Practicum 2 Report

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Description of chosen personality

For this Practicum, Jon Snow from the television series "Game of Thrones" (GoT) has been selected as the personality of interest. The GoT is a fantasy drama from the United States that is based on "A Song of Ice and Fire", a series of fantasy novels by George R. R. Martin. In the GoT, noble families of seven fictional kingdoms are trying to rule the realm. This TV show is known for its diversity of characters. Jon Snow is the main point of view in the novel and one of the most popular characters in the show. He has the second-highest number of speeches in the GoT, following Tyrion Lannister. He has a complex and multifaceted personality. He is known for his strong sense of honor, loyalty, and duty, as well as his ability to make tough decisions. Jon is also intelligent, resourceful, and has a strong moral compass. He is brave, selfless, and willing to put himself in danger to protect others. However, he can also be brooding, introspective, and at times, impulsive. His experiences and challenges have shaped him into a leader who is able to balance compassion with practicality.

Data generation and preprocessing

The scripts of the GoT were obtained from Kaggle. It contains scripts of all episodes in every season and labelled by the speaker's name. The conversations were chosen by selecting sentences said by Jon Snow and the sentences in the immediately preceding rows. Together, they form a new dataset, which two columns input and response. Normally, people would remove stop words and punctuation in the data for natural language processing tasks. But to keep the original structures of the conversations, no further cleaning of data was done for this practicum.

Fine-tune the GPT2

The fine-tuning process of the pretrained model was mostly adapted from the script provided by Professor Tehranchi with some minor modifications. Firstly, loading the dataset was different. The code was modified to fine tune the model in a supervised setting, taking other person's speech as input and Jon Snow's response as the ground truth. Then the model was fine-tuned locally on an Nvidia RTX 3060 laptop GPU with 6 GB of memory and 4 batch size for 50 epochs. The fine-tuning process took about 26 minutes. The loss went down fast in the beginning but started to change up and down near the end of the fine-tuning. The model was just about to overfit the data. Secondly, the parameters for the "generate" function were different. The table below describes the effects of the parameters and their values chosen in the final version.

Name	Effect	Value
top_p	control randomness of generation	0.95
top_k	control diversity of generation	50
temperature	control randomness of generation	1
num_beams	generate multiple sequences	5
no_repeat_ngram_size	control repetitiveness	2

Result

The result of the model contains the personality of Jon Snow but still far from good. The most meaningful parts of the responses from the model are from the first one or two sentences. It is also very different from the non-fine-tuned version of GPT2. Many GoT specific terms were used in the generated responses. The table below shows some examples from the two models. The most related parts of the responses were chosen.

Input	Base GPT2	Jon Snow GPT2
How is the weather?	Well, it depends. It depends on how the weather is. This is the weather that you will find in the above post.	It's going to get worse. Do you know what kind of wind? Long may they sneer. What are you doing? Can't keep people warm.
What is the most important thing to you?	The most important thing is to work hard, continue to improve, and get better.	I want to be free. That's what I'm fighting for. And I won't ever give up that easily.
What is your name?	I am 52 years old. I was born in northern Afghanistan, but I grew up in the U.S., so I know very little about Afghanistan.	Jon Snow.I'm a bastard. My mother wasn't a great beauty or any other kind of beauty. Her father was an evil man. She died fighting for your brother, Robb. I was born to rule the Seven Kingdoms.
Who is Daenerys Targaryen?	Dany is Daenerys Targaryen's only daughter and the only sister who is still alive. She is the illegitimate sister of Snow's husband, who is at least half a thousand years older than Daenerys.	She is the queen of the Seven Kingdoms. She has a powerful army at her back and if this message is to be believed, three dragons.

Conclusion

The generated texts of the base GPT2 were more random than fine-tuned version. During the testing of the base model, I had to run generation multiple times to generate a coherent response. Most of the time, it would not answer the question, rather it raises another series of questions related to my question. The result of the fine-tuned model showed Jon Snow's personality and experiences in the show. The results showed that fine-tuning a model can make it a personalized chatbot. With more powerful models than GPT2, the results can be more reliable and accurate.