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Bridging the Gap: Fine-Tuning Artificial Intelligence (AI) Chatbots for Tourism

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Abstract

Generative pre-trained transformers (GPTs) are subsets of large language models (LLMs) that are designed to understand, generate and interact with human language (ChatGPT). GPTs are trained with vast amounts of data in order to answer queries in a human-like manner. As a member of the broader GPT family, OpenAIs ChatGPT is regarded as a game changer artificial intelligence (AI) chatbot because it allowed public to access LLMs complex world in a user-friendly way (Dai et al., 2023). Users of ChatGPT can easily handle queries such as domain-specific questions, content generation, statistical analyses, language-based corrections (Ali, 2024), thus, it provides useful tools for customer services in diverse businesses (Nah et al., 2023). ChatGPT has promising opportunities for tourism & travel industry in terms of dealing with guest services, automating specific tasks, facilitating more dynamic social media, increasing the efficiency of the staff, fostering marketing activities, enhancing travel-related decision making, therefore tailoring a better guest experience (Carvalho & Ivanov, 2023; Wong et al., 2023). AI chatbots have also raised the interest of tourism & hospitality academia due to their potential benefits (Cai et al., 2022; Rather, 2024; Tosun et al., 2024; GURSOY et al., 2023; Pillai and Sivathanu, 2020; Wong et al., 2023).

Despite the advancements in natural language processing (NLP), chatbots still struggle with some conversational abilities while interacting with its users (Hosseini, 2020). There could be problematic issues such as (1) generation of non-sensical or misleading content by the chatbot which is called hallucination, (2) insufficiency or low-quality of training data, (3) difficulties regarding the update of real-

time data (Nah et al., 2023; GURSOY et al., 2023). In addition to these, GPT-4, which is the most advanced and recent language model of ChatGPT has a data cut-off date of April 2023 (ChatGPT), which indicates that the language model has been trained at the very latest at that time. For these reasons, Hsu et al. (2024) called for a tourism-specific generative AI concept according to the industry needs. They advise that LLMs could be trained specifically with domain-specific, trustful tourism data. Because these LLMs are pre-trained models, fine-tuning them with up-to-date data might be useful and beneficial (Hsu et al., 2024; Dai et al., 2023; Brown et al., 2020). Fine-tuning allows users to feed their language model periodically to keep it up-to-date and train them with context specific data. By doing so, pre-trained LLMs will act more accurately for tourism-specific contexts in which ChatGPT exhibits deficient or false responses.

One of the most attractive tourism-specific contexts that requires domain-specific data could be regarded as enotourism (wine tourism), which is progressively growing in Türkiye. Türkiye stands as fifth in grape production worldwide, processing 4.2 million tons of grapes (in 2022), thereby reaching a level of 62.2 billion liters of total wine production yearly (in 2022) (OIV, 2022a: 5,7; <https://www.oiv.int/what-we-do/data-discovery-report?oiv>).

Historically, Anatolia's organized wine production could be dated back to 4000 BC (McGovern et al., 2017; Gürsoy, 2021: 15). Therefore, grape cultivation and wine production was always an important cultural heritage aspect of Anatolia, which makes Türkiye to be able to produce unique types of wine-grapes nowadays. This leads to the research question of this study. Although there is sufficient information about recognised Anatolian wine-grapes such as Boğazkere, Öküzgözü, and Çalkarası, relatively lesser-known and indigenous grapes that are grown in specific local-regions often lack comprehensive and accurate information. Preliminary search revealed that this information lacks in both online search engines and ChatGPTs (and other AI Chatbots) latest versions. ChatGPT provides erroneous and misleading results about indigenous grapes, thus requires a proper fine-tuning with reliable data.

This research's objective is to develop a fine-tuned AI chatbot to answer users and potential tourists queries. Proper fine-tuning was aimed to train the chatbot, so the necessary text-data to be trained was decided. Mardin and Şırnak regions located in southeastern Türkiye host unique grape types that are known as Syriac (or Assyrian) wine-

grapes. Data about these indigenous wine-grapes (called Mazrona and Kerküş)-which are being used to produce the famous Syriac wine (a unique cultural heritage value for Turkiyes enotourism), was obtained. Then these steps were followed, respectively:

- An assistant API was generated from openAIs platform
- In order to fine-tune the data, openAIs guidelines were followed (<https://platform.openai.com/docs/guides/fine-tuning>)
- For assistant preference, OpenAIs recommendation was compiled (gpt-3.5-turbo-0125)
- Appropriate fine-tuning data was obtained from a licensed local (Syriac/Mardin) tourist guide
- json, jsonl, docx, pdf and txt types of data were used during testing process
- Code interpreter and retrieval options were tested separately

As a result of the fine-tuning process, the txt document type was found to be the most effective training data for chatbot. It gave the most human-like and appropriate answers regarding the specific Syriac wine-grape queries. The trained assistants' responses were superior to base (untrained) ChatGPT 3.5/4. Besides, base ChatGPT displays misleading or deficient answers to questions, and were prone to hallucination. Consequently, while AI chatbots are powerful tools for tourism, their effectiveness is limited regarding local heritage, culture or custom-specific queries, unless they have been specifically trained by tourism professionals (Hsu et al., 2024; Wong et al., 2023). The tourism and travel industry has many diverse subsets to be trained, offering unique fine-tuning opportunities. Therefore, the context of this research should be extended to niche domains of tourism such as local cuisines, cultural routes, alternative types of tourism and historical & archeological heritage.

Keywords: artificial Intelligence, ChatGPT, fine-tuning, enotourism, OpenAI

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