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## EDITED AND REVIEWED BY

Dana Kristjansson,  
Norwegian Institute of Public Health  
(NIPH), Norway

## \*CORRESPONDENCE

Roberto Gatta  
✉ roberto.gatta@unibs.it

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# Editorial: Artificial intelligence in process modelling in oncology

Carlos Fernandez-Llatas<sup>1</sup>, Roberto Gatta<sup>2\*</sup>,  
Fernando Seoane<sup>3,4,5,6</sup> and Vincenzo Valentini<sup>7,8</sup>

<sup>1</sup>ITACA-SABIEN Technologies for Health and Well-Being, Polytechnic University of Valencia, Valencia, Spain, <sup>2</sup>Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>3</sup>Department of Clinical Science, Intervention and Technology, Karolinska Institutet (KI), Stockholm, Sweden, <sup>4</sup>Department of Textile Technology, Faculty of Textiles, Engineering and Business, University of Borås, Borås, Sweden, <sup>5</sup>Department of Clinical Physiology, Karolinska University Hospital, Stockholm, Sweden, <sup>6</sup>Department of Medical Technology, Karolinska University Hospital, Huddinge, Sweden, <sup>7</sup>Agostino Gemelli University Polyclinic (IRCCS), Rome, Italy, <sup>8</sup>Catholic University of the Sacred Heart, Rome, Italy

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## Editorial on the Research Topic

### Artificial intelligence in process modelling in oncology

## 1 Introduction

From the early days of process mining in healthcare, oncology has consistently been one of the most compelling application areas (Rojas et al. (1)). The various oncological diseases, in fact, from the perspective of screening, diagnosis, treatment, and follow-up pathways, although sharing some common elements, also differ considerably depending on the anatomical district involved, while maintaining a generally well-structured practice, codified in consensus, protocols, and guidelines. In addition, the significant impact on patients and the high social costs contribute in making this sector one in which Data Analysis seeks to provide a meaningful contribution through the application of innovative techniques. Since in this context, it is particularly important to capture the temporal evolution of relevant factors, the application of Artificial Intelligence (AI) techniques for modeling clinical/healthcare processes can be a key tool in understanding what may play a significant role in disease control or the induction of iatrogenic events in the care pathway.

In this Research Topic, many applications covering different areas of Process-Modelling in the oncology theme have been explored.

In [Tozzi et al.](#), by a systematic review of systematic reviews, an exploration of the current contributes of AI in Pediatric Oncology is given, in Europe in particular. A set of 34 reviews and 304 articles were considered, retrieved by querying the Web of Science platform. The number of original papers, relatively stable from 2004 to 2016, quadruples in 2018 and subsequently doubles compared to 2018 in 2020. This is interpreted as a sign of the growing interest in paradigms, methods and tools provided by AI and how, nowadays, it is seen as promising in the field of oncology. Notably, despite the considerable amount of retrieved papers, there was no evidence found for AI utilization in process mining, clinical



interactive and iterative iterations among physicians and Data Scientists and can be easily applied on all the cancer type. The tool is rich of features and provide tools for data inspections, querying, clustering, process discovery, presenting understandable results visually and navigable.

In Kalendralis et al. is shown how AI can be also used to cope in trying to assure the quality of radiotherapy treatment plans. In this contribute, the authors extend the analysis in a multi-centric perspective. Here a Bayesian network is trained to identify the risk to expose the patients tu sub-optimal treatment plans collecting the experience of three hospitals, in United States and Europe.

From this Research Topic (Figure 1 shows the most significant terms in this article collection) and the underlying bibliography, clear signals emerge: on one hand, there is an increasing need to address the growing accumulation of data collected from clinical practice, which is becoming more heterogeneous and structured. On the other hand, process analysis using AI-based techniques, although still in its early stages of practical application, appears to possess innovative tools compared to what is currently available. This gap now represents the greatest opportunity, as recognized in the manifesto of Process Mining for Healthcare Munoz-Gama et al. (3), that unites the international alliance and aims to bring out the true potential of this approach by focusing on the practical application of disciplines related to real-world data.

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