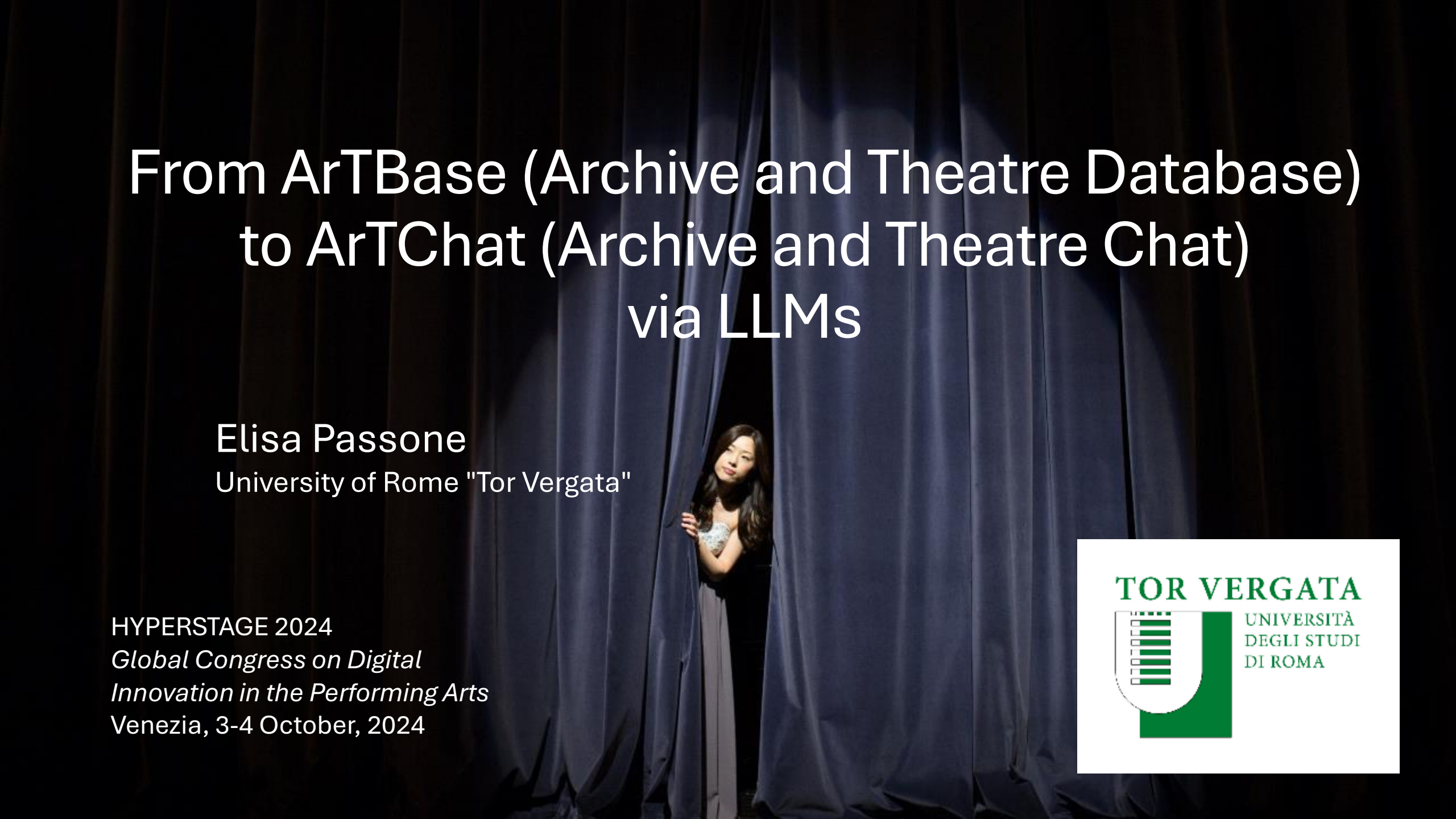
From ArTBase (Archive and Theatre Database) to ArTChat (Archive and Theatre Chat) via LLMs



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ArTBase Assumptions and Scope

LACK OF ITALIAN NATIONAL CATALOGUE FOR THEATRES AND OF METHODOLOGY OF CATALOUGUING

RADATMAS PROJECT 2022

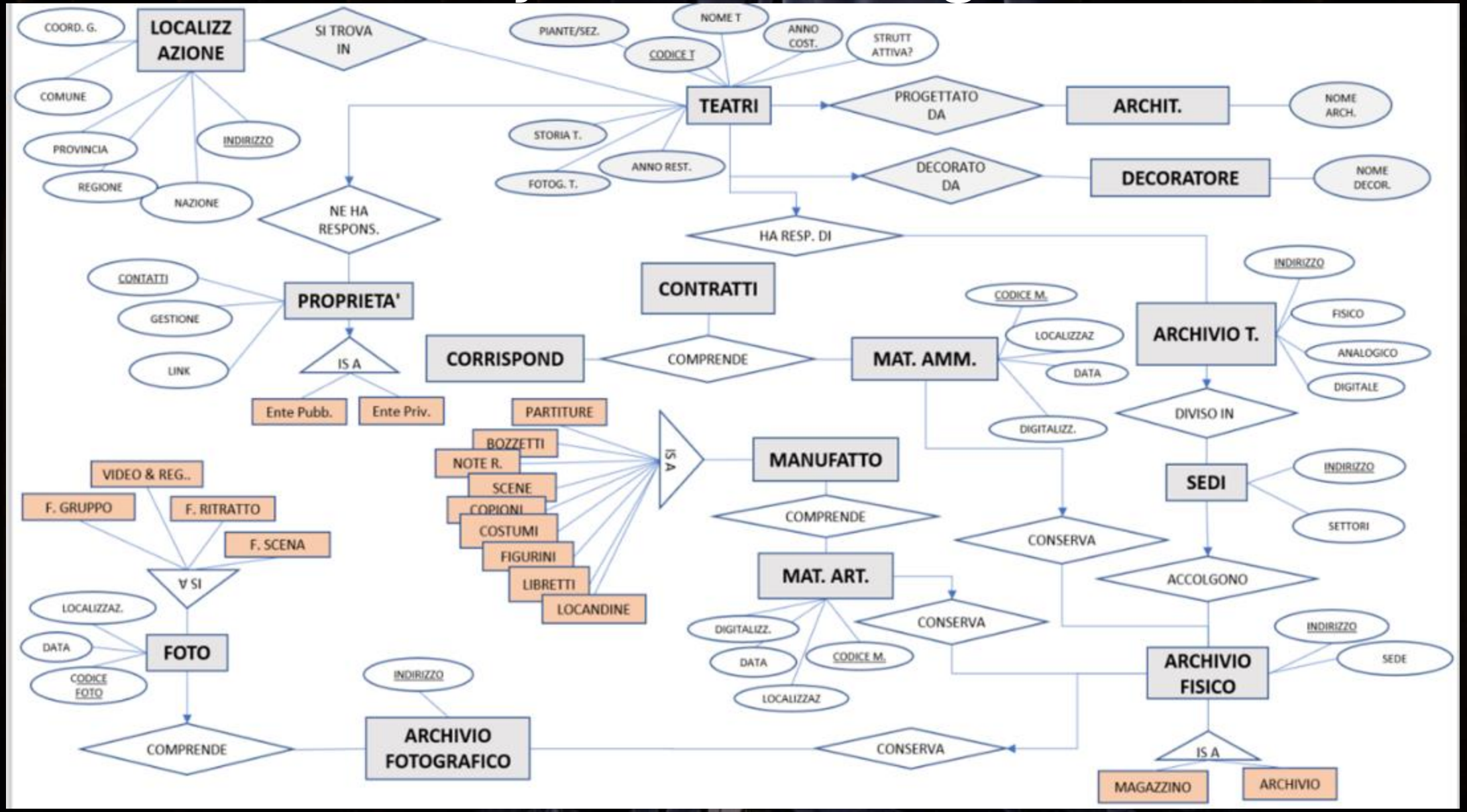
The goal of **ArTBase** project is to complete this research, widening the field on a national scale and integrating the cataloguing tables with data specifically useful for tourism promotion and cultural heritage enhancement.

To study a complex phenomenon like this, it is necessary to unite the forces of Humanities and Data Science: the multidisciplinary approach is the prerogative of the cataloguing methodology of ArTBase project, in wich digital technologies are a resource for humanities.

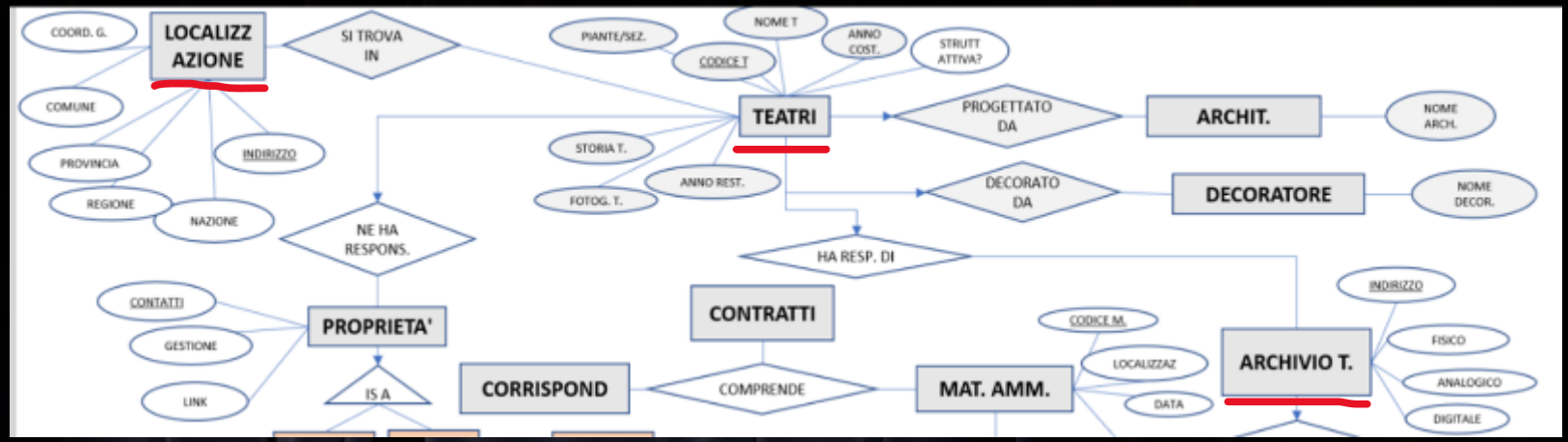
Theatre and Smart Tourism

- Archives about historical theaters are relevant in the definition of the touristic offer of a territory (as for the Macerata district)
- Theaters contribute to the cultural identity of the corresponding district
- They are meaningful to the suitable descriptions of the cultural heritage of the source towns as well as to the dissemination of the identity of the underlying social communities
- Existing Touristic platforms are making reference to general archives (e.g. MiBACT DBs) **but local identities are not well covered**

Entity Relation Diagram



Entities



- THEATER, the reference entity
- LOCATION, the city/address of the theater
- ARCHIVE, the library or archive of the theater
- ARTIFACT, is the individual artwork (book, images, photos, …) that is documented in one of the theater archives

Steps for the creation of the Database

1. Study of possible use, queries to the target DB
2. Mapping of the conceptual model (ER) to the logical schema

```
CREATE TABLE Theatre (
    Theatre_id      CHAR (20),
    Theatre_name CHAR (20),
    C_Year          CHAR (20),
    R_Year          CHAR (20),
    Activity        CHAR (20),
    Pictures         BLOB,
    History         TEXT,
    PRIMARY KEY (Theatre_id) )
```

3. Data gathering in tables
4. DB Population via SQL queries

Teatro_id	Nome_teatro	Anno_costruzione	Anno_reatauro	Attivit...	Foto	Storia
10	Auditorium del Foro Italico	1927-1933	null	s	null	null
11	Auditorium Giovanni Paolo II	1974-1979	null	s	null	null
12	Aula Magna dell'Ateneum Angelicum	1930	null	s	null	null
13	Auditorio Conservatorio Santa Cecilia	1894	null	s	null	null
14	Angelo Mai		null	s	null	null
15	Brancaccio	1916	1937	s	null	null
16	Biblioteca Quarticciolo	2002	null	s	null	null
17	Capranica	1450-1679	null	no	null	null
18	Cinema Teatro Garbatella		null	s	null	null
19	Cinema Teatro Adriano	1898	2000	s	null	null
20	Delle Arti	1930-1936	null	no	null	null
21	Della Cometa	1956	1986	s	null	null
22	Drammatico Nazionale	1886	null	no	null	null
23	Eliseo	1900	null	no	null	null
24	Piccolo Eliseo	2000	null	no	null	null
25	Gigi Proietti Globe Theatre	2003	null	no teamporaneam	null	null
26	Goldoni a Palazzo Altems	1879	null	s	null	null
27	Horti di Agrippina o di Nerone	54-68 d.c.	null	no	null	null
28	India	1999	null	s	null	null
29	Italia	1930	null	s	null	null
30	Istituto Teresa Gerini Torlonia	1952	null	no	null	null
31	Lido di Ostia	2003	null	s	null	null
32	Marcello	17 a.c.	421	no	null	null
33	Manzoni		null	s	null	null

How to query MySql

- SELECT *

  FROM *theatre, localization*

  WHERE *theatre.Theatre_id = localization.Theatre_id AND Municipality = "Roma"*

  Wich is the list of the theatres in Rome?

- SELECT *Address*

  FROM *localization, theatre*

  WHERE *localization.Theatre_id = theatre.Theatre_id AND Theatre_Name = "Ambra Jovinelli''*

  Wich is the address of Ambra Jovinelli theatre?


ArTBase Project
ArTChat Project
Search for Region
Search Theatre
Search Archive
Search Event
ArTChat
Archive and Theatre Chat
Talk to ArTChat
Contacts
Collaborations
Financial Plan

Why a chat

- AI and HRI (Human Robot Interaction) can amplify the dissemination of cultural information for touristic goals
- AI-enabled conversations should allow a natural communication in order to speak to larger audiences in a creative and interesting ways
- This approach will explore advanced technologies giving the performative arts field the opportunity to innovate by the interaction with other fields of knowledge
- The chat will be able to recognize the user tipology, selecting personalized information for tourists, researchers, students and so on, presenting them in a user specific graphic format
- Such platform could bring the new generations closer to theatre

Why ArTChat is innovative

- **Limits of generalistic LLMs, e.g., ChatGPT**
  - They return **general information** when asked for **Performing Arts** issues, often limited to popular facts or events.
  - Provided information are in general not verified
  - **Such impoverished contributions are of very limited interest for Performing Arts applications:** tourism, research in cultural heritage or governance
- **ArTChat** will be designed for being:
  - **Easy to use**
  - **Culturally aware,** via access to **larger sources** on Performing Arts.
  - Accurate as fed by **certified information**
  - Able to promote **personalized user experiences**

How to realize ArTChat

- Objectives: creation of an interactive portal using a chatbot to interact with the user on performing arts
- Challenges:
  - Formulation of queries in natural language to recognize user intents and map query directly onto the DB (without coding)
  - Ideation and design of a LLM agent able to naturally converse with different types of users
- Procedure: we can identify two main tasks
  - TEXT-TO-SQL
  - Human –like text generation

How to realize ArTChat

- Task 1: TEXT-TO-SQL INTERACTION

  The Text-to-SQL process provides an automation of the generation of SQL queries triggered by natural language questions via LLMs (Large Language Models). RAG models support *natural language understanding*, *semantic parsing* (natural language conversion into *machine – understandable* representiations), and retrieval from the DBs.

  - Recognizing user intent and selecting the sources
  - Mapping questions into SQL queries
  - Information extraction from the results from the ArTBase archive
  - Generating linguistic summaries of the results

How to realize ArTChat

- Task 2: Human – like text generation via LLM.
  This task consists in text generation using an interactive chat that allows the user to interact with the portal, query the database and receive personalized answers

  → LLaMA, LLMs family

VOCABULARY

LARGE LANGUAGE MODELS:	They are models of the language focused on understanding and generating linguistic content
TRANSFORMER BASED ARCHITECTURE:	deep learning models that process sequences of text in parallel and use self – attention mechanism to identify the relations between tokens and their weight.
ENCODER – DECODER:	transformer architecture
LLAMA:	It is a transformer based model (decoder – only architecture) used for NLP (Natural Language Processing) and Text Generation.

Open Questions

- Wich model is adequate?
  - Efficient to process artistic info
  - Accurate about the underlying artistic topics
  - Easy to use
- At an esthetic level, how can we define the impact of conversational abilities onto the user subject?
- How can we evaluate the conversational capabilities along the above directions?
- What are the limits of current LLMs that we are able to extend? What could they be able to offer to the future of Performing Arts?

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THANK YOU FOR THE ATTENTION!

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