Object detection in medical images using image segmentation and deep learning techniques

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Abstract

Heart attack is mainly caused due to atherosclerosis. It is a coronary artery disease (CAD) and it is a leading cause of death worldwide. It occurs when the coronary artery that supplies blood and oxygen to the heart and different parts of the body becomes blocked or narrowed due to deposition of proteins, cholesterol and other fatty deposits in the inner wall of the coronary artery. This results in a heart attack or damage to the heart tissue. Existing techniques for detection of plaque are Magnetic Resonance Imaging (MRI), Electron Beam Computed Tomography (EBCT) and Angiography, among these existing techniques Angiography is widely used at present to detect and cure heart attack. The currently available techniques are expensive, beyond the reach of normal people, not easily available in remote areas and cannot detect deeply embedded plaque with accuracy at early stages. The plaque is only detected by these techniques when blockage in artery is more than 70%. In order to remove the limitations of existing techniques Intravascular Ultrasound (IVUS) technique is proposed in our research work. This technique is based on application of image processing by using bio-markers and Marker Controlled Watershed Modified Image Segmentation Algorithm which better detects the Plaque deposits embedded deep inside the Coronary Artery wall that are undetectable by Angiography or other Cardiac test that are prone to rupture without warning sign. In addition to this technique Artificial Intelligence (Deep Learning) computing technique will also be used for image classification.

Biography

Deepak S. Mane is a Senior Data Scientist/Enterprise Solution Architect in Global Consulting practice - Performance Engineering Lab at Tata Research Development and Design Center (A Research wing of TCS). In his previous role he was Scientific Officer at Tata Institute of Fundamental Research (TIFR). Mr. Deepak Mane has 17+ years of experience as Data Scientist/Enterprise Solution architect in Data Science, Data Management, governance, Science and Analytics, Big Data, Cloud Computing, Artificial Intelligence, Machine Learning, Deep Learning. Currently, he is working as Senior Data Scientist Commonwealth Bank of Australia through TCS. He has 7+ onsite experiences at various locations such as USA, Europe, Australia and Asia in big data and cloud domain. Deepak Mane holds 6 certifications in the Data Science and cloud computing domain. He has published 21 papers in Conferences Seminars, and has been conducting Seminars/workshops at various colleges in Maharashtra and MP under AIP/FDP activities - TCS. He's also a mentor for KreSIT, Indian Institute of Technology - Mumbai. He is working as Reviewer for 10 Scopus and Springer Journals including cyber war, cyber security, and artificial Intelligence. He has also been a Speaker for various international conferences across the globe (UK, USA, and INDIA). He is also a member of the Technical program committee and reviewer for national/International conferences.