ABSTRACT FOR SEMINAR

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Topic: A U-Net Based Approach for Removing Salt and Pepper Noise from Images Using Noise Mask

Abstract: The removal of salt and pepper noise from images is an important task to be able to correctly interpret the underlying signal. It is a challenging problem in the field of image processing. Many image processing based methods have been proposed which make use of hand designed filters to remove the noise. Often these hand designed filters are not suitable for use in a large variety of images. Hence, a large number of deep learning-based methods have been used to address this problem, but the inability to extract all the information from these noisy images and unwanted intensity distortion of data pixels during the denoising process often leads to problems such as over-smoothing and loss of textual information. Also, an important task before denoising is the identifying whether a pixel is noisy or not. To address these issues, we first generate a noise mask identifying the noise and non-noise pixel locations in the image. During the denoising stage, this mask is provided as input as a channel along with the noisy image, acting as a guidance mask. An autoencoder using the U-Net architecture is used in two stages. The noise mask is further used to restore the original intensity values of the data pixels in the generated output from the denoising stage, in the case that they have been unnecessarily altered. The model has been evaluated on the UCMerced LandUse dataset as well as other benchmark images, showing superior performance than the state-of-the-art methods in most of the cases.