Artificial Intelligence in Medicine

Tahereh Mahmoudi[1], Alireza Mehdizadeh[2]*

Artificial intelligence (AI) as a branch of computer science focuses on creating intelligent computers to do activities, which generally require human intelligence. AI is considered in many aspects of the routine day, including personal assistants, aircraft, video games, and automated public transit. Moreover, AI is recently considered mostly in healthcare and medicine: disease diagnosis, referral management, service delivery, drug development, predictive modeling, and decision support, drastically leading to altering some processes of patient care [1-5]. The number of manuscripts related to AI in Medicine (AIM) submitted to the Journal of Biomedical Physics and Engineering (JBPE) has been significantly increasing since the past years, resulting in assigning this issue only to selected AIM manuscripts as a special opportunity for AIM researchers. This special issue aimed to show the most recent advances and innovative uses of AI in the medical field. Therefore, scholars and researchers are invited to submit their original research articles based on AI techniques to address health challenges. Furthermore, some of the articles were selected from the manuscripts presented at the first international congress on "Advanced Health Technologies-Artificial Intelligence in Medicine" [6], leading to the selection of 11 papers that cover a wide range of AIM: diagnosis, prediction, classification, and cancer detection using AI techniques, such as machine learning, neural network, and deep learning. This study also aimed to provide historical perspective and an up-to-date review of AIM publications. This review briefly discusses the number of publications, research trends, and hot medical topics related to AIM. From the WOS and PubMed databases, Papers were selected based on keywords like 1) AI type, 2) medicine/health from 1971 to November 25th 2022. The conference proceedings, abstract meetings, book chapters, and articles published in languages other than English were excluded. The AI types were set as "*Artificial intelligence*", "*Deep learning*", "*Machine learning*", "*Neural network*", "*Artificial neural network*", "*Natural language processing*", "*Fuzzy expert system*" and "*Robotics*". Meanwhile, the search terms "*medicine*", "*health**", "*diagnosis*", "*treatment*", "*diseases*" and "*illness*" were considered the medicine/health items in the research. Finally, these two queries were connected with "AND" together. Figure 1 shows the growth of some publications in WOS and PubMed, which is a significant increase in AIM publications since 2018. Figure 2 demonstrates the different hot-topic medical fields, using AI approaches, and surgery first ranks in AI usage. The number of published papers in different branches of medical sciences is compared from 2019 to 2022 (Figure 2) to illustrate the explosive growth of published papers in the last four years.

Authors' Contribution

T. Mahmoudi was involved in ideation, data collection and writing the manuscript. AR. Mehdizadeh contributed in ideation and writing the manuscript. Both of authors approved the final version of the manuscript.

[1]PhD, Department of Medical Physics and Engineering, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
[2]MD, PhD, Editor-in-Chief, Journal of Biomedical Physics and Engineering, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author:
Alireza Mehdizadeh
Editor-in-Chief, Journal of Biomedical Physics and Engineering, Shiraz University of Medical Sciences, Shiraz, Iran
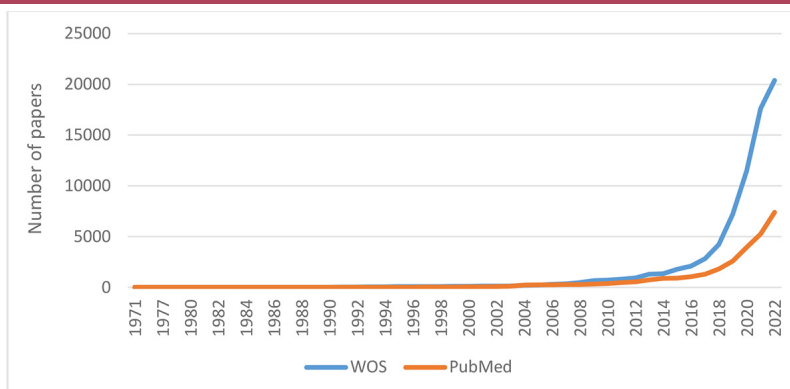E-mail: mehdizade@sums.ac.ir

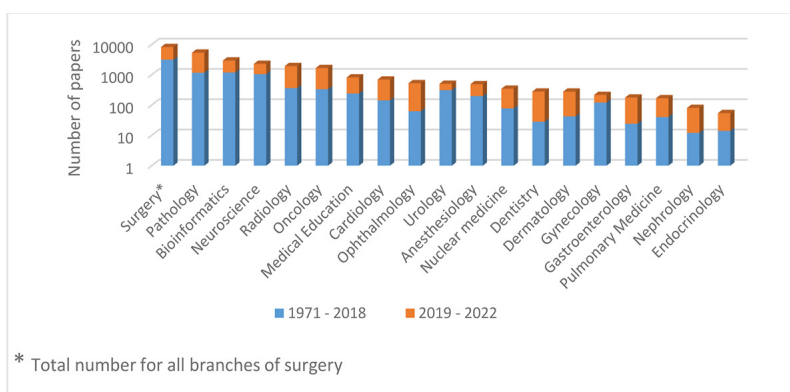**Figure 1:** The number of papers by year, 1971-2022

Figure 2: The number of publications in medical fields in the dataset, 1971-2022

Conflict of Interest

None

References

1. Mahmoudi T, Kouzahkanan ZM, Radmard AR, Kafieh R, Salehnia A, et al. Segmentation of pancreatic ductal adenocarcinoma (PDAC) and surrounding vessels in CT images using deep convolutional neural networks and texture descriptors. *Sci Rep*. 2022;**12**(1):3092. doi: 10.1038/s41598-022-07111-9. PubMed PMID: 35197542. PubMed PMCID: PMC8866432.

2. Pasyar P, Mahmoudi T, Kouzehkanan SZ, Ahmadian A, Arabalibeik H, Soltanian N, Radmard AR. Hybrid classification of diffuse liver diseases in ultrasound images using deep convolutional neural networks. *Informatics in Medicine Unlocked*. 2021;**22**:100496. doi: 10.1016/j.imu.2020.100496.

3. Montazerin M, Sajjadifar Z, Khalili Pour E, Riazi-Esfahani H, Mahmoudi T, et al. Livelayer: a semi-automatic software program for segmentation of layers and diabetic macular edema in optical coherence tomography images. *Sci Rep*. 2021;**11**(1):13794. doi:10.1038/s41598-021-92713-y. PubMed PMID: 34215763. PubMed PMCID: PMC8253852.

4. Tavakoli M, Mehdizadeh AR, Aghayan A, et al. Automated microaneurysms detection in retinal images using radon transform and supervised learning: application to mass screening of diabetic retinopathy. *IEEE Access.* 2021;**9**:67302-14.

5. Abbasi S, Tavakoli M, Boveiri HR, et al. Medical image registration using unsupervised deep neural network: A scoping literature review. *Biomedical Signal Processing and Control*. 2022;**73**:103444. doi: 10.1016/j.bspc.2021.103444.

6. Selk Ghafari A, Rezaianzadeh A, Mehdizadeh AR, Erfani E, editors. The First International Congress on Advanced Health Technologies-Artificial Intelligence in Medicine. 2021 Dec 28-29; Kish, Iran: SUMS and SUTIC; 2021. Available from: https://aht2021.kish.ac.ir/en/.