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## REVIEWER'S REPORT

**Manuscript No.: IJAR-59617**

**Title: Using a pre-trained neural network (VGG16) to solve the image style transfer problem**

**Recommendation:**

Accept as it is .....

Accept after minor revision.....

Accept after major revision .....yes.....

Do not accept (*Reasons below*) .....

| Rating | Excel. | Good | Fair | Poor |
|---|---|---|---|---|
| Originality | | | Y | |
| Techn. Quality | | | Y | |
| Clarity | | | Y | |
| Significance | | | y | |

**Reviewer's ID: JPR-Dr.Shaweta sachdeva**

## *Detailed Reviewer's Report*

1. The manuscript presents an image style transfer approach based on a pre-trained VGG16 network. However, the authors should clearly distinguish the proposed method from established neural style transfer techniques and explain the specific novelty of their contribution.
2. The title emphasizes image style transfer, whereas the abstract and keywords also refer to face recognition, image classification, and object detection. The authors should ensure consistency between the title, research objectives, methodology, and keywords.
3. The abstract should be revised to include the research problem, proposed methodology, experimental setup, key quantitative results, and the principal contribution. The current abstract does not adequately report the experimental findings.
4. The introduction should provide a clearer motivation for selecting VGG16 for image style transfer and explain its advantages and limitations compared with other convolutional neural network architectures.
5. The literature review should be expanded to include foundational and recent studies on neural style transfer, feature-based image reconstruction, Gram matrices, and optimization-based artistic image generation.
6. The authors should explicitly formulate the research problem and identify the limitations of existing style transfer methods that the proposed approach aims to address.
7. The methodology requires a more detailed explanation of how VGG16 is adapted for style transfer. The authors should specify the exact convolutional layers used for content and style feature extraction and justify their selection.
8. The manuscript discusses fine-tuning and replacing the classification layer of VGG16, including an example involving CIFAR-10 classification. However, the relationship between these classification experiments and the proposed style transfer method is unclear. The authors should separate these discussions or explain their methodological relevance.

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9. The mathematical formulation of content loss and style loss should be presented more rigorously. The authors should define all variables, tensor dimensions, normalization factors, and optimization parameters used in the loss functions.
10. The authors should provide the complete combined loss function, including the weighting coefficients assigned to content and style losses, and explain how these coefficients influence the generated image.
11. The manuscript reports 600 training iterations and presents loss values at different stages in Figure 7 (pages 7–8). However, the authors should clarify whether the reported values correspond to content loss, style loss, or total loss and explain the numerical scale of these measurements.
12. The reported style loss values are extremely large, initially around \(10^{19}\), and decrease substantially during optimization. The authors should investigate whether these values result from the loss formulation, feature normalization, or numerical scaling and demonstrate that the optimization remains stable.
13. The experimental section uses a parrot image and a stylized landscape image as the principal example. The authors should evaluate the proposed method on a more diverse set of content and style images to demonstrate its generalizability.
14. Figure 8 illustrates the final stylized parrot image. However, the manuscript does not provide a systematic quantitative or qualitative comparison with established neural style transfer methods. The authors should include baseline comparisons using consistent input images and evaluation settings.
15. The authors should specify the experimental configuration, including the image dimensions, VGG16 implementation and pretrained weights, optimizer, learning rate, number of iterations, hardware, and software environment, to ensure reproducibility.
16. The manuscript should clarify whether the VGG16 parameters remain frozen throughout optimization and whether gradients are calculated with respect to the generated image or the network weights. This distinction is essential for understanding the proposed optimization procedure.
17. The discussion of Adaptive Average Pooling and feature map dimensions requires technical clarification. The authors should verify the stated tensor shapes and ensure that the explanation accurately reflects the implemented VGG16 architecture.
18. The authors should include an ablation study to examine the contribution of different VGG16 layers, content-loss components, style-loss components, and loss weighting coefficients to the final image quality.
19. The results should be evaluated using suitable quantitative measures, such as perceptual similarity, content preservation, or style similarity, alongside visual assessment. The authors should explain the limitations of the selected metrics.
20. The captions and descriptions of Figures 3–8 should be improved to explain the purpose of each illustration, the corresponding experimental stage, and the significance of the displayed results. In particular, the loss progression in Figure 7 should be presented in a clearer and more interpretable format.
21. The conclusion states that the obtained results demonstrate the effectiveness of the proposed method. However, this claim should be supported by comparative experiments, reproducible measurements, and a discussion of the method's limitations.
22. The references should be carefully reviewed for relevance and completeness. Several cited works concern object detection, face recognition, and image datasets rather than directly addressing neural style transfer. The authors should incorporate more directly relevant literature and ensure consistent bibliographic formatting.

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23. The manuscript contains several grammatical and technical language issues. Terms such as "eras" should be corrected to "epochs" where appropriate, and the text should be professionally edited for clarity, consistency, and scientific precision.
24. Overall, the manuscript addresses an interesting computer vision problem, but its scientific contribution remains insufficiently established. Major revisions are required to clarify the novelty, strengthen the mathematical formulation, resolve inconsistencies in the experimental description, validate the reported loss values, and provide comprehensive comparative evaluation before the effectiveness of the proposed method can be assessed reliably.