CHI Greece 2023

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Large Language Models for Cultural Heritage

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- Digital Storytelling and AI for Cultural Heritage
- VR / AR, Smart Glasses, Robotics, Laser scanning, Photogrammetry, Tangible UI

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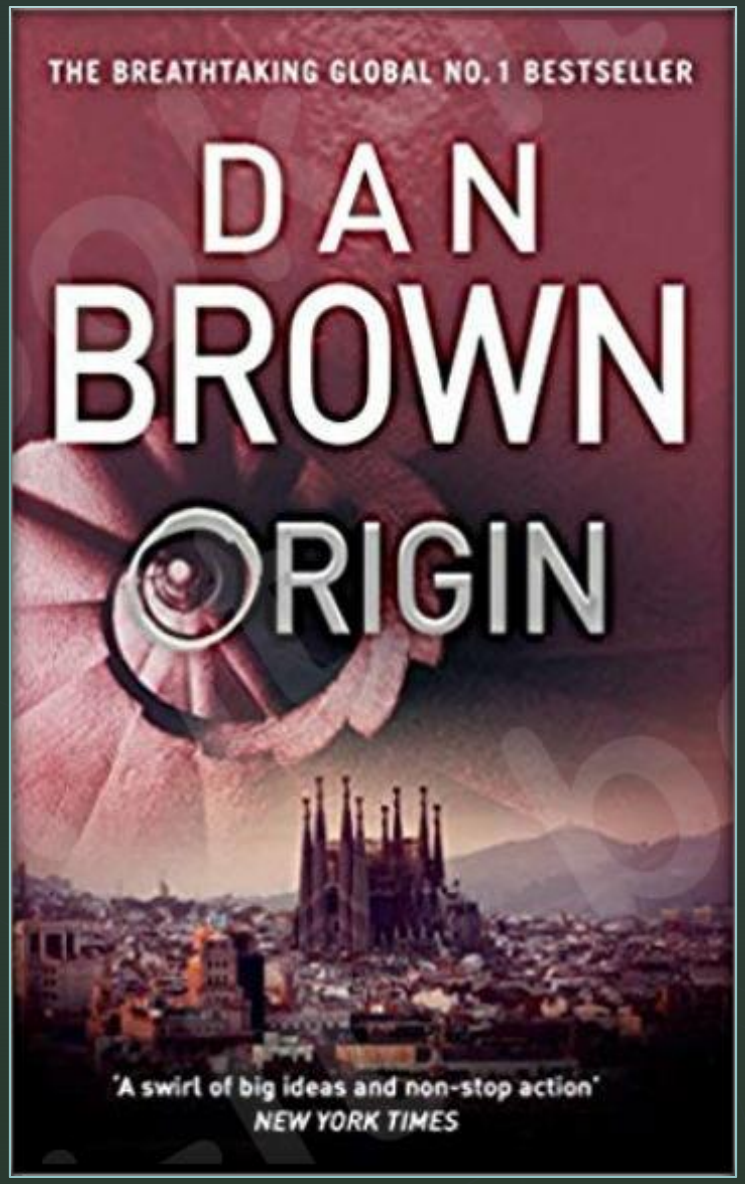
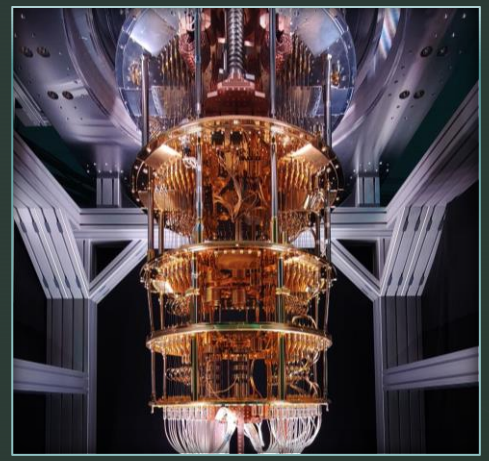
Ph.D. Research

- "Intelligent methods for digital, pervasive and augmented storytelling, for shared and linked user experience”

Is this possible?





Fictional or not?

Research terms involved

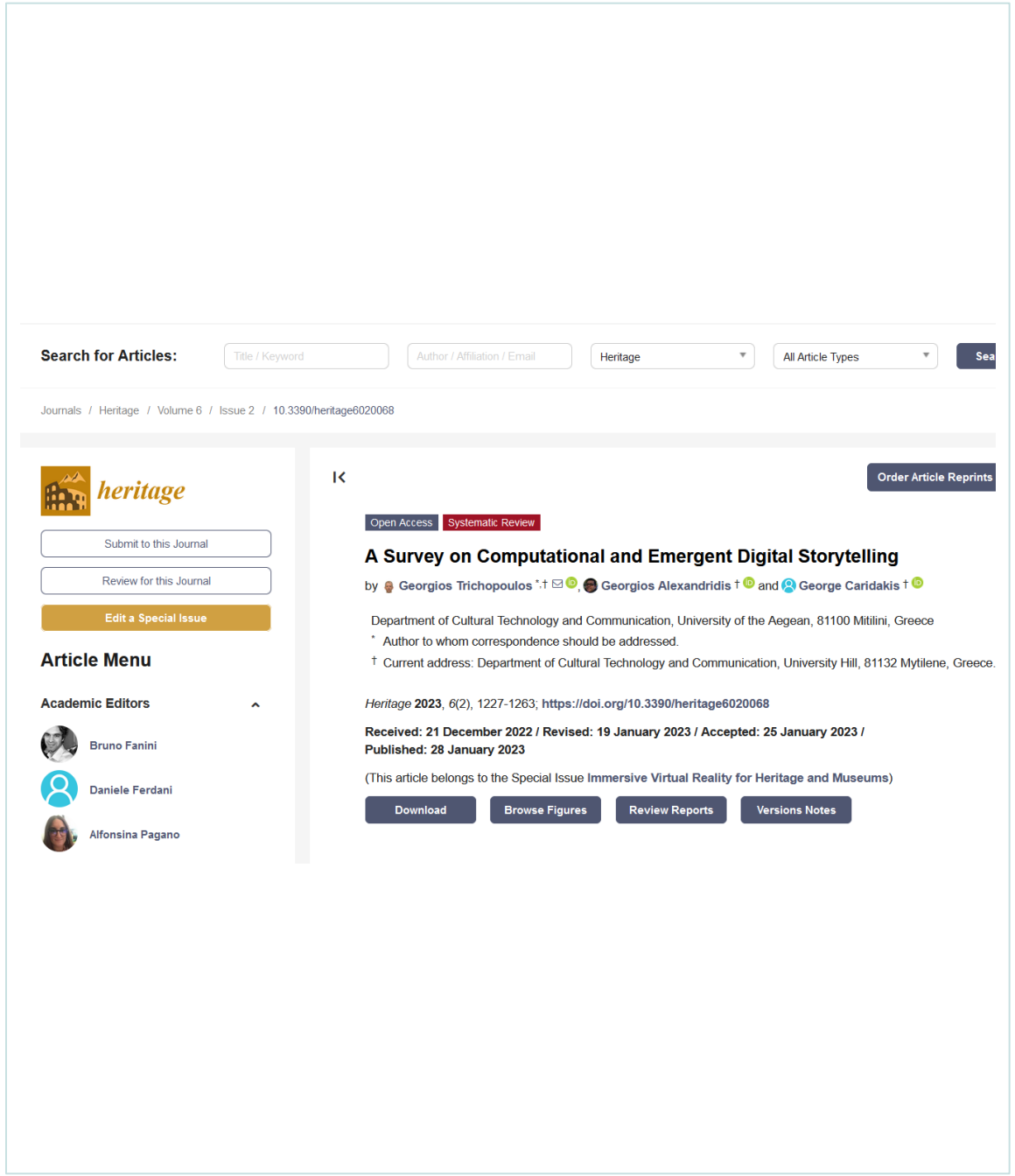
Where to start?

- Narrative Acts
- Machine Learning
- Chatbots
- Transformers
- Deep Learning
- Neural networks

- Digital Storytelling
- Narratives for CH
- Computational narratives
- Emergent storytelling

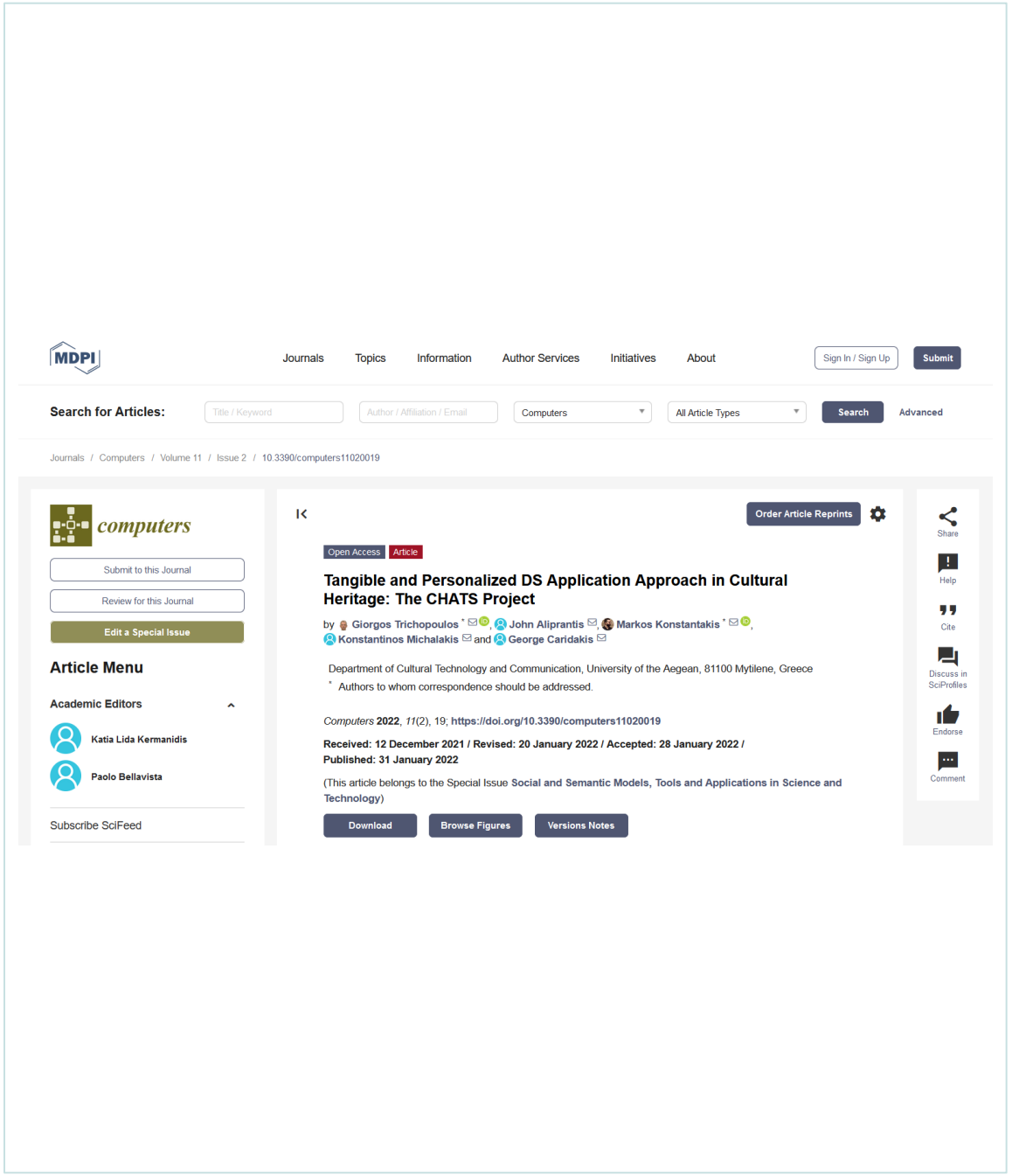
Survey - Computational DS

- A Survey on Computational and Emergent Digital Storytelling

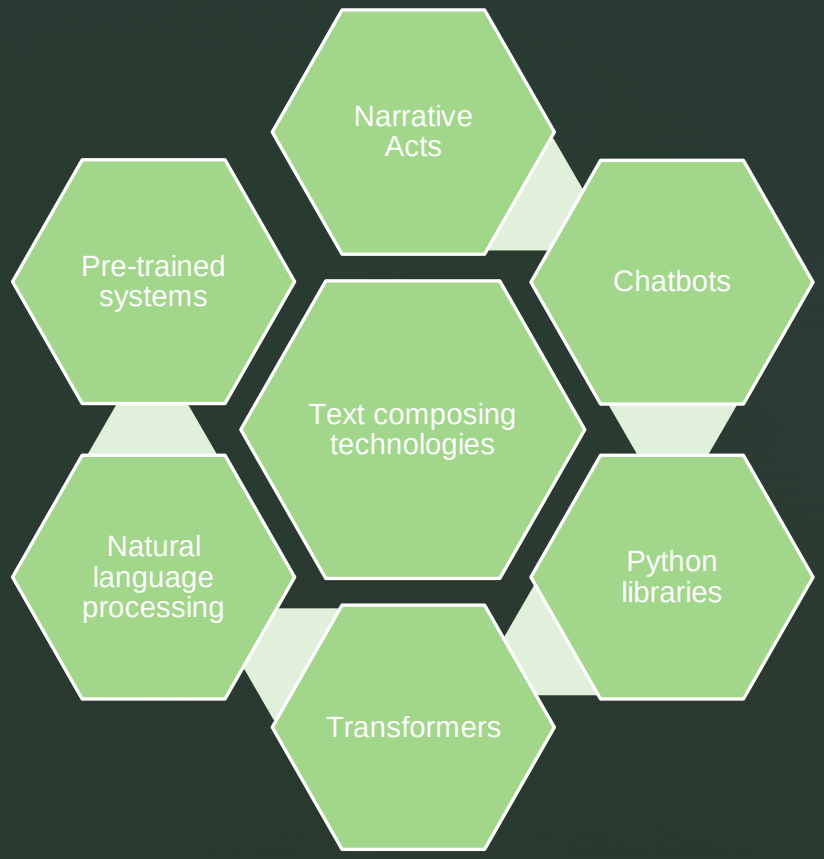


Tangible DS

- Tangible and Personalized DS Application Approach in Cultural Heritage: The CHATS Project



Artificial Intelligence



GPT by OpenAI

GPT2	GPT3	GPT3.5	GPT4
Trained on over 1.5 billion parameters 7.000 fiction books 8 million web pages Generate the next sequence of text 9 / 2019	Trained on 175 billion parameters Write essays, text summarization, translations, answering questions, writing code 5 / 2020	Updated training data up to 9 / 2021 Stateful model ChatGPT Easier on guidance Lower cost 9 / 2021	More capable on handling text Better on translating Multimodal 3 / 2023

Creating a first museum guide

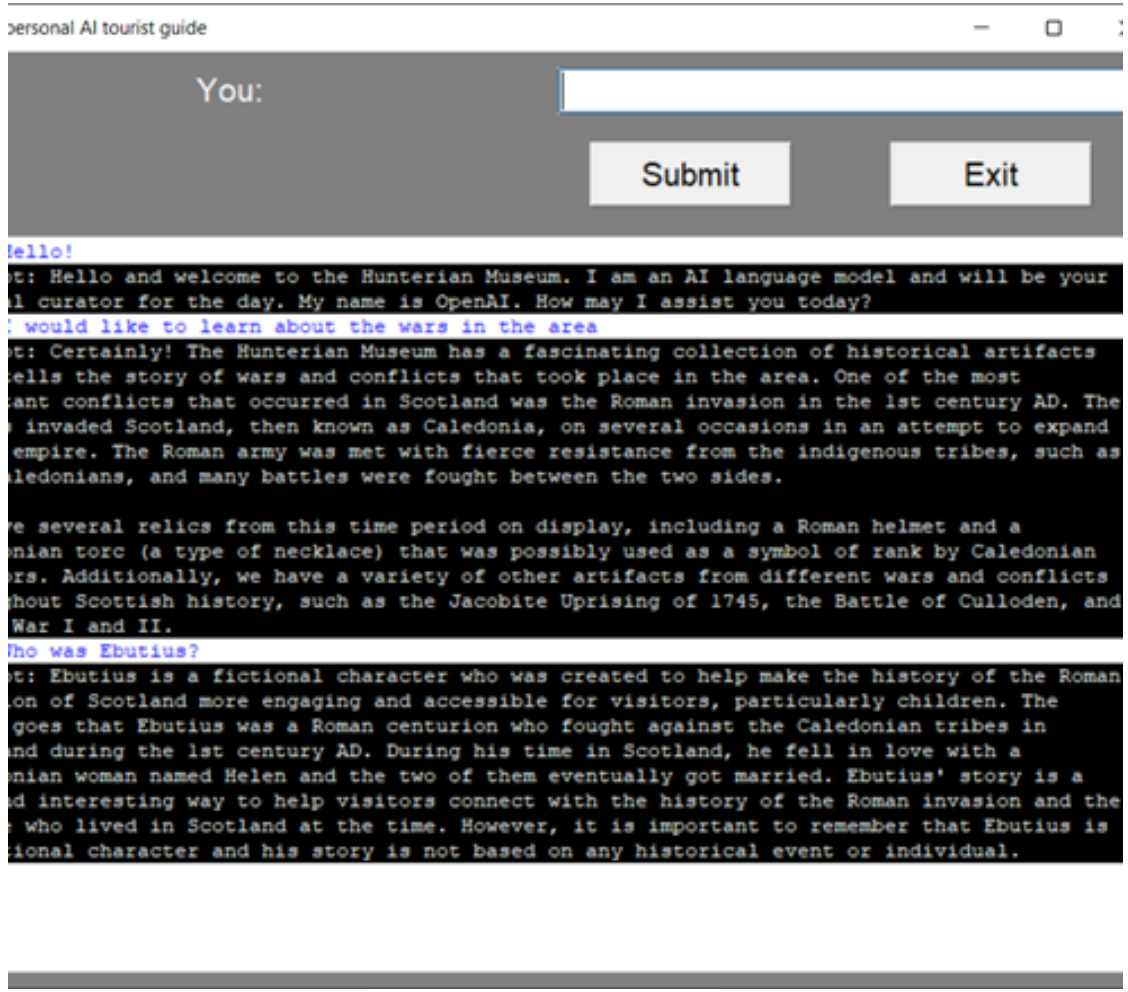
- GPT3, DaVinci-003 (Fine tuned)
- Cultural data from project “Emotive” by “Narralive” team
- Hunterian Museum Glascow – The Antonine Wall
- 155 Questions & Answers
- Fictional characters were used (Ebutius and Calle)

Early tests issues

- More data is needed
- Training the LLM is quite expensive
- Controversial answers given
- The creation of text by GPT3 stops without obvious reason
- Stateless model – No dialogue can occur

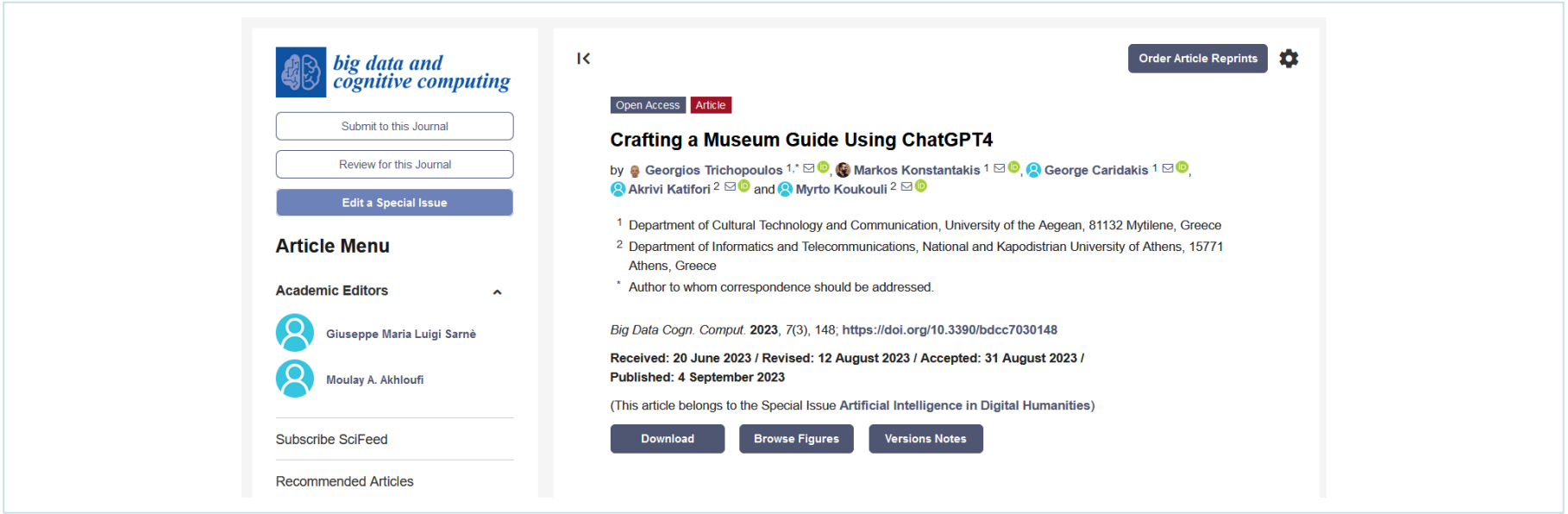
Advancing to newer versions

- GPT3.5 and GPT4 are stateful models
- Cost for training drops down
- Training is easier
- Limitations on the number of tokens used, drops down
- Produced text gets better
- Translation gets better
- Language model can take a role and be guided on behavior
- A simple GUI was built to better support the tests



MAGICAL System

- Museum AI Guide for Augmenting Cultural Heritage with Intelligent Language model
- To be used with smart glasses or similar IoT devices
- Voice controlled and activated – Natural language
- Embodied in robots



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Crafting a Museum Guide Using ChatGPT4

by Georgios Trichopoulos [1,*], Markos Konstantakis [1], George Caridakis [1], Akrivi Katifori [2] and Myrto Koukouli [2]

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Big Data Cogn. Comput. **2023**, *7*(3), 148; **https://doi.org/10.3390/bdcc7030148**

Received: 20 June 2023 / Revised: 12 August 2023 / Accepted: 31 August 2023 / Published: 4 September 2023

(This article belongs to the Special Issue **Artificial Intelligence in Digital Humanities**)

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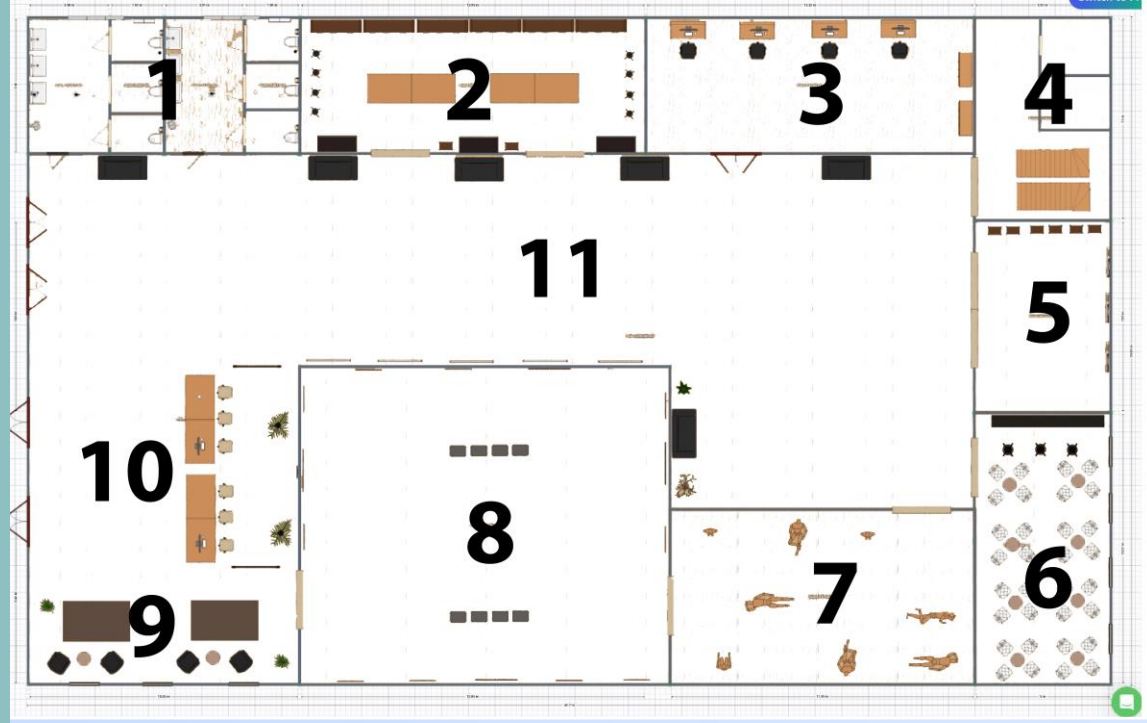
Crafting a museum guide using ChatGPT4

Museum Guide

Creating a recommender system

- Fictional museum: The Metamorphosis Museum of Modern Art (MMMA)
- 2D and 3D floor plans
- Exhibits and artists are all fictional
- GPT helped on creating names and descriptions about exhibits and artists



MMMA Museum Recommender

- More than 18.000 tokens used to train GPT4
- Smart museum guide responds to all kinds of questions and gives recommendations during visit

MAGICAL Recommender

- Large Language Models as Recommendation Systems in Museums

Large Language Models as Recommendation Systems in Museums

Georgios Trichopoulos *, Markos Konstantakis *, Georgios Alexandridis, George Caridakis

Version 1 : Received: 19 July 2023 / Approved: 20 July 2023 / Online: 20 July 2023 (08:41:04 CEST)

How to cite: Trichopoulos, G.; Konstantakis, M.; Alexandridis, G.; Caridakis, G. Large Language Models as Recommendation Systems in Museums. *Preprints* **2023**, 2023071393. https://doi.org/10.20944/preprints202307.1393.v1 Copy

Abstract

This paper proposes the utilization of large language models as recommendations systems for museums. Since the aforementioned models lack the notion of context, they can't work with temporal information that is often present in recommendations for cultural environments (e.g. special exhibitions or events). In this respect, the current work aims at enhancing the capabilities of large language models through a fine-tuning process that incorporates contextual information and user instructions. The resulting models are expected to be capable of providing personalized recommendations, aligned with user preferences and desires. More specifically, Generative Pre-trained Transformer 4, a knowledge-based large language model is fine-tuned and turned into a context-ware recommendation system, adapting its suggestions based on user input and specific contextual factors such as location, time of visit, and other relevant parameters. The effectiveness of the proposed approach is evaluated through certain user studies, which ensure an improved user experience and engagement within the museum environment.

Keywords

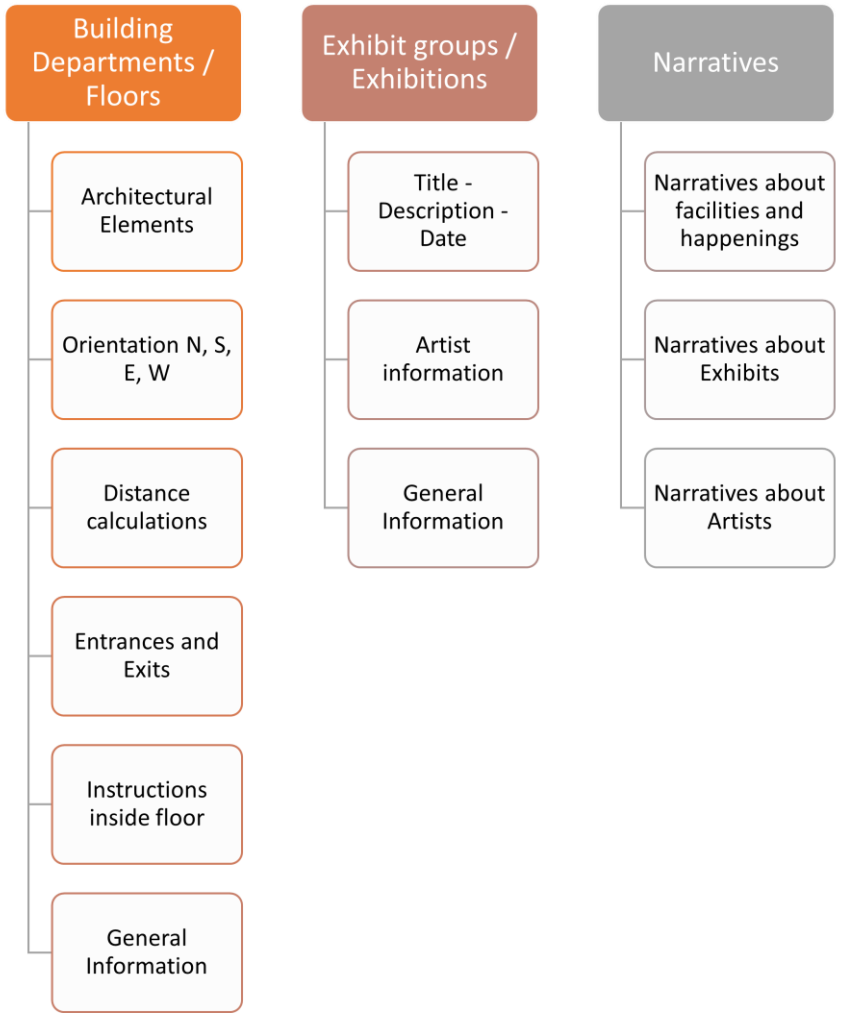
large language models; recommender systems; GPT-4; context awareness; personalization; cultural heritage; museum

Subject

Computer Science and Mathematics, Artificial Intelligence and Machine Learning

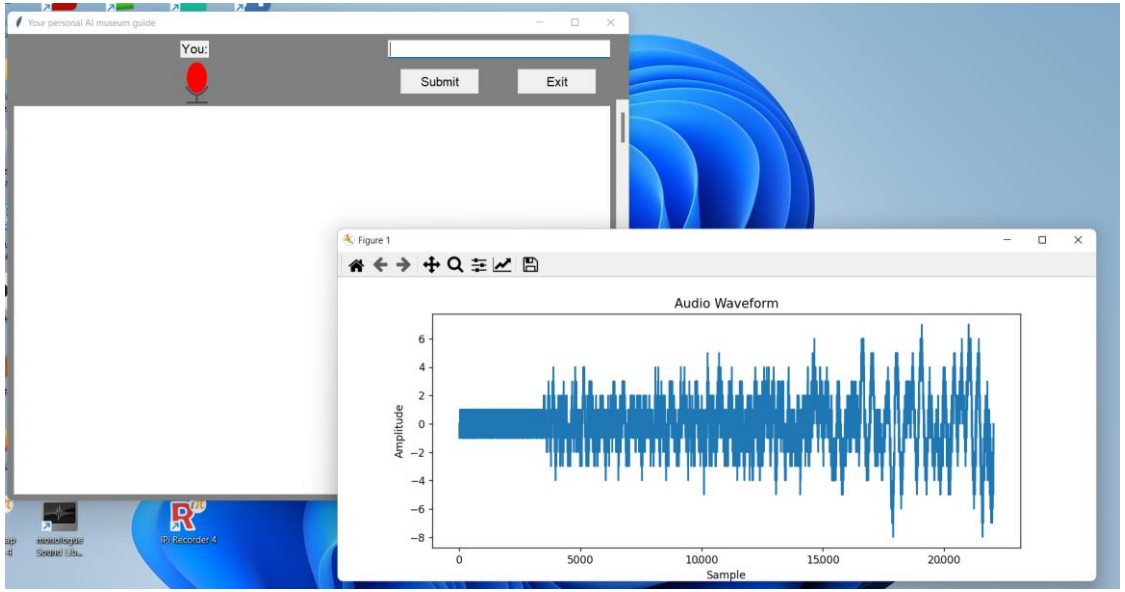
Training methodology in MAGICAL

- Can be applied in any space
- Low cost



Advancements in MAGICAL

- Speech-To-Text (STT) and Text-To-Speech (TTS) modules
- Triggered voice recognition
- Connection with Whisper (OpenAI), Google API



Advancements in MAGICAL

- Embodied Storytelling – NAO Robot

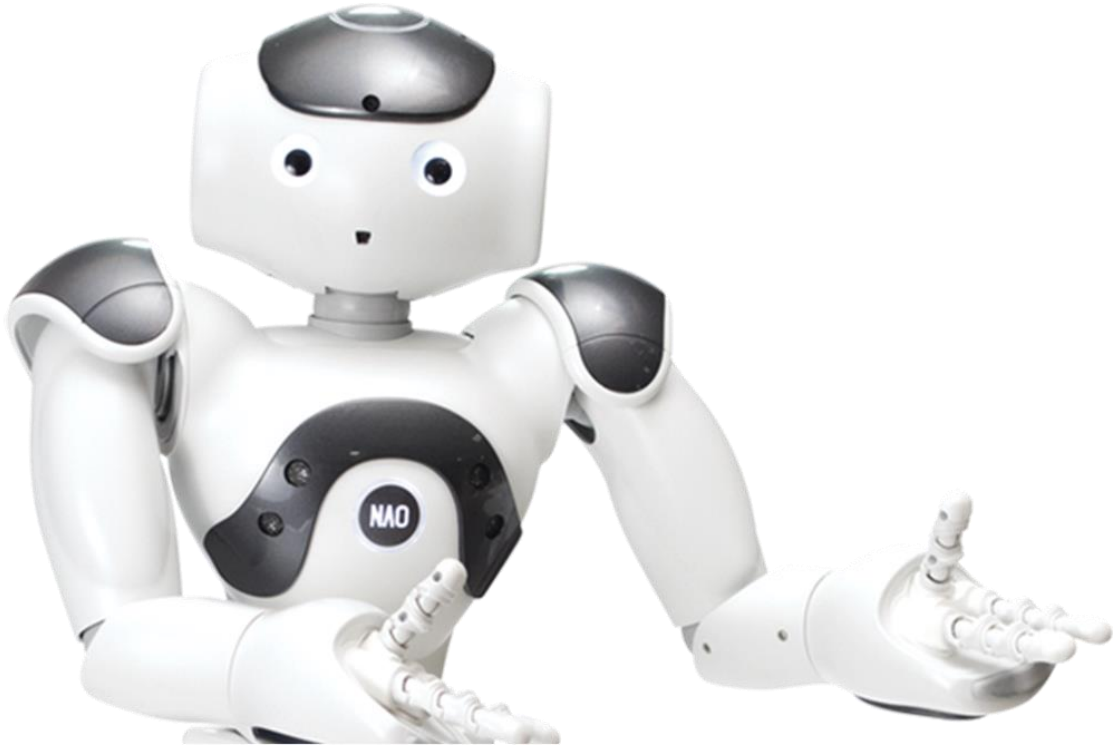


Image taken from www.aldebaran.com

Survey on Smart Glasses

- Smart glasses for cultural heritage: A survey

Future works

- Sum-up of all created modules
- Use of MAGICAL in a real museum
- Testing and evaluation by museum visitors

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- Thank you for attending!

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