

Trustworthy AI in Medicine and Healthcare

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Abstract

The problem of reliability and the degree of trust in artificial intelligence (AI) systems is now particularly acute. Today AI is implemented in various areas of human life: industrial production, defense industry, economics, education, and medicine. In this regard, reasonable questions are: can we trust AI; to what extent the decisions made by AI are justified; who is responsible for the mistakes made by the AI system, which can lead to not only financial but also human losses?

The problem of trustworthy AI is especially relevant for medicine and healthcare. Today, thanks to the evolution of AI, personalized medical applications have moved from solving diagnostic problems to therapy. If the first generation of medical technologies processed only structured data, today's AI-based medical systems are built on big data platforms and process unstructured data. The next generation of medical technology will focus on working with Edge-of-Things data – the huge amount of streaming data generated by IoT platforms, cloud systems, and edge computing platforms. These medical systems will be able to be used for personalized healthcare through smart healthcare applications on edge devices such as smart sensors and wearables. They will process this data by interactive virtual agents to report on the patient's health status, as well as specific recommendations for his treatment.

Due to the widespread use of artificial intelligence technologies in the healthcare sector, it has become necessary to legally legitimize the requirements for such systems. This is necessary in order to accelerate the spread of such systems by increasing the credibility of both patients and doctors. To sustain the trustworthiness of AI was developed to two sets of popular principles have been outlined by the Organization for Economic Co-operation and Development (OECD) and European Commission's AI High-Level Expert Group (HLEG). The OECD defines such five principles for implementing trustworthy AI: inclusive growth, sustainable development, and well-being; human-centered values and fairness; transparency and explainability; robustness, security, and safety; accountability. The HLEG developed Ethics Guidelines for Trustworthy Artificial Intelligence (April 2019). According to the Guidelines, trustworthy AI should be: lawful, ethical, and robust. Also, the Guidelines put forward a set of 7 key requirements that AI systems should meet in order to be deemed trustworthy.

This talk discusses the current situation with trustworthy AI systems in medicine and healthcare, compares the approaches and legal requirements to the developing AI systems in different countries, and also considers the documents developed by the European Commission and HLEG on AI. Recommendations for developing medical AI systems completed to the Directive of The European Parliament and of The Council on Adapting Non-Contractual Civil Liability Rules to Artificial Intelligence (September 2022) and The Assessment List For Trustworthy Artificial Intelligence will be considered.

Keywords 1

Ethical AI, Trustworthy AI, Digital Healthcare Systems, Smart Healthcare and Medicine, Ethics Guidelines for Trustworthy Artificial Intelligence.

This work was realized within the framework of the program Erasmus+ Jean Monnet Module “Trustworthy artificial intelligence: the European approach” (101085626 — TrustAI).

IDDM-2022: 5th International Conference on Informatics & Data-Driven Medicine, November 18–20, 2022, Lyon, France

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CEUR Workshop Proceedings (CEUR-WS.org)