



## **VirtualZeus: ORAL HUMAN-LLM INTERACTION IN AR FOR DIALOG WITH A MYTHOLOGICAL CHARACTER.**

Evridiki A. Konstantinidou, Lampros Ntarkos, Pantelis I. Kaplanoglou

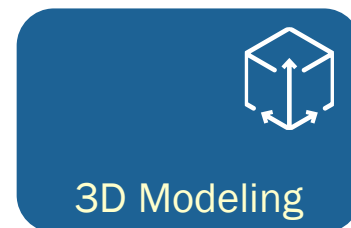
BLUE AVATARS



## ABOUT US

- **BlueAvatars** is an innovative informatics company based in Thessaloniki, which specializes in the development of media, video and entertainment platforms, using streaming, AR/VR and 3D graphics technologies.
- Today it expands its activities into the development of tools and applications that are based on Large Language Models (LLMs), creating reliable and immersive experiences that combine Artificial Intelligence and Multimedia.

The company specializes on the fields of:



## PROJECT VISION



We can:

- ▶ **improve the mobile user experience** in intelligent dialog agents (a.k.a. chatbots) by visualizing an avatar with Augmented Reality (AR) and interfacing via spoken natural language.
- ▶ **create the impression of a virtual persona** in human-computer dialog by carefully engineering multiple features about its character:

The way it answers:

.....  
knowledge, tone,  
respectfulness,  
seriousness.

The way it looks:

.....  
stereotypical patterns,  
facial characteristics,  
age.

The way it speaks:

.....  
pitch, expressiveness,  
accent, emphasis.

## PROJECT OUTCOMES



The user can **engage in dialog** with the mythical god **Zeus** by using a mobile device.

► Get an answer with “godly wisdom”.

A **novel immersive experience** that can be used by public organizations and private businesses to promote culture and tourism.

► A novel platform.

A **new tool for the personalized education of minors**, that could gamify teaching of Greek mythology and history and assist students with micro-learning.

► Combination of education with entertainment.



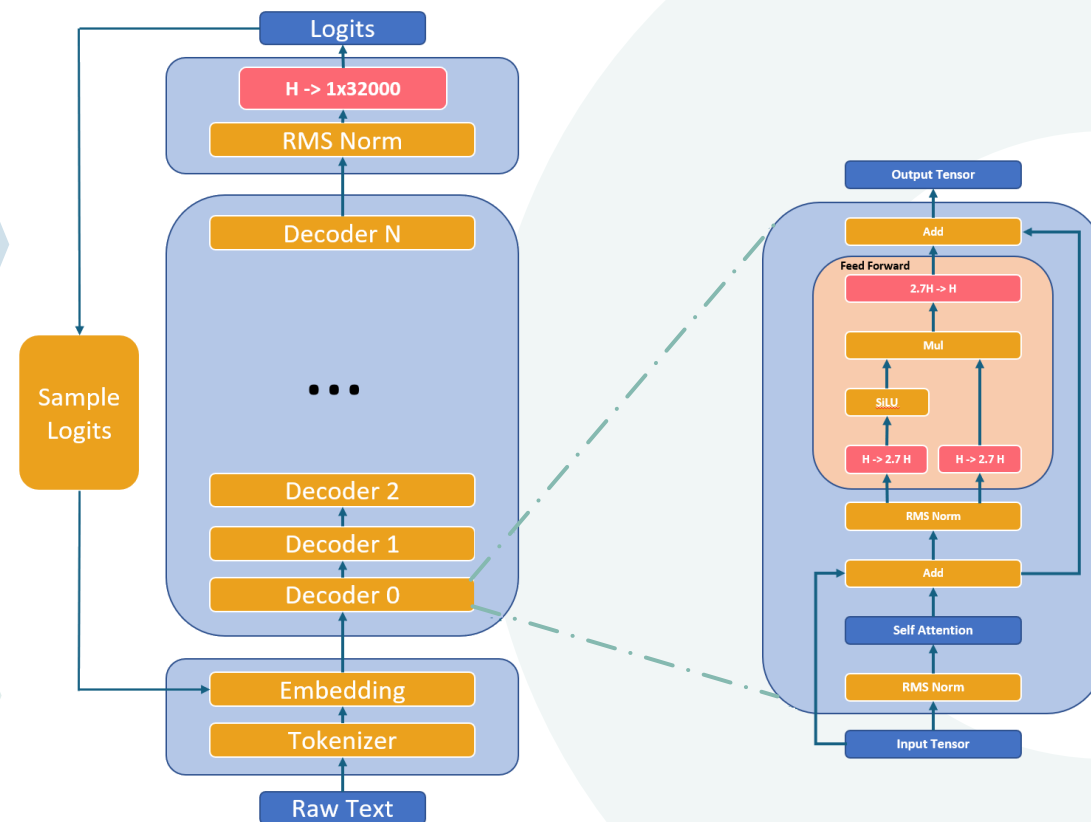
## VirtualZeus - OBJECTIVES / AI

1. A locally deployed **Large Language Model (LLM)** for high quality dialog in both Greek and English.

**ILSP Llama Krikri [1]**: A transformer deep neural network model, based on **Meta Llama 3.1 [2]**, fine-tuned by ILSP on Greek corpora.

2. A chatbot that should give the impression of the mythical god Zeus.

Custom **prompt engineering** before LLM input.



[1] D. Roussis et al., "Krikri: Advancing Open Large Language Models for Greek," May 30, 2025, arXiv: arXiv:2505.13772. doi: [10.48550/arXiv.2505.13772](https://doi.org/10.48550/arXiv.2505.13772).

[2] A. Grattafiori et al., "The Llama 3 Herd of Models," Nov. 23, 2024, arXiv: arXiv:2407.21783. doi: [10.48550/arXiv.2407.21783](https://doi.org/10.48550/arXiv.2407.21783).

## VirtualZeus - OBJECTIVES / AI

3. A reliable automatic Speech Recognition (ASR) with low-latency (Greek/English).

**Google Speech-To-Text API [1]:** Uses Google models (undisclosed), which combine the speech-to-text task with language modeling.

4. An accurate speech synthesis with a suitable voice to give the impression of Zeus (el/en).

**ElevenLabs Flash 2.5 [2]:** Uses generative voice model (undisclosed), where the characteristics are created through prompting.



[1] T. Kimura, T. Nose, S. Hirooka, Y. Chiba, and A. Ito, "Comparison of Speech Recognition Performance Between Kaldi and Google Cloud Speech API," in *Recent Advances in Intelligent Information Hiding and Multimedia Signal Processing*, J.-S. Pan, A. Ito, P.-W. Tsai, and L. C. Jain, Eds., Cham: Springer International Publishing, 2019, pp. 109–115. doi: [10.1007/978-3-030-03748-2\\_13](https://doi.org/10.1007/978-3-030-03748-2_13).

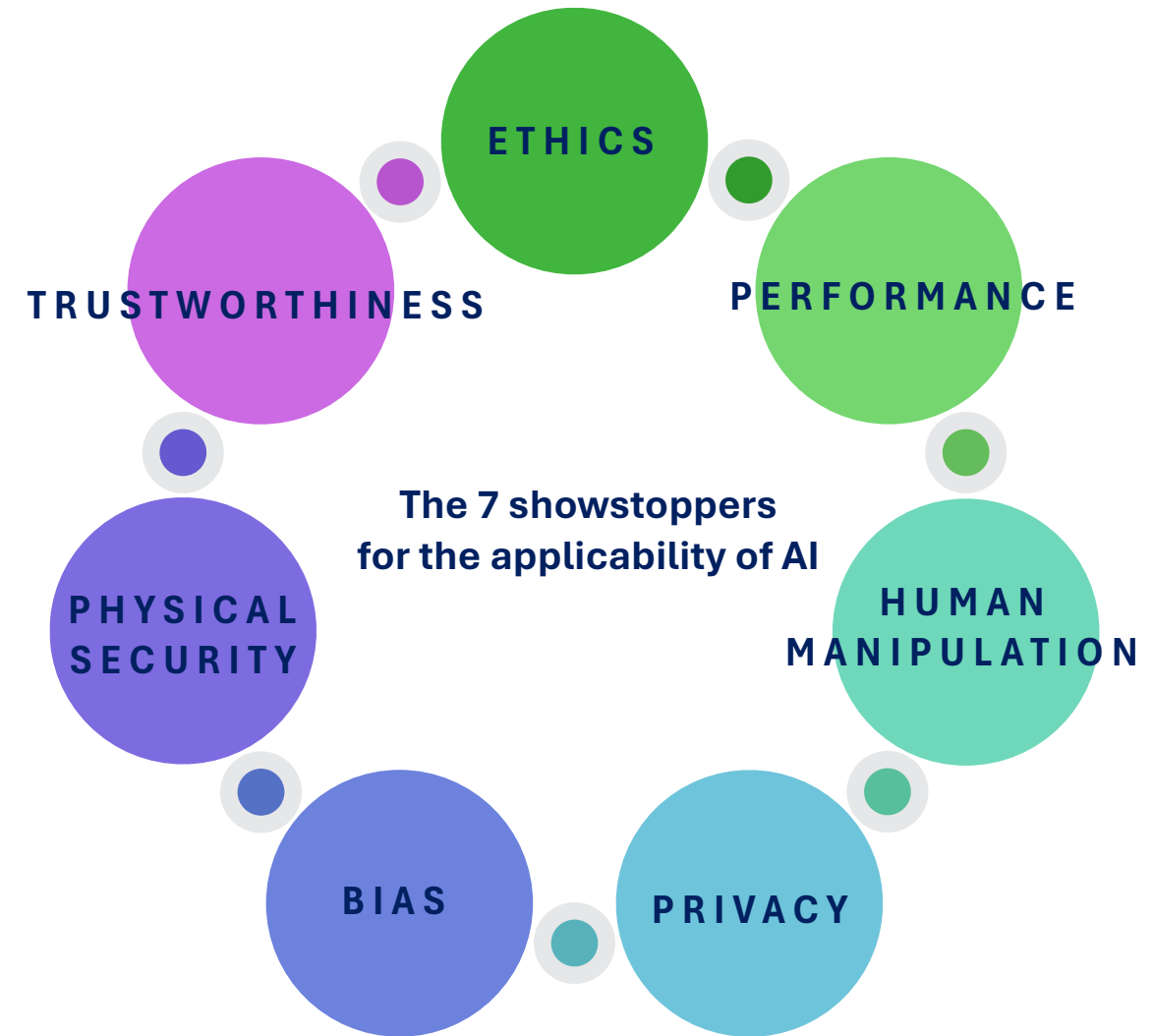
## VirtualZeus - OBJECTIVES / TAI

(5) Improved responses based on **Trustworthy Artificial Intelligence (TAI)** principles and guidelines [1]. Reduce *confabulations* [2], provide responses that are **ethical, lawful** and **socially robust**

**Retrieval Augmented Generation (RAG)** [3]: Retrieve documents that are relative the user prompt to augment it before the LLM's response.

An expert philologist has **collected documents** about Greek mythology, used by RAG.

**Specialized prompt engineering** shapes the LLM responses to irrelative, provocative, abusive questions to manifest the desired “wisdom of Zeus”.



[1] "Ethics guidelines for trustworthy AI | Shaping Europe's digital future." Accessed: Sept. 09, 2025. [Online].

Available: <https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai>

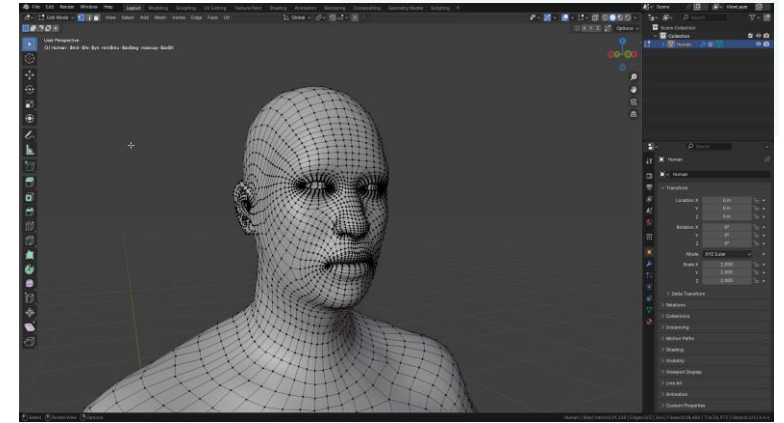
[2] A. L. Smith, F. Greaves, and T. Panch, "Hallucination or Confabulation? Neuroanatomy as metaphor in Large Language Models," *PLOS Digital Health*, vol. 2, no. 11, p. e0000388, Nov. 2023, doi: [10.1371/journal.pdig.0000388](https://doi.org/10.1371/journal.pdig.0000388).

[3] P. Lewis et al., "Retrieval-Augmented Generation for Knowledge-Intensive NLP Tasks," Apr. 12, 2021, *arXiv:2005.11401*. doi: [10.48550/arXiv.2005.11401](https://doi.org/10.48550/arXiv.2005.11401).

## VirtualZeus - OBJECTIVES / VISUALS

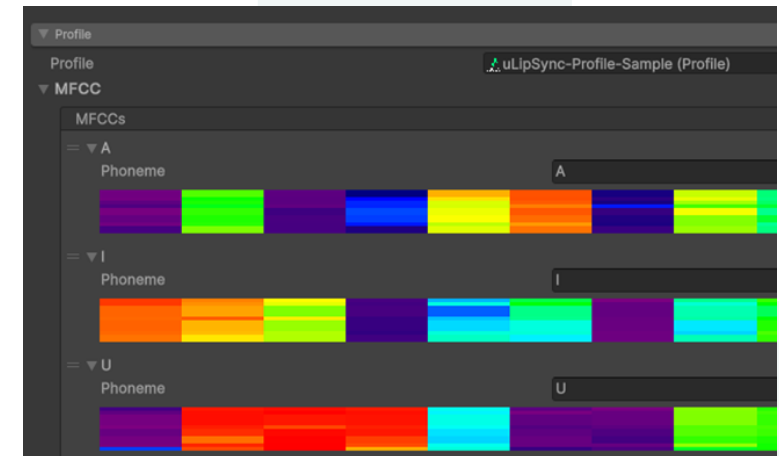
6. The 3D avatar should give the impression of a statue of Zeus that "came to life" inside the user environment, via AR on a mobile device.

- Used **Blender** and **Makehuman** [1] for creating the custom 3D model.
- Used **ARCore** [1] in **Unity**.
- Deployed as an **Android** application.



7. There should be synchronized movement of the 3D avatar's lips along with the speech audio.

- Created *shape keys* on the 3D model.
- Used **uLipSync** in **Unity**.
- Additionally, implemented eye blink movements.



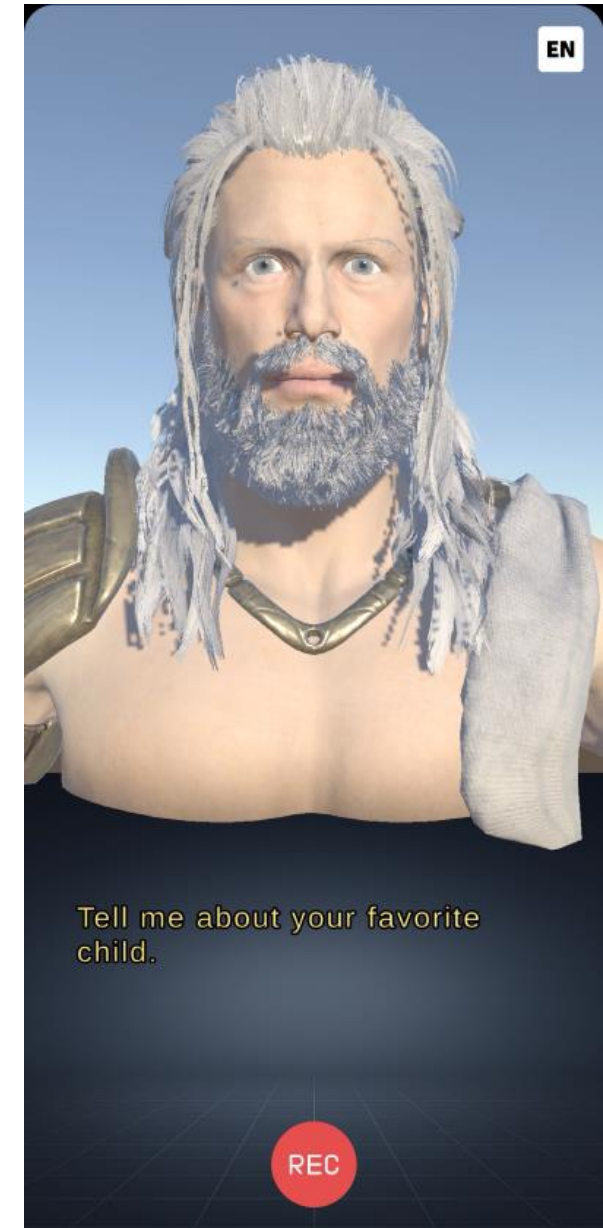
[1] L. Briceno and G. Paul, "MakeHuman: A Review of the Modelling Framework," in *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018)*, vol. 822, S. Bagnara, R. Tartaglia, S. Albolino, T. Alexander, and Y. Fujita, Eds., in *Advances in Intelligent Systems and Computing*, vol. 822, Cham: Springer International Publishing, 2019, pp. 224–232. doi: [10.1007/978-3-319-96077-7\\_23](https://doi.org/10.1007/978-3-319-96077-7_23).

[2] P. Nowacki and M. Woda, "Capabilities of ARCore and ARKit Platforms for AR/VR Applications," in *Engineering in Dependability of Computer Systems and Networks*, W. Zamojski, J. Mazurkiewicz, J. Sugier, T. Walkowiak, and J. Kacprzyk, Eds., Cham: Springer International Publishing, 2020, pp. 358–370. doi: [10.1007/978-3-030-19501-4\\_36](https://doi.org/10.1007/978-3-030-19501-4_36).



## VirtualZeus - OBJECTIVES / AUDIO

- 8. The speech synthesizer model should be fluent in both English and Greek, with accurate pronunciation, well articulated
  - EvelenLabs multilingual models.
- 9. The voice of Zeus is male, low pitch, strong, commanding and expressive.
  - **Proper prompting** for creating a generative voice model with the desired characteristics.



**THANK YOU**

BLUE AVATARS

Leontos Sofou 18  
54625 Thessaloniki, Greece

<https://www.blueavatars.com/>

