

# Editorial from the new Editor-in-Chief: AIIM and the forthcoming challenges

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## Abstract

Since January 2017 I have been covering the role of Editor in Chief of journal Artificial Intelligence in Medicine. In this editorial I will try to share some observations, comments, and desiderata about the journal. At the same time, I will introduce some (small) changes in the organization of the journal.

*Keywords:* *Artificial Intelligence in Medicine*, Publication and Review Process, Editorial organization

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## 1. Introduction

Starting from January 2017, I have been called to cover the role of Editor-in-Chief (EiC) of the prestigious and important journal Artificial Intelligence in Medicine (AIIM). I have to admit that when Elsevier officers asked me about it, I was at the same time surprised, honored, and worried. I was aware of the high visibility of AIIM journal within the worldwide scientific community of medical informatics and computer science, having published several papers in the last years, having had the role of co-guest editor of some special issues, and being in the previous editorial board since 1999. But thinking to act as EiC was an unforseen and new perspective for me. Knowing the sound reputation reached and maintained by AIIM under the guidance of prof. Klaus-Peter Adlassnig in the last fifteen years, I was a little bit worried about my capabilities of maintaining the high quality of the journal and at the same time facing in a suitable way the novelties of the continuously changing worldwide scientific community.

I started to act in this new role, with such underlying attention both to the AIIM past and to its future. I have also to admit that many colleagues from my scientific community expressed in a warm way their encouragement for this new responsibility. This confirms that the scientific organization and management of AIIM is a shared responsibility among the authors, the reviewers, the editorial board members, and the EiC.

According to this perspective, in this editorial I would share some observations, comments, and desiderata about AIIM. At the same time, I would introduce some (small) changes in the organization of the journal.

25 This editorial is structured as in the following. Section 2 briefly recalls what  
artificial intelligence in medicine is about. Then, the specific role and focus of  
AIIM is highlighted, even with regard to journal metrics. Section 3 details the  
slightly modified editorial organization of the journal. Section 4 briefly describes  
the publication process and underlines the importance of high-level reviews.  
30 Finally, Section 5 contains my acknowledgments and some considerations about  
how I will try to cover this new role.

## 2. the AIIM role in the scientific community

Before considering in some detail the specific role of AIIM within the world-  
wide scientific community, I would briefly start from the meaning of the two  
35 parts of the name of the journal. As for *Artificial Intelligence*, it is well-known  
that a precise definition has not yet been reached and many proposals have  
been done through the last 50 years. Discussing in detail all the different (even  
formal) definitions of artificial intelligence is beyond the scope of this editorial.  
However, I would like to consider the definition proposed by the online version  
40 of Merriam Webster Dictionary [1]:

1. a branch of computer science dealing with the simulation of intelligent  
behavior in computers
2. the capability of a machine to imitate intelligent human behavior

On the other side, the term *Medicine* is defined by Merriam Webster as  
45 *the science and art dealing with the maintenance of health and the prevention,  
alleviation, or cure of disease.*

Going back to these basics should help in having a clear comprehension of  
what is the current landmark of the research in AI in Medicine and what are  
the forthcoming challenges and hot research topics the journal will manage and  
50 stimulate.

Indeed, even though not all the nuances of Artificial Intelligence in Medicine  
have been identified with these basic definitions, we can recognize there some  
aspects that relate AI in medicine to medical (intelligent) decision-based tasks,  
such as diagnosis, therapy, prognosis, and monitoring, and to the capability of  
55 software (and hardware) tools to support/provide some form of reasoning similar  
to the human one in the medical domain. As a side comment, it is worth noting  
that the philosophical question "Is medicine science or art?" has been simply  
skipped in the Merriam Webster's definition by taking both science and art in  
the considered definition.

60 In the early days, the biggest challenge was the modeling of knowledge and  
of reasoning techniques for the purpose of supporting tasks as diagnosis, ther-  
apy, and monitoring [? ]. It still remain a challenging research topic. But  
the information explosion, due to Internet and, more recently, to Internet-based  
social networks, cloud computing, and big-data platforms (just to use some  
65 current, sometimes overused, keywords) has brought a drastic shift in focus  
from *knowledge-intensive* to *data-intensive* applications and from *systems that*

advise to systems that provide ad-hoc information during decision-based (intelligent) tasks [2, 3, 4]. The major challenge is the intelligent exploitation of heterogeneous data. The type, the provenance, and the structure of such data is becoming more and more complex, as we have to deal with demographic data, historical and family data, biomedical signals and images, genetic data, biomolecular data, clinical pathway data, social network data, just to mention some wide categories of data and without any claims to completeness. As a consequence, knowledge related and/or inferred from such data is extremely valuable, multifaceted, and interdisciplinary. In this direction, intelligent (information) systems become a key-element to support decision-based and data intensive tasks as diagnosis, therapy, prevention, monitoring of patient populations, care quality assurance, and healthcare policy assessment and definition [4, 5].

In spite of the shift in focus towards data-intensive applications that provide ad-hoc information for medical decision-based tasks, the ultimate objective is still the same, namely to support care providers in reaching the best possible decisions for any patient at the right time, to help them see through the consequences of their decisions/actions, and to improve and widen their knowledge and comprehension of clinical phenomena.

Artificial intelligence in Medicine could thus be characterized as the science that deals with all those research studies, projects, and applications that aim at supporting decision-based medical tasks through knowledge and/or data intensive computer-based solutions that provide performances not possible to a human care provider in the right time.

### 2.1. AIIM focus

Within the scenario depicted in the previous section, AIIM has a well-defined research-oriented focus that distinguishes the journal with respect to other journals in the area of medical informatics. Indeed, papers considered for publication on AIIM should have

- a potential high impact in some medical/healthcare domain
- a strong novelty as for the methodological/theoretical content related to AI techniques

The first point underlines that the medical issues discussed in AIIM papers are not oversimplified “toy” examples from medicine. AIIM papers must refer to real-world medical domains, considered and discussed at the proper level of deepness, even from the medical point of view.

The second one explicitly says that the novelty AIIM is looking at is mainly in the AI-related methodological and/or theoretical content of the paper. If the paper is mainly theoretical, it has to show that the proposed solution has novel features in area of AI and, at the same time, it has some important effect in some medical field. On the other hand, if the paper is about a methodology, it has to show how the proposed methodology can be applied to Medicine, how it

has been applied to some real-world medical domains, and where is its novelty  
110 with respect to other proposals.

In other words, the application of well-known published algorithms to sets  
of medical data is not regarded as original research work of interest form AIIM.  
Papers of this nature will not be accepted for publication. If the authors present  
methodological novelties, the latter must be explicitly stated as such and compared  
115 to the work of others. Furthermore, I strongly recommend the inclusion  
of a clinical assessment on the usefulness and potential impact of the submitted  
work. The evaluation should demonstrate the feasibility of the presented newly  
developed formal methods and applications in medicine. Finally, AIIM is inter-  
ested in papers considering a variety of interdisciplinary perspectives concerning  
120 the theory and practice of artificial intelligence (AI) in medicine, human biology,  
and healthcare.

The research topics AIIM is interested in include (but are not restricted to):

- AI-based clinical decision making;
- Medical knowledge engineering;
- 125 • Knowledge-based and agent-based systems;
- Computational intelligence in bio- and clinical medicine;
- Intelligent information systems in medicine;
- Natural language processing in medicine;
- Data analytics and mining for medical decision support;
- 130 • New Computational platforms and models for biomedicine;
- Intelligent devices and instruments;
- Automated reasoning and metareasoning in medicine;
- Methodological, philosophical, ethical, and social issues of AI in medicine.

## *2.2. Journal metrics and relevance of the Journal*

135 Nowadays, there are many metrics for scientific journals that help to monitor  
the health of the journal, as key performance indicators. I will consider,  
together with all people involved in the AIIM editorial activities, all such met-  
rics and will try to improve such indicators or, at least, to maintain the reached  
level. It is important, however, to underline that such journal metrics are not  
140 a goal, are only a quantitative way to try to understand, together with other  
qualitative evaluations, whether the scientific quality and the considered topics  
of the journal meets the expectations of the scientific community AIIM is related  
to. The goal of the journal remains that of serving the scientific community as  
a way for exchanging, publishing, and stimulating high quality research results  
145 in the area of artificial intelligence in medicine.

### 3. Editorial Organization

As I wrote at the beginning of this editorial, managing both the publishing issues and the scientific work behind an international scientific journal is a shared task, with different roles and responsibilities. As Editor-in-Chief I will be supported by the Elsevier staff as for the publishing issues. On the scientific side, I will manage all the issues related to the research themes, the research directions, the paper reviewing process, and the various initiatives with the help of the *Advisory Board*, the *Editorial Board*, and the *Editorial Office*. Members of the *Advisory Board* will help with suggestions, comments, and proposals about medium- and long-term research-related strategies of the journal. Members of the *Editorial Board* will mainly help in the review process and in the management of specific initiatives, as, for example, special issues. Members of both Advisory and Editorial Boards are well-known scientists in areas related to AI in medicine, and are come from different world regions and from different research institutions. Members of such boards are also different as for their career state (and age), to have the presence of different approaches and sensitivities to well-established and emerging research topics. As a novelty in the AIIM editorial organization, we will have also some junior members, i.e., postdocs and PhD students, to share with such young researchers the most recent research directions. People of the Editorial Office will help me in all the organizational activities and in managing all the work with the Elsevier staff. Annual meetings of Editorial and Advisory Boards will take place, in most cases during some international conference related to topics of AIIM and relevant for the AIIM community.

### 4. The reviewing and publication process

The reviewing process is extremely delicate and it is crucial in determining the scientific quality of a journal. It starts with the reviewers selection and their invitation. This phase could be a little bit frustrating, as often either many invited reviewers decline the invitation or some invited reviewers do not send any answer to the (often reiterated) invitation. When a submitted paper reaches the acceptance of at least two reviewers, it enters the review phase. At the end of this phase, two reviews are submitted, sometime with some delays and after some solicitations by the Editor in Chief. On the basis of the received reviews, the EiC can decide for the acceptance of the paper, for asking minor or major revisions to authors, for rejecting the paper. Sometime, the EiC decides for rejection without any reviews, if he considers, after an overview of the paper, that the paper is out of scope with respect to what has been discussed in the previous section. I will do my best to make as short as possible this process, without sacrificing the quality of the process itself.

Finding the right reviewers of a paper is a challenging and time-consuming task I consider among the most important commitments of an EiC. However, it is clear that the critical task within this review process is done by reviewers.

190 Reviewers and authors determine with the quality of their work the overall reputation of a scientific journal. While the work of authors is more visible and rewarding, the work of reviewers is usually in background, it does not help significantly in career promotions, it is time-consuming and scarcely acknowledged. Nevertheless, without sound reviews it is not possible to have good journal articles. Good reviews should be detailed with all the comments required for allowing authors to improve their research and the related paper. Comments  
195 must be always constructive. Providing destructive comments does not help anyone to improve the quality of her work. AIIM is continuously looking for good reviewers and to this end the Editorial Board will play an important role, both as a source of high level reviewers and as hint provider about other good reviewers.

200 AIIM features different kinds of scientific contributions:

- Original research contributions
- Methodological reviews
- Survey papers
- Special issue articles
- 205 • Position papers
- Historical perspectives
- Editorials
- Guest editorials
- Letters to the editor
- 210 • Book reviews
- PhD projects

While all the kinds of contributions but the last one are well known, I will only introduce the last one, i.e., *PhD projects*. Such kind of contribution has the goal of allowing PhD candidates to explain their PhD research project and  
215 to share it with other scientists interested in the considered topic. Such contribution should not be in competition with regular research papers and should provide an early publication about the more recent research trends. It could be seen as a journal-version of contribution to doctoral consortia, which are quite common and attractive in many computer science and medical informatics conferences.  
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#### 4.1. *Special Issues*

As it can be observed in the history of AIIM, this journal regularly publishes special issues about interesting theoretical/methodological research or convincing applications related to AI in medicine, compiled by one or more guest editors who are outstanding experts on the selected topics. Special Issues must address topical subjects, dedicated to a novel and definable research area. AIIM does not publish conference volumes or conference papers. However, selected and high-level research results presented earlier at conferences may be published in AIIM, in the form of a thoroughly revised (rephrased) and extended (including new research results) original research paper.

### 5. Acknowledgments

Acting as EiC is an exciting work I will try to do it as a service to the scientific community. I'm sure I'll make errors and mistakes. Thus, I will need the help and the collaboration on many colleagues to maintain the high scientific quality and the reputation AIIM has gained in its history. I would thank in advance all this people. I would thank the old and the new members of the editorial boards, of the advisory board, of the editorial office, and the associate editors for their help. Thanks to all the Elsevier staff; they started to help me since the very beginning. A special thanks is due to prof. Klaus-Peter Adlassnig, who managed in an excellent way AIIM and leaved me a journal in healthy (scientific) state and ready to face new scientific challenges. Prof. Adlassnig and Andrea Rappelsberger at the editorial office helped me in the first phases of this new job in an effective way. I would like to thank them.

At last, I would thank prof. Francesco Pinciroli, who guided me as PhD advisor at the beginning of my scientific career. Francesco Pinciroli and the late prof. Mario Stefanelli had, with different roles and responsibilities, a great importance in my scientific life. And it is important for me to attest it in this editorial.

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