**Image restoration using deep learning-based approaches**

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# REVIEW1

In the article you gave, the shortcomings of current machine learning methods for picture restoration are discussed, and a brand-new on-demand learning algorithm is suggested as a solution. The authors specifically contend that current models might overfit to particular levels of image corruption and fall short of generalising to more difficult levels of corruption. They suggest an approach to get around this restriction by generating training cases where they are most needed, enabling the model to become more adaptable to different levels of corruption. The authors use four picture restoration tasks and three datasets to demonstrate the efficacy of their methodology, which outperforms both the standard training technique and alternative curriculum learning methods. The article's overall message emphasises the significance of overcoming the shortcomings of present machine learning methods for picture restoration and outlines a promising new approach to increase these models' generalizability.

# REVIEW2

The paper you gave is a review of recent research on picture restoration techniques that can improve first responders' (FRs') situational awareness during rescue operations in inclement weather. The article specifically focuses on the deraining, desnowing, and dehazing families of image restoration techniques. The authors review the research on these techniques, paying particular attention to how deep learning models are used and how well they fit the criteria for use in rescue operations. The article's main point is the possibility of picture restoration techniques based on deep learning models to improve first responders' situational awareness during rescue missions inclement weather. The authors give a thorough overview of the techniques and their applicability for this application by reviewing recent literature and presenting a faceted taxonomy. Researchers developing picture restoration techniques to aid first responders in rescue operations may find this survey to be helpful.

# REVIEW3

With a focus on deep learning-based methods, the authors offer insightful information about the state-of-the-art in picture restoration techniques for first responders. The authors offer a helpful tool for academics working on picture restoration techniques for this particular application by reviewing the literature and developing a faceted taxonomy. The paper also emphasises how these techniques may enhance first responders' situational awareness during rescue missions in inclement weather.

# REVIEW4

In this article, the significance of repairing ancient photographs—many of which have undergone various forms of degradation—is discussed, and a deep neural network-based technique is suggested. The background and significance of the topic are introduced, and then general convolutional neural networks and generative adversarial networks are discussed along with their principles and structures. The article describes the design and loss function of the suggested picture restoration technique, which is based on these networks. The research concludes with experimental findings that demonstrate the suggested algorithm performs better than previous algorithms in blur repair and damage repair, making it more appropriate for the restoration of ancient pictures. The post does note that there is still space for improvement in terms of fixing broken photos, and that is where future work will be concentrated.

# REVIEW5

The paper addresses conventional approaches for image restoration and how deep learning's debut has greatly enhanced image restoration efficiency. Using widely used quantitative evaluation indices, many deep learning-based restoration algorithms are compared and examined. The quality of picture restoration can be improved by using an appropriate loss function during the network creation and training process, according to the report.

# REVIEW6

Indeed, picture restoration using deep learning approaches has produced encouraging results, particularly when dealing with intricate and severely damaged images. Large-scale data collection and autonomous learning techniques can be used to get around common image restoration problems and enhance the quality of recovered photos. As you pointed out, further research is still required to determine how well these strategies work when dealing with various kinds of image degradations and combinations of degradations.

# REVIEW7

It is true that as technology has advanced, computers have gotten better and better at doing things that were previously only possible for people to do. One such task that computers are effective at performing is image restoration. Image restoration techniques provide a solution to the issue of how to preserve ancient and damaged photographs, which cannot be overstated. However, it can be difficult to repair photographs that have been damaged by numerous kinds of noise and flaws.

# REVIEW8

It's exciting to see that your suggested method for restoring degraded images—using a pre-trained convolutional neural network—can minimise noise and blur without the use of laborious iterative methods. The fact that your technology has produced good deblurring outcomes is also encouraging. It's crucial to remember that additional study is required to see whether it works for other kinds of image degradations or combinations of degradations. More thorough results and comparisons with other cutting-edge approaches in the field would be beneficial.

# REVIEW9

In the paper, a deep learning architecture for Poisson picture denoising is proposed. This design performs better than conventional techniques, especially when the noise level is high. Low-light and photon-limited environments frequently experience poisson noise, which the suggested design can accurately handle. Convolutional and deconvolutional layers are combined with symmetric connections in the architecture. In tests using the image peak values 4, 2, and 1, the network outperformed benchmark traditional techniques by a statistically significant margin in terms of PSNR increases. By adjusting the reconstruction stride sizes, the denoising network can run more quickly. Despite being somewhat shallow in comparison to contemporary designs, the suggested network can execute Poisson denoising without being explicitly taught the noise properties and can learn the parameters from data alone. Future study can look into how well this architecture handles different types of noise, such Gaussian noise or random noise with unknown properties, as well as other imaging issues like deblurring or inpainting.

# REVIEW10

This paper describes a cutting-edge machine learning method for signal reconstruction. Without explicit image priors or likelihood models of the corruption, the authors show that it is possible to train a model to restore images by solely using corrupted instances. In some cases, the trained model's performance may even be better than models that were trained using uncontaminated data. The authors demonstrate how this method may be applied to a variety of tasks, such as the removal of photographic noise, the denoising of artificial Monte Carlo pictures, and the reconstruction of undersampled MRI scans, all of which are affected by various processes. The findings imply that this method has the potential to be a potent tool for a variety

**CONCLUSION:**

We went through several fascinating and essential research papers published Image restoration utilising deep learning-based approaches and even other methods in the following assignment and provided reviews for the following.

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