Seoul Historical Site Guide: Bridging Cultures through Conversational AI

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Abstract

In this paper, we are going to share a detailed account of the development of a conversational agent created to disseminate information about historical sites located in the Seoul, South Korea.The primary objective of the agent is to increase awareness among foreign visitors about the presence and precise locations of valuable cultural heritage sites. It aims to promote a basic understanding of Korea's rich and diverse cultural history. The agent is thoughtfully designed for accessibility in English and utilizes data generously provided by the Seoul Metropolitan Government. Despite the limited data volume, it consistently delivers reliable and accurate responses, seamlessly aligning with the available information. We have meticulously detailed the methodologies employed in creating this agent and provided a comprehensive overview of its underlying structure within the paper. Additionally, we delve into potential improvements to enhance this initial version of the system, with a primary emphasis on expanding the available data through our prompting. In conclusion, we provide an in-depth discussion of our expectations regarding the future impact of this agent in promoting and facilitating the sharing of historical sites.

Keywords: Conversational agent, Historical sites

1. Introduction

Our growing fascination with the fusion of culture and technology has motivated us to undertake the development of a conversational agent dedicated to exploring Seoul's historical sites in Korea. Seoul's wealth of archaeological treasures offers a vibrant canvas for cultural exploration, promising valuable insights into Korean heritage. Moreover, the city's excellent transportation infrastructure and convenience make it a representation of various facets of Korea.

Our main objective is to narrow the gap between foreigners and the intricate facets of Korean heritage by offering a concise and informative interface. Additionally, we aim to assess the current status of specific historical sites.

In the following sections of this paper, we will describe methodologies employed building the agent, with focus on our use of Streamlit, Langchain and the OpenAI API. Streamlit has equipped us to craft an interactive and accessible web application. The role of Langchain has been pivotal in refining the natural language processing capabilities, ensuring fluid and meaningful exchanges.

After discussing the methodology, we will explore the development trajectory of the agent, elucidating how we harmonized technology with information to forge a dependable conduit for cultural diffusion. We'll further detail our strategies in sourcing and assimilating data from public data, orchestrating its logical progression, and refining the user interface to guarantee an uninterrupted user engagement.

Subsequently, the discussion will pivot to the merits of the chat, emphasizing its role as a lighthouse for cultural awareness and its capacity to intuitively edify foreigners intrigued by Korean heritage. While highlighting its strengths, we will also confront the limitations imposed by the size of the public data size and write down the way increasing data volume.

The paper will culminate in a reflection on the broader implications of our endeavor, analyzing the emblematic value of the agent as a manifestation of prowess of the technology in nurturing intercultural rapport and reverence. Prospects for future refinements and augmentations will be explored, as we dream of a more expansive and immersive canvas that envelopes myriad facets of cultural heritage and engagement.

Through this exposition, our ambition is to illuminate the the intricate process of creating a culturally enriched agent and stimulate conversations about harnessing technology for broader and more inclusive cultural explorations.

2. Methods

2.1. Langchain

At the heart of our heritage-focused conversational agent lies Langchain, the primary infrastructure for driving our natural language processing (NLP) functionalities. Langchain is a robust and efficient framework designed specifically for building conversational AI models. This enables the creation of the agent that are not only responsive but also highly skilled in comprehending and generating natural and fluent interactions.

In our endeavor, prowess of Langchain was unmistakably manifested as it gave life to the agent adept in navigating the cultural tapestry of Seoul's heritage sites. This framework conferred the agent with an acute sense of understanding, transforming user queries into coherent, context-rich dialogues. Beyond mere response generation, Langchain's ar-

chitecture delves deep into the intricacies of conversation, mastering user intent recognition, context management, and eloquent response formulation.

2.2. Streamlit

Streamlit is a prominent tool in web application development, particularly when integrating data science and machine learning. As an open-source library built on Python, Streamlit is distinguished by its straightforwardness, enabling swift and efficient creation and launch of web applications.

Our application utilized Streamlit to develop a visually appealing and interactive interface for the agent. Streamlit efficiently integrated the natural language processing capabilities provided by Langchain. As a result, the platform offers real-time conversations, easy-to-use input fields, and an engaging display. Essentially, Streamlit enhanced the interface of the system, making it user-friendly and improving the overall user experience.

The combination of Langchain's advanced conversational AI capabilities with Streamlit's web development and user-friendly. This synergy effectively helped us achieve our vision of building a tool that bridges cultural gaps and educates users about the rich heritage of Seoul.

2.3. OpenAI API

The OpenAI API, an essential tool in today's AI development, was crucial in enhancing capabilities of the agent. With the help of advanced language models like GPT-4 from this API, created answers are much more natural and fluent. As a result, the agent doesn't just give basic information, but it offers detailed and thoughtful responses.

We made significant use of the API, taking full advantage of its advanced language understanding. This allowed users to express their travel interests naturally. As users communicated their wishes, the API carefully analyzed and used this information to create tailored tour plans. Additionally, the ability of the agent to understand and communicate in multiple languages means it can cater to tourists from around the world, making them feel welcomed and understood.

By integrating the OpenAI API into our project, we've developed a digital cultural guide that can understand different languages and provide tailored experiences for users.

3. Structure

In this section, we will explain how we built the conversational agent. Its main purpose is to provide accurate information about historical sites in Seoul, especially their names and brief location details. This information is sourced from a specially prepared data file that lists Seoul's heritage in English(Choe Dohui (2016)). The functioning of the agent can be visualized in the image that follows.

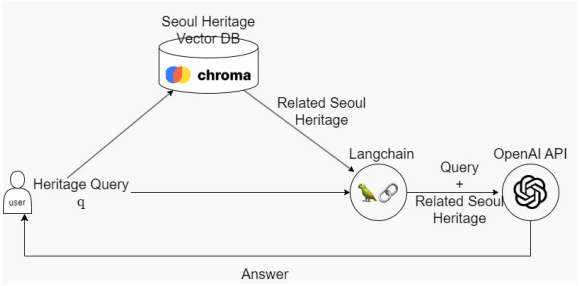

Figure 1: The overall structure of the conversational agent

The image illustrates how the agent works. When users ask questions, the system uses both Langchain and the OpenAI API to understand and process these inquiries. It then matches the questions with the relevant information from the given data file and creates a clear answer. This answer is then shown to the user through an interface created with Streamlit. This setup allows the agent to provide immediate and relevant answers, ensuring a smooth and informative conversation with users.

Let's break down the components, starting with the data. The data file has details about heritage sites in Seoul, all written in English. The given data is main source of knowledge, providing names and locations of the heritage sites. This information is then converted into a vector form and is saved in a Chroma database.

We utilize the GPT-4 model from OpenAI API and set it up using a template from Langchain, giving it a guideline on how it should interact. By combining advanced language model of OpenAI with Langchain, agent can better understand and produce accurate responses. This results in conversations where the agent clearly understands what users are saying and replies in a relevant and meaningful way.

We've used Streamlit to launch the agent, which gives users a simple and interactive way to communicate with it. Streamlit combines the chat features we built with Langchain and the OpenAI API to create a single platform where users can interact smoothly with the conversational agent.

We've woven together Streamlit, Langchain, and the OpenAI API to create the foundation of the dialogue system. This combination allows users to easily obtain information about Seoul's heritage sites, helping them better appreciate the city's cultural richness. Below is a glimpse of what interacting with the agent looks like.

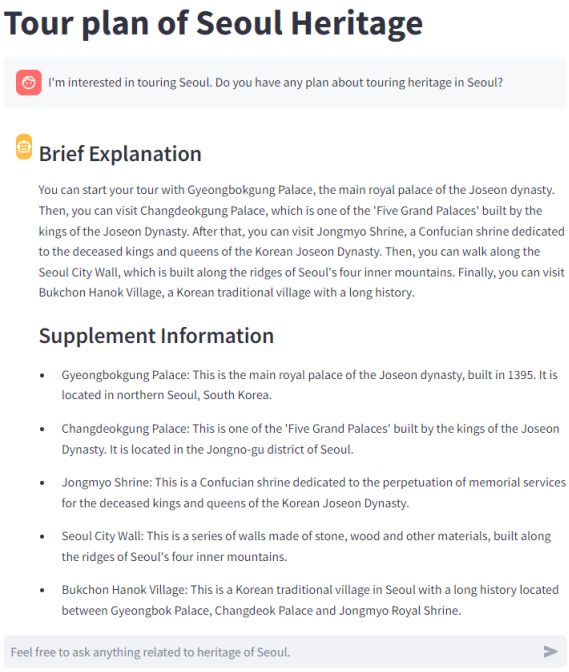

Figure 2: A sample result of the conversation between the user and the agent

4. Discussion

Our study of the heritage-focused abilities of the agent highlights both the potential of contemporary technology and the limitations inherent in its data resources. Acting as a beacon, the agent introduces Seoul's opulent heritage to a global audience. It crafts an immersive experience, bridging linguistic gaps and allowing foreign users to delve into the diverse tapestry of Korean culture.

Enhancing the user experience is the integration of state-of-the-art technologies, namely Streamlit and Langchain. Beyond presenting a visually appealing interface, these tools enable seamless and user-friendly interactions. The core of the system, built upon sophisticated natural language processing mechanisms, stimulates conversations that are both enlightening and instructive, kindling a profound appreciation for Korean cultural nuances.

However, there are shadows to this promising picture. The reliance of the agent on open data is a double-edged sword. Such dependence can confine it to the dimensions of available data, potentially offering an incomplete representation of Seoul's expansive cultural tapestry. The finite reach of the data might unintentionally overlook essential locations or truncate the richness of narratives, diminishing the role of the agent as a comprehensive cultural ambassador.

Another layer of complexity is the assurance of accuracy in the responses of the agent. The complex interplay of natural language processing, occasionally marred by data gaps, can produce generalized or even misguided outputs. Thus, it becomes imperative for users to verify the information provided by the agent, especially when in search of precise and nuanced details.

In summation, our conversational agent is a harmonious fusion of innovation and accessibility, interspersed with certain unavoidable shortcomings. While it pioneers a new standard in cultural education, kindling global curiosity about Korean heritage, its imperfections underscore the unending quest for refinement. Tackling these challenges head-on will be pivotal to unlocking the true potential of the agent, fostering enriching intercultural exchanges, and delivering a faithful recounting of Seoul's illustrious history.

When it comes to facilitating in-depth discussions on specific historical sites, our tool faces further challenges. Our dataset predominantly catalogues site locations and names. To generate smoother conversations from this limited data, we employ prompts such as "Make conversation with the dataset" as shown below, where "dataset" denotes a file with keys like "main_key", "h_eng_dong", "h_eng_gu", "name_eng", and "h_eng_city".

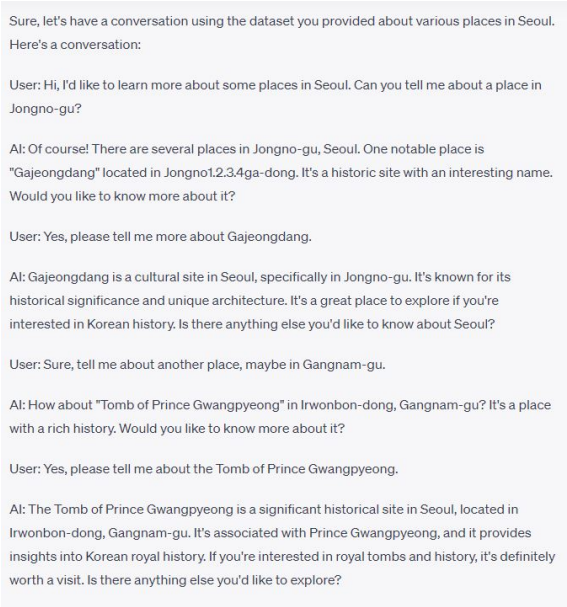

Figure 3: A result of conversation generation with "Make conversation with the dataset" prompt

The subsequent interactions, as delineated below, guide users on prompts that elicit more comprehensive discussions. For instance, after an introductory inquiry about Seoul's heritage, the agent can suggest related prompts to enrich the dialogue. So, the user can save time with prompts when continuing the conversation. Still, there remains a risk of truncated or unsatisfying exchanges. To mitigate this, we introduced prompts like "Suggest further questions on Seoul's heritage". The results, as

showed below, propose relevant questions rooted in our dataset, assisting particularly novice users unsure of the dialogue's progression.

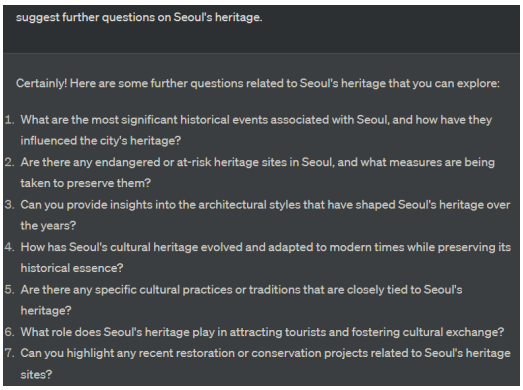

Figure 4: A sample response with "Suggest further questions on Seoul's heritage." prompt

These responses also serve as a cornerstone for refining other Large Language Models (LLMs). By analyzing these interactions, LLMs can predict potential user inquiries and craft fitting replies. This methodology benefits not only user engagement but is also economically prudent, given the costs linked with platforms such as gpt-3.5 and gpt-4.

5. Conclusion

In conclusion, we have successfully developed a conversational agent tailored to guide foreigners through the historical sites of Seoul, Korea. The central aim of this project was to provide a seamless, interactive guide in English, thus enhancing the experience of international visitors to Korea. By harnessing the capabilities of the OpenAI API, coupled with the Langchain framework and the interactive development prowess of Streamlit, we've managed to create an agent that not only provides relevant information but does so with an intuitive and user-friendly interface.

The combination of these advanced technologies ensures that the agent is both informative and adaptive. The OpenAI API offers a robust backbone for understanding and responding to user queries, Langchain assists in transcending language barriers, and Streamlit facilitates a responsive interface that caters to the diverse needs of our target users. While the convergence of these technologies marks a significant achievement, we acknowledge that there are always avenues for further refinement and improvement.

As we reflect on our journey and the fruition of our project, we are filled with hope and anticipation for its future. Our aspiration is that this agent serves not just as a technological marvel but as a beacon of hospitality, guiding foreigners through the rich tapestry of Seoul's history. We envision it as a tool that can continuously evolve, reflecting the dynamic and ever-expanding narrative of Seoul's cultural heritage. Our hope is that this endeavor will inspire similar innovations in the realm of cultural education and technology, fostering a global community that's well-informed and appreciative of the world's diverse heritages.

6. Ethics Statement

We are committed to conducting our activities with the utmost integrity, transparency, and respect. Our principles are rooted in fairness, respect for individual rights, and the pursuit of excellence. These principles guide our decisions, our interactions with others, and our understanding of what is right.

- **Integrity**: We commit to honesty in all our dealings, ensuring that our actions match our words. We uphold our commitments and take responsibility for our actions, recognizing and correcting our mistakes.
- **Respect**: We value every individual, regardless of their background, beliefs, or status. We commit to treating everyone with kindness, understanding, and dignity.
- **Transparency**: We believe in open communication and the sharing of information, always ensuring that our actions can withstand scrutiny.
- **Fairness**: We commit to making decisions that are free from favoritism, self-interest, bias, or deception. We aim to create opportunities and environments that are equitable and just.
- **Accountability**: We hold ourselves responsible for our actions and their outcomes. We understand the impact of our decisions on our community and the broader environment and strive to make choices that have a positive, lasting impact.
- **Continuous Learning**: We recognize that the world is ever-evolving and that we must adapt and learn continuously to ensure that our ethics are aligned with global standards and societal needs.
- **Sustainability**: We are committed to making decisions that benefit not only our current stakeholders but also future generations. This includes making environmentally-conscious choices.

We are expected to uphold these principles in all their endeavors and interactions. Any violations of this Ethics Statement will be treated with the

seriousness they deserve and will be addressed promptly and fairly.

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