

## BME16 – Artificial Intelligence and Medical Decision Support Systems

4<sup>th</sup> Trimester 2023-2024

Instructor: Prof. Michail G. Lagoudakis (TUC)

Class eLearn Page: <https://elearn.uoc.gr/course/view.php?id=5208>

### Term Assignment – “Identification and Description of an AI-in-Medicine System”

*Assignment Weight:* This assignment counts towards **65%** of your final mark in the course.

The purpose of this assignment is for you to do your own research to discover existing AI-in-Medicine systems. These can be any platforms / applications / applets / programs or even robots or robotic / AI-enhanced equipment that are used in the medical/healthcare domain; and which employ some AI technology to perform at least some key function(s), if not their central function. The systems might be used for *medical diagnosis, medical decision support, medical tasks scheduling, healthcare logistics, examinations’ scheduling, maintaining and accessing medical data and health records, telemedicine, medical imaging applications, robot-assisted surgery* – to name a few examples. The list is not exhaustive. Moreover, it is not necessary that such a system finds application in the medical/healthcare domain *only*; however, at least one of its main applications/functions should be in medicine/healthcare, and it should be employing AI methods/technology at some level.

Therefore, your task is to identify, find out about, and describe one such system. Write a **report** of *at least four (4)* and *at most six (6)* typed pages (figures and references not included) to describe it. You should cover the following questions to the best of your ability:

1. Brief history of the system (name, years, developers, affiliations, framework, ...)
2. What does the system do? What is intelligent about it?
  - Why is the system or its particular aspects/functions intelligent?
  - What are the system’s AI-related aspects and their main functions?
  - How is AI central or key to the system and its main functions?
3. What AI technologies does it use? Is it belief/decision networks, semantic networks, search-based AI, constraint satisfaction, logic, rules, machine learning, (deep) neural networks, pattern recognition, other?
4. Make every attempt to list clearly:
  - at least one or more goals that the system’s AI aspect(s)/function(s) have
  - the types of prior knowledge that it needs to perform intelligently
  - the types of past experiences that it does (or could) learn from the environment in order to improve its performance over time
  - the types of observations that it needs about the environment
  - the types of actions that it performs
5. Is it an experimental system or a fielded system (i.e., used in a real-world setting)?

- If experimental, do the authors mention how much more work would be required to turn it (and in particular, its AI aspects) into a fielded application?
  - If fielded, in what context is it used and how many users does it have?
6. In what way and how well has the system and/or its AI aspects been evaluated? How well does/do it/they perform?
  7. Do you find the evaluation convincing? Why or why not?
  8. References: where did you get the information about the system? What books, articles, or web pages would be useful references for others wanting to learn more about it? List all your references in a separate section at the end of your text.
  9. You are welcome to include in your report figures/images/screenshots of the system, at the end of your text, as long as these are appropriately referenced.

**Proposal:** In order to help ensure that you all submit a report on a different AI system, please submit a short proposal, via the corresponding form on eLearn, and describe briefly the system you intend to discuss. You will be contacted, in case the system you intend to present is already “picked” by another student or is unrelated to AI.

**Submission:** Your final report must be submitted via the corresponding form on eLearn, exclusively as a **single PDF file**, before the stated deadline. Do not include a cover page in your report; only use the first few lines to clearly list the title of your report, your full name and your contact details.

**Collaboration and Plagiarism:** You may discuss your assignment with your fellow students. However, you must list all of the people you discussed with and all the references you used. If you use a web page, paper, or book, you must cite it (i.e., you must provide a clear reference to it at the appropriate point in your text). All of the phrasing must be your own, not machine-generated. If you want *to copy* a phrase or a sentence, you must put it in quotations and give a reference (including page numbers) where it is found. All submitted assignments will be checked for originality and similarity.