All Sciences Proceedings
http://as-proceeding.com/

AS-ABSTRACTS
https://as-proceeding.com/index.php/as-abstracts
ISSN: 2980-1834

All Sciences Abstracts,
Volume 1, pp. 3, 1, 2023

Medical image super-resolution: A review, recent trends and techniques

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Abstract **–** The quality and resolution of medical images significantly impact the accuracy of clinical decisions. Preprocessing of medical images plays a crucial role in the performance of computer-aided diagnosis (CAD) systems, which helps to improve the quality of input images, remove noise, and enhance contrast. Medical images are often characterized by low resolution due to different constraints such as hardware limits and image acquisition time. To address this issue, researchers have proposed various super-resolution approaches to improve the resolution of medical imagesand therefore better image quality. Hence, the super-resolution (SR) process aims to reconstruct a high-resolution (HR) image from its low-resolution (LR) counterpart. Several techniques are suggested in the literature including interpolation-based methods, reconstruction-based methods and learning-based methods. In recent years, deep learning-based methods have shownpromising results in various medical image applications while preserving important features and structures. In this article, we present a review of different studies that have proven to be useful in medical image super-resolution including classical computer vision methods and deep learning based-methods.

Keywords: Super-Resolution (SR), Medical Image, Deep Learning, Convolutional Neural Network (CNN), Preprocessing, CAD System