

# Medical image denoising using convolutional denoising autoencoders

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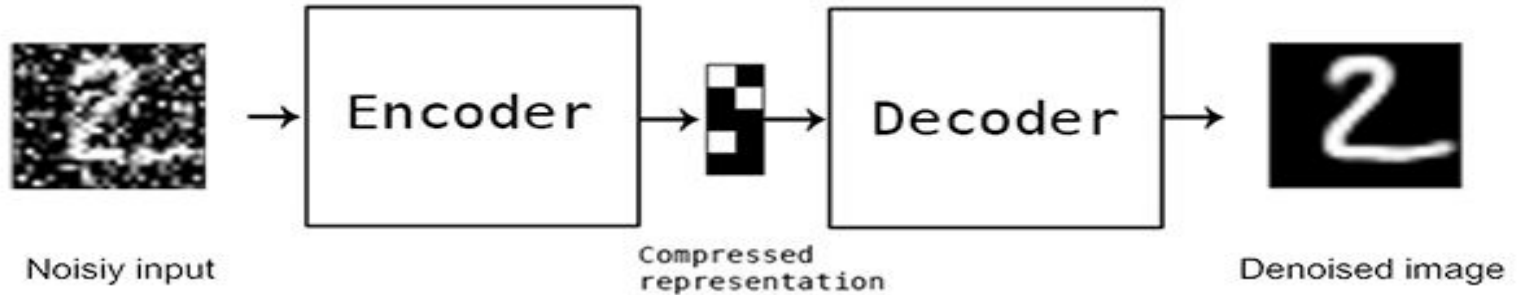
# Problem Statement

- Image denoising is an important preprocessing step in medical image analysis. Different algorithms have been proposed in past three decades with varying denoising performances.
- More recently, having outperformed all conventional methods, deep learning based models have shown a great promise. These methods are however limited for requirement of large training sample size and high computational costs.
- In this paper we show that using small sample size, denoising autoencoders constructed using convolutional layers can be used for efficient denoising of medical images.

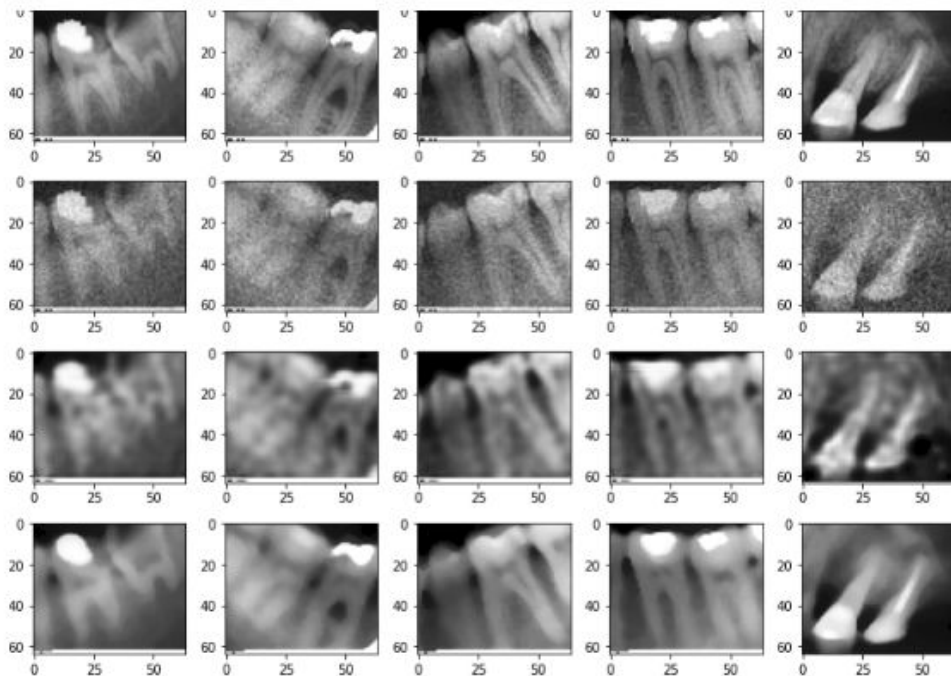
# Denoising AutoEncoders

- Autoencoders are an unsupervised learning technique in which we leverage neural networks for the task of representation learning. Specifically, we'll design a neural network architecture such that we impose a bottleneck in the network which forces a compressed knowledge representation of the original input.
- Denoising autoencoders are a stochastic version of standard autoencoders that reduces the risk of learning the identity function. Denoising autoencoders attempt to get around this risk of identity-function affiliation by introducing noise, i.e. randomly corrupting input so that the autoencoder must then “denoise” or reconstruct the original input.

# Diagram of Denoising Autoencoder



# Experimental Results



ORIGINAL IMAGE

NOISE IMAGE

DENOISED AUTOENCODER

MEDIAN FILTER IMAGE

*Thankyou*