

Applications of Artificial Intelligence (AI) in Cardiac imaging

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Abstract : The purpose of this study is to inform the reader, about the various applications of artificial intelligence (AI), in cardiac imaging. AI grows fast and its role is crucial in medical specialties, which use large amounts of digital data, that are very difficult or even impossible to be managed by human beings and especially doctors. Artificial intelligence (AI) refers to the ability of computers to mimic human cognitive function, performing tasks such as learning, problem-solving, and autonomous decision making based on digital data. Whereas AI describes the concept of using computers to mimic human cognitive tasks, machine learning (ML) describes the category of algorithms that enable most current applications described as AI. Some of the current applications of AI in cardiac imaging are the follows: Ultrasound: Automated segmentation of cardiac chambers across five common views and consequently quantify chamber volumes/mass, ascertain ejection fraction and determine longitudinal strain through speckle tracking. Determine the severity of mitral regurgitation (accuracy > 99% for every degree of severity). Identify myocardial infarction. Distinguish between Athlete's heart and hypertrophic cardiomyopathy, as well as restrictive cardiomyopathy and constrictive pericarditis. Predict all-cause mortality. CT Reduce radiation doses. Calculate the calcium score. Diagnose coronary artery disease (CAD). Predict all-cause 5-year mortality. Predict major cardiovascular events in patients with suspected CAD. MRI Segment of cardiac structures and infarct tissue. Calculate cardiac mass and function parameters. Distinguish between patients with myocardial infarction and control subjects. It could potentially reduce costs since it would preclude the need for gadolinium-enhanced CMR. Predict 4-year survival in patients with pulmonary hypertension. Nuclear Imaging Classify normal and abnormal myocardium in CAD. Detect locations with abnormal myocardium. Predict cardiac death. ML was comparable to or better than two experienced readers in predicting the need for revascularization. AI emerge as a helpful tool in cardiac imaging and for the doctors who can not manage the overall increasing demand, in examinations such as ultrasound, computed tomography, MRI, or nuclear imaging studies.

Keywords : artificial intelligence, cardiac imaging, ultrasound, MRI, CT, nuclear medicine

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