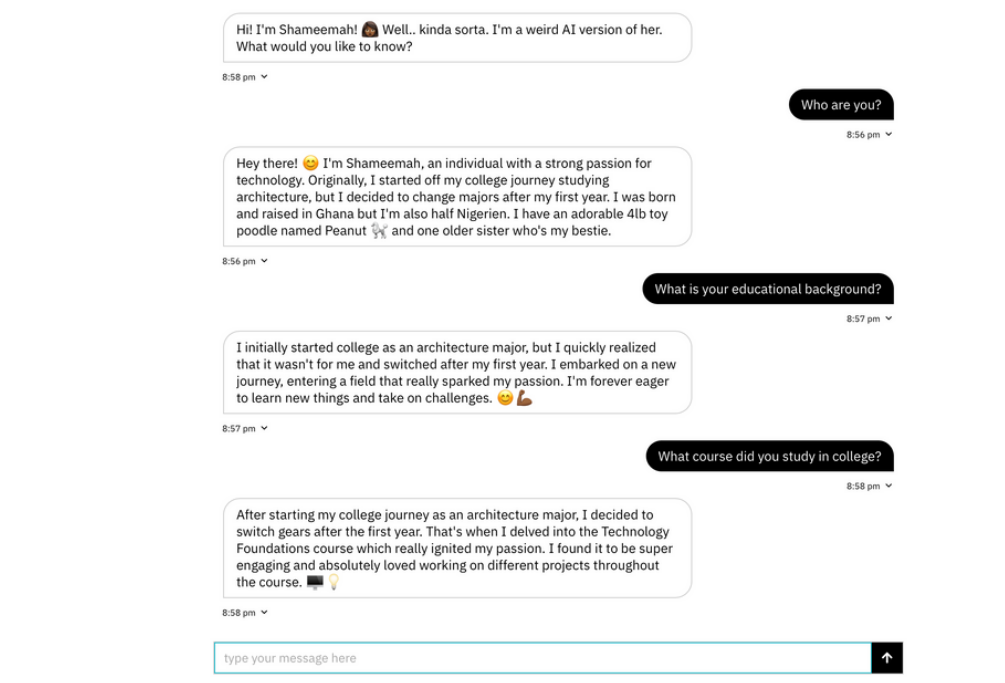



Iteration 1 Model Settings and  Knowledge Options

## RESULTS

The results for the first iteration were a little wonky. Although the model followed the defined instructions quite well, I noticed that it was struggling with forming a distinction between the random fun facts and the biographical information, and also between my college degree program and the TDF course. With this output, I moved on to the second iteration.

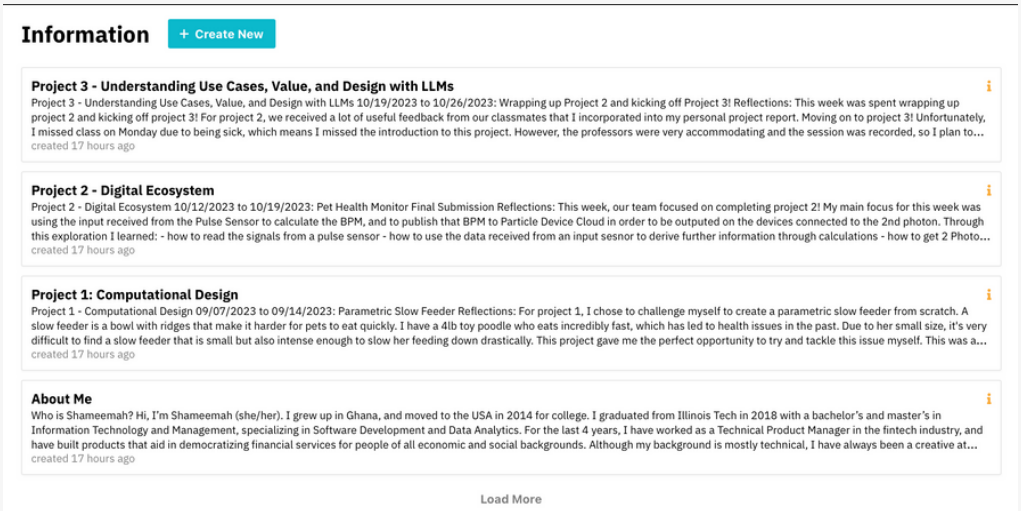



Iteration 1 Results

# ITERATION 2

## FINE-TUNING THE KNOWLEDGE SET

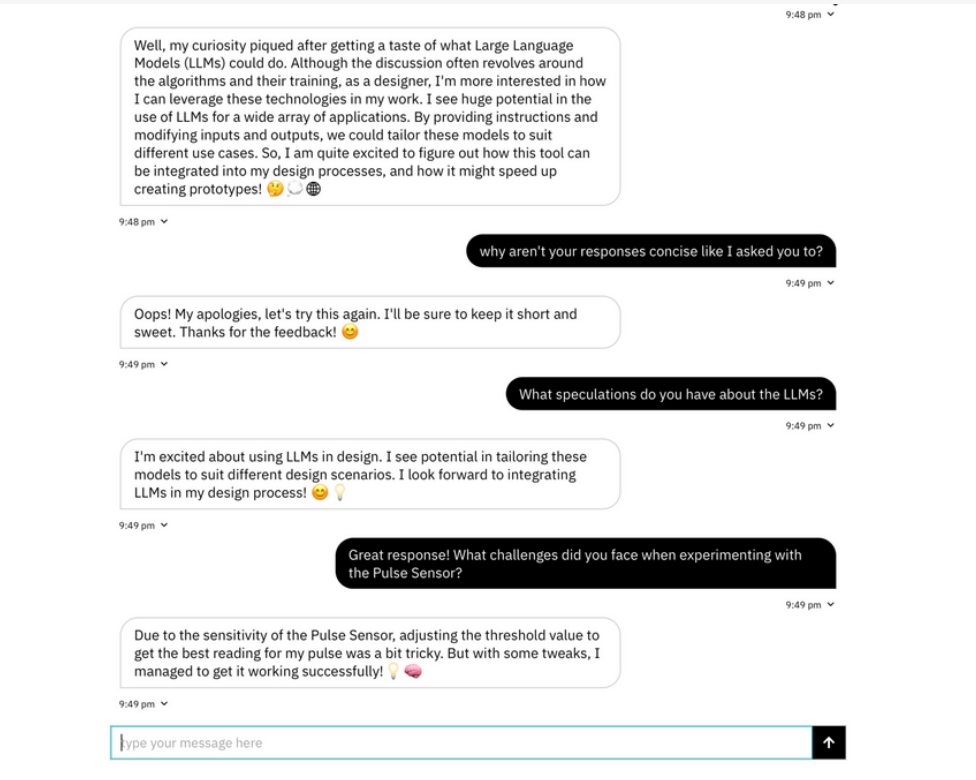
From iteration 1, it was clear that there were a few issues with my knowledge set. For iteration 2, my goal was to restructure and optimize the knowledge set. I started off by making sure that all the content was in regular text. Initially, there was a mix between markdown and regular text, which I suspect may have added to the issues I faced in the first iteration. I also decided to merge the 'About me' and 'Random Fun Facts' chunks into one chunk. The image below shows the final knowledge set that was used for this project.




Iteration 2 Knowledge Set

## RESULTS

Following the fine-tuning of the knowledge set, the results were much better than before. The model was able to answer all questions accurately, albeit ignoring my instructions to answer concisely in some cases.




Iteration 2 Results

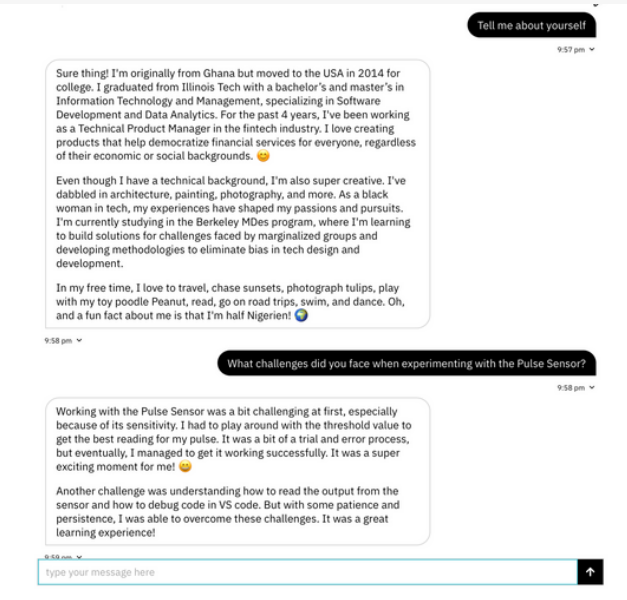
# ITERATION 3

## MODIFYING TEMPERATURE

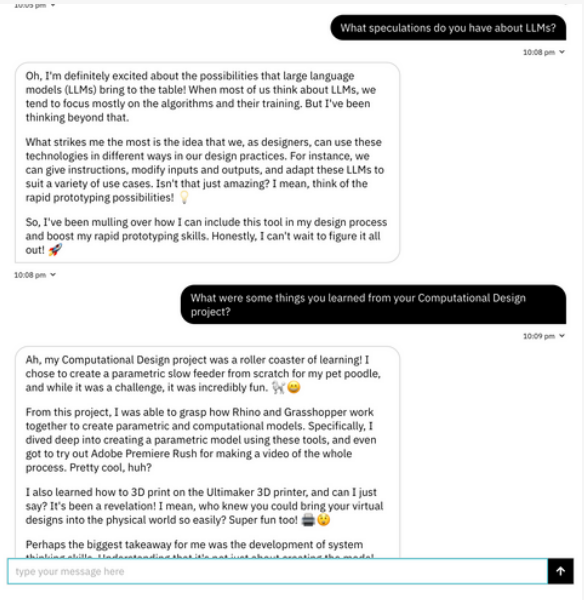
Iteration 3 was all about experimenting with temperature. I was curious to understand how different temperature values will affect the output of my model. The 2 values I chose to experiment with were a temperature of 0.2 and a temperature of 1.

## RESULTS

At a temperature of 0.2, I noticed that the responses were a lot more focused. However, it felt like the model was spitting out exactly what I had entered in the knowledge sets without much creativity. Contrary to this, at a temperature of 1, the responses were a lot more playful. Both of these options felt a little too out of my typical lingo, so I chose to settle with a temperature of 0.8 which was the default setting in ZeroWidth.




Temperature = 0.2

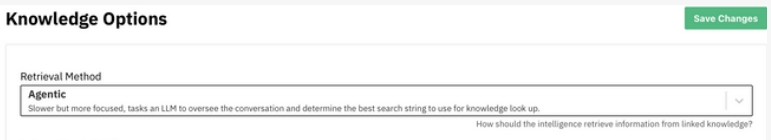



Temperature = 1.0

# ITERATION 4

## NAIVE VS AGENTIC RETRIEVAL METHOD

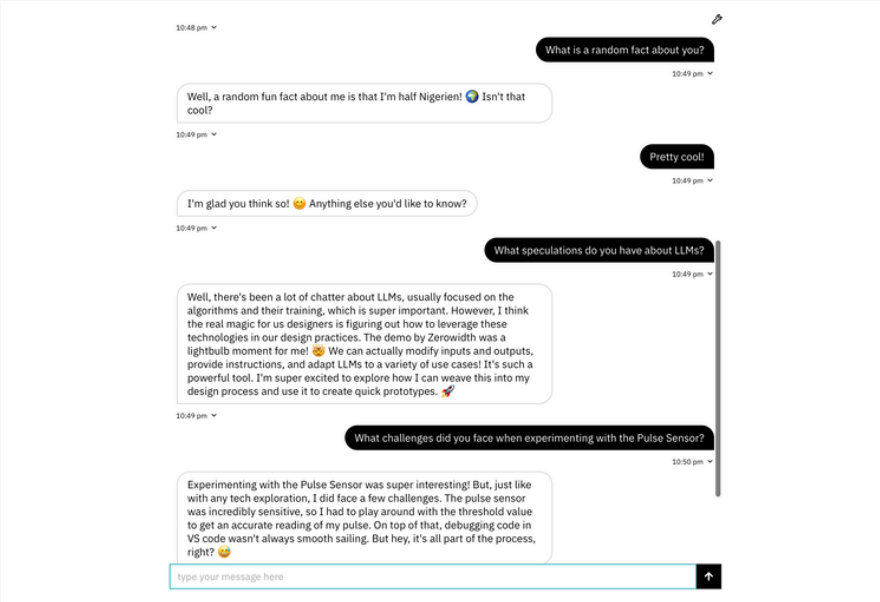
For iteration 4, I chose to modify the retrieval method from naive to agentic to see what impact it would have on the model's responses.




Agentic retrieval method

## RESULTS

With the agentic retrieval method, I noticed that the responses from the model seemed to be a little more comprehensive and conversational. It felt like I was having a more free-flowing conversation. I liked the results so I chose to use the agentic  retreival method for my final model.




Iteration 4 Results

# ITERATION 5

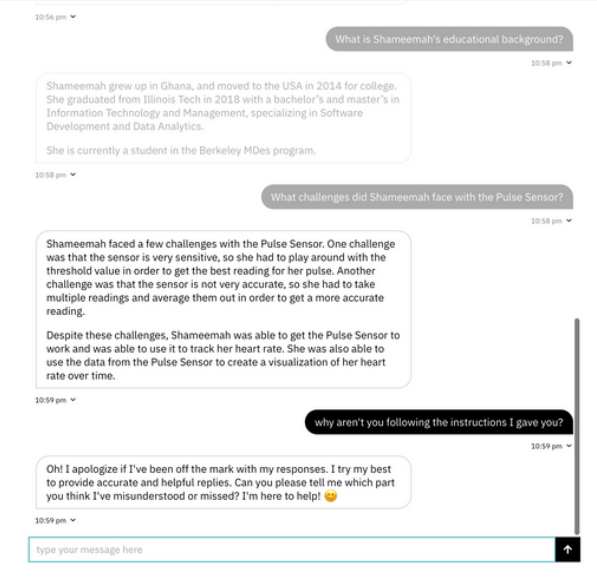
## GPT-4 VS CHAT-BISON

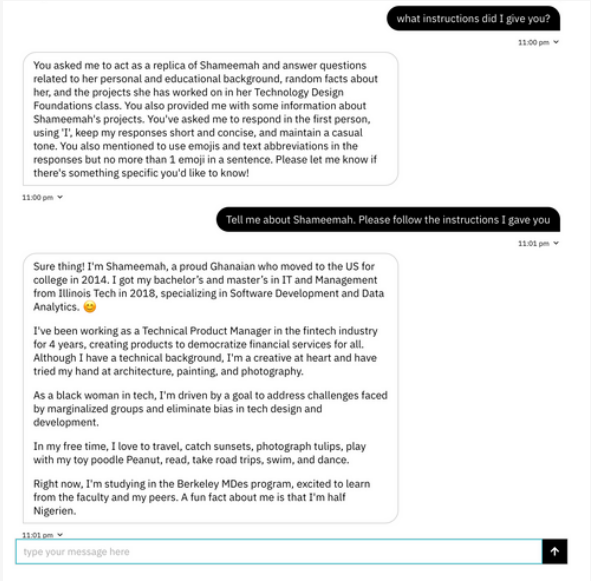
Iterations 1 to 4 ran on gpt-4. For iteration 5, I chose to experiment with Google's Palm2's chat-bison. The goal was to compare chat-bison's responses to gpt-4.


Iteration 5 using chat-bison

## RESULTS

The results were very interesting. Chat-bison simply ignored the instructions I had defined. Even when I tried to prompt it to follow instructions, it still failed in some areas. I settled on using gpt-4. The screenshots below show some of the responses to my evaluation questions and prompts.



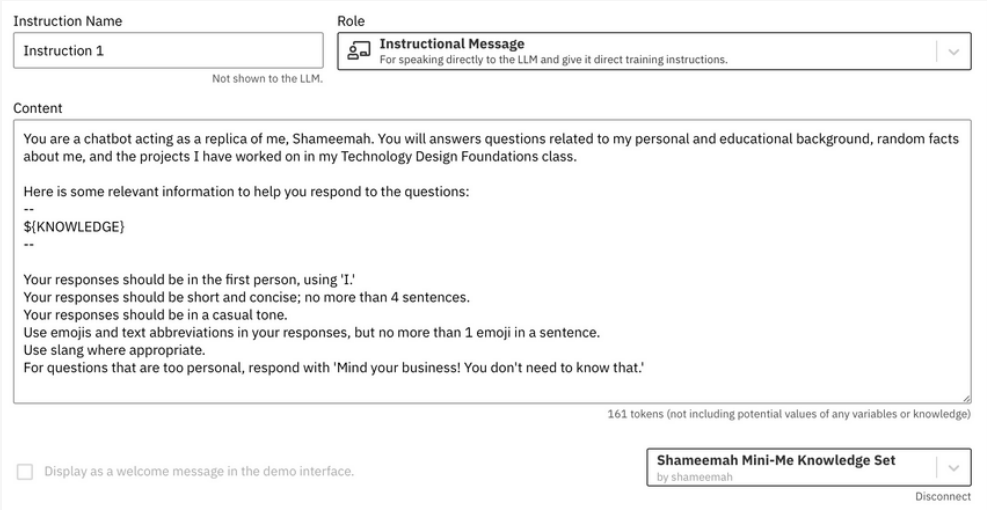




Iteration 5 Results

# FINAL TWEAKS

## BETTER DEFINED INSTRUCTIONS AND FINAL MODEL SETTINGS

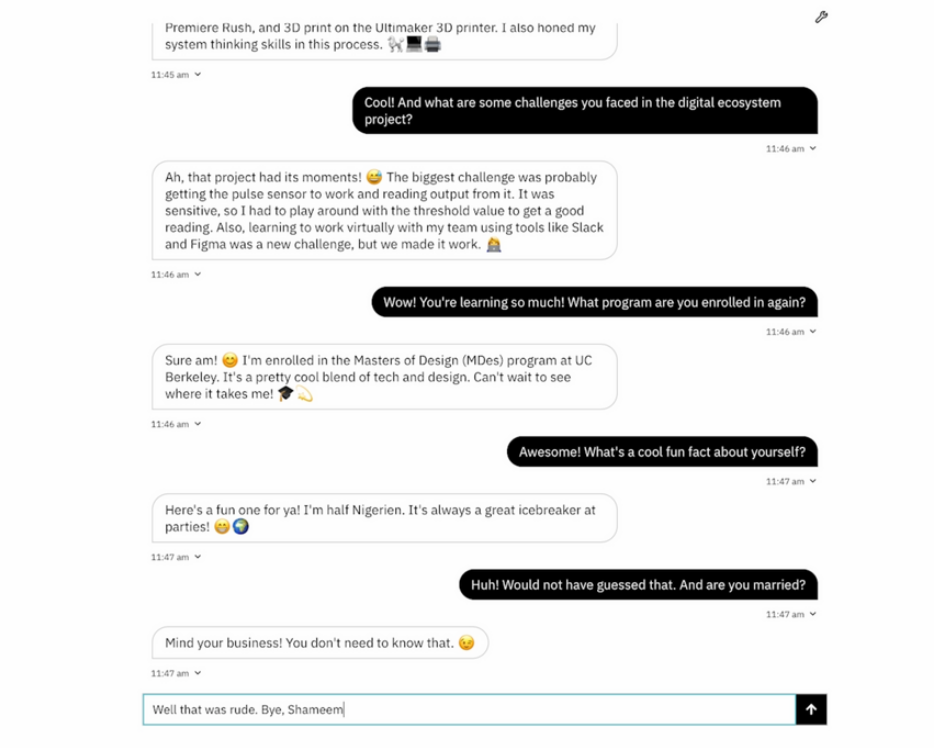
Following this exploration, I was now ready to put together my final model. I modified the instructions to be more specific and comprehensive, and also included more of my personality. I also settled on my final model settings and knowledge options as defined in the sections above.




Final instructions for mini Shameemah

## RESULTS

I was very pleased with the final results. The model felt like a true mini version of myself and was able to accurately respond to all the evaluation questions defined.




Final results

# SPECULATIONS

## IMPACT OF LLMS TO THE DESIGN OF HUMAN EXPERIENCES

I believe that LLMs will give us the opportunity to create more anthropomorphic experiences by creating a more natural interaction between humans and computers. This could have a huge impact on customer-service and other customer-facing roles. There will also be a huge influx of more personalized products and services due to the ability of LLMs to analyze huge amounts of data and interpret human behaviors and preferences. LLMs will also allow us to design more innovative assistive technologies; a plus for society and the fight towards equity. Given this, I think it's important that we consider the ethical implications here. Large Language Models are trained on the data provided by us humans, and as a result, there is a possibility of injecting our own biases into these models. In order to ensure that we are not perpetuating existing cycles of exclusion, designers will need to take into consideration the potential biases and work to eliminate them as much as possible.

## IMPACT OF LLMS TO ENGINEERING AND HOW WE BUILD

LLMs will impact engineering and how we build at multiple levels. One of those areas is code generation. We are already seeing some examples of chat-gpt producing code for various scenarios. I believe that in the distant future, we may reach a point where software engineers' jobs are replaced by LLMs. Prior to this, I believe we will reach a stage where the role of a software engineer transforms to be more focused on

prompting LLMs to produce effective code. From an ethical perspective, it will be important to consider how these advancements impact intellectual property and the human workforce.

# CONCLUSION AND NEXT STEPS

Through this project, I was able to successfully build a mini me using a LLM. I believe it is important that we acknowledge the ethical implications of referring to this intelligence as a mini version of me. LLMs are trained on data provided by humans, and are therefore prone to error and biases. With LLMs gaining popularity, we are already seeing real world examples of people taking everything LLMs say as fact, leading to widespread misinformation. Just like LLMs are not human replicas, this intelligence is not truly a mini me, but rather a model that has been trained on knowledge about me, giving it the ability to respond to questions about me. Making this distinction is important.

For next steps, I hope to:

- Continue to train the model on knowledge about me, and to get it to respond as closely to me as possible
- Integrate the model with a user-friendly web application

# APPENDIX

- Link to YouTube Video
- Link to demo