

## Title

### LLM-based Patient Interaction from Clinical Phone Calls

## Supervision

Hugo Pedro Proença (UBI-DI)

## Description

Large language models (LLMs) are increasingly being studied for clinical question answering, patient triage support, information extraction and conversational assistance. In a healthcare context, however, these systems must be evaluated with special care because errors, hallucinations, bias, privacy failures and unsafe recommendations may have direct consequences for patients and clinical teams.

The main purpose of this dissertation is to study and research LLM-based solutions that interact with patients in a clinical or health context, using information provided by patients during a phone call. The work should consider an end-to-end pipeline in which call information is transcribed, structured, interpreted and used to support a safe dialogue or decision-support workflow under human supervision.



*Figure 1: LLM-based patient interaction from clinical phone calls.*

Hence, the main objectives of this Master dissertation are:

- Review representative LLM-based approaches for clinical dialogue, medical question answering and patient-facing assistance.
- Design a privacy-aware architecture that uses phone-call information to generate structured clinical summaries and safe patient interaction.
- Study prompting, retrieval-augmented generation and guardrail mechanisms for reducing hallucinations and unsafe advice.
- Evaluate the system using clinically meaningful criteria, including factuality, completeness, uncertainty handling, safety and usability.
- Publish the obtained results in an international journal or conference.



# Proposal of Masters Dissertation

## Workplan

- 1- Comparative study of the methods previously published in medical LLMs, clinical dialogue systems and patient-facing AI.
- 2- Definition of target scenarios, ethical constraints, risk categories, datasets and evaluation protocols.
- 3- Development and test of a prototype for converting phone-call information into structured summaries and controlled patient interaction.
- 4- Evaluation of LLM behaviour under incomplete, ambiguous and potentially risky patient-provided information.
- 5- Preparation of the dissertation and submission of a scientific publication.

## Chronogram

Task	M1-M3	M4-M6	M7-M9	M10-M12
Literature review and problem formalisation	X	X		
Dataset preparation, baselines and metrics		X	X	
Model development, evaluation and ablation studies		X	X	X
Dissertation writing and scientific publication			X	X

## Prerequisites

- Basic skills in English writing/reading.
- Good programming skills, preferably in Python.
- Previous knowledge about machine learning, artificial intelligence and natural language processing.
- Interest in healthcare AI, privacy, safety and ethical evaluation.

## References

- [1] Singhal, K. et al., Large language models encode clinical knowledge, Nature, 620, 172-180, 2023.
- [2] Thirunavukarasu, A. J. et al., Large language models in medicine, Nature Medicine, 29, 1930-1940, 2023.
- [3] Ayers, J. W. et al., Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum, JAMA Internal Medicine, 183(6), 589-596, 2023.