A bibliometric analysis of use of Machine learning and Artificial intelligence in Prostate Cancer Detection

Syed Raza[1], Ikram Burney A[2], Nadeem Pervez[2], and Momena Ahmed[3]

[1]Sultan Qaboos University College of Economics and Political Science
[2]Sultan Qaboos Comprehensive Cancer Center
[3]University of Houston

December 5, 2022

Abstract

Objectives: Prostate cancer is one of the most common cancers worldwide in men, with a huge geographical variation both in incidence and mortality. Whereas, the incidence is higher in developed countries, mortality is higher in developing countries. The reasons for high mortality in these countries include variation in practice leading to early diagnosis. Artificial Intelligence (AI) and Machine learning (ML) are increasingly being used to improve the diagnostic accuracy of prostate cancer. We interrogated the published literature to review the usage of AI and ML in the diagnosis of prostate cancer. Methods: Research databases such as SCOPUS, Web of Science (WoS), and Google Scholar were searched to identify articles related to AI/ML in the diagnosis and management of prostate cancer. Key-words included ("prostate" AND "cancer"), ("machine" AND ("learn" OR "learning")) OR ("artificial" AND ("intelligence" OR "intelligent")). Results Using a screening criterion, 293 reviewed research papers were identified. The two most consistent themes were predictive modeling and application of AI/ ML tools for cancer grading and radiomics. AI and ML enhance the diagnostic accuracy by reducing the inter-individual variation in Gleason's scoring, and complimenting the interpretation of multiparametric magnetic resonance imaging (mpMRI). A few publications reported the use of AI/ML tools by combining histopathology and MRI signals. Conclusions: AI and ML can improve the diagnostic accuracy of prostate cancer. Literature is beginning to emerge suggesting to use a combination of demographic features, clinical data, serological markers, pathological grading and radiological factors, and genomic data, to propose accurate non-invasive diagnosis of clinically significant prostate cancer.

Hosted file

`paper_AI models in prostate cancer_Dec_02.docx` available at https://authorea.com/users/562921/articles/610158-a-bibliometric-analysis-of-use-of-machine-learning-and-artificial-intelligence-in-prostate-cancer-detection