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Artificial Intelligence and Digital Pathology for Improving Cancer Diagnosis, Grading and Patient Care

The state of the art techniques in Artificial Intelligence (AI), when applied to Digital Pathology (DP) of Prostate Cancer, can provide a timelier and accurate automatic alternative to manual microscopic evaluation. The proposed DP alternative will reduce the time for diagnosis, grading, and treatment and will result in greatly improved patient care. Prostate Cancer is the third most commonly diagnosed cancer worldwideafter lung and breast cancer and the fifth most common cause of cancer-specific death inmales. Further, it is the most commonly diagnosed non-skin malignancy in men and the second overall leading cause of cancer mortality. It is estimated that 1 in 6 American men will be affected by this ailment during their lifetimes. The increased volume of prostate biopsies and a shortage of pathologists are major challenges for the task of diagnosis and grading. Given the overwhelming impact of this disease and the challenges in diagnosing it, we developed novel algorithms for addressing the tasks of diagnosis and grading of prostate cancer by using state of the art AI techniques in image classification. Using this novel algorithm, we aim to mimic the manual modeling process of pathologists who analyze the WSIs by visually inspecting and classifying tissue regions and then detecting one or more Gleason patterns. AI models used in healthcare should be reproducible and should be validated thoroughly on a large-scale dataset from different laboratories.

Keywords: Artificial Intelligence, Cancer Diagnosis and Care

Biography:

Prof. Saeed Amal is an Assistant Research Professor at Northeastern University and a member of the research institute The Roux Institute. Amal is focusing on the use AI and multimodal data in medicine for improving cardiovascular disease and cancer. Amal was a Postdoctoral Fellow at the Stanford University School of Medicine. Amal is a former VP of an R&D data medical startup in the field of cardiology. Amal has vast leadership experience in AI based research from both academia and the tech industry General Electric and General Motors. Amal's research interests are the precision medicine, healthcare applications for artificial intelligence, including deep learning and machine learning, natural language processing (NLP), image processing and recommender systems.

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