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RRef.: Ms. No. **NEUCOM-D-24-08078**

Bridging the Metrics Gap in Image Style Transfer: A Comprehensive Survey of Models and Criteria
Neurocomputing

Dear Mr. Zhou,

Please find below the referee reports. Based on these and the corresponding recommendation of the associate editor, I have to inform you that your paper

Bridging the Metrics Gap in Image Style Transfer: A Comprehensive Survey of Models and Criteria with manuscript number: **NEUCOM-D-24-08078**

in its present form cannot be accepted for publication in Neurocomputing.

However, I would very much like to invite you to revise your paper, seriously taking into account the comments of the reviewers, and to resubmit your revised version by **Dec 15, 2024** (mm/dd/yy). Any revision received after that may be treated as a new submission.

To submit your revision, go to <https://www2.cloud.editorialmanager.com/neucom/default2.aspx> and login as an Author. You will see a menu item call Submission Needing Revision. Here you will also find your submission record.

The revised material should consist of

- your response to the reviewers' comments (to be uploaded as "Revision notes"),
- the revised PDF of the manuscript,
- the source files that have been used to prepare it (source files in LaTeX or Word, as well as separate figure files; these will be used for the eventual typesetting of the paper)
- and finally, biographies and pictures of all authors.

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Kind regards,
Jungong Han, Ph.D.
Editor in Chief
Neurocomputing

Editor's and reviewers' comments:

Reviewer #1: Strength: Image style transfer combines the content of a real photograph with the artistic style of another image to create a new and stylized image. This paper provides a comprehensive review of the field of image style transfer. The paper is easy to follow, and the motivation of this paper is sound.

Weakness:

缺点1：需要讨论当前工作在可解释性上的努力与不足, 并指明未来的发展方向

1. The discussions on interpretability and controllability need further clarification (Sec. 5.2). Current research on style transfer develops limited research on explicit interpretability [1-4]. Some diffusion model, use visual programming based approaches to achieve controllability [5-6], however, the transferring process is not transparent (This topic can be included in Sec. 5.5 in human-computer interaction). These works should be discussed, and highlight the future directions.

2. While the current paper covers a lot of specific works, a more general/high-level discussions of different methods, and future direction is encouraged. This can help the community target more specific goals.

缺点2：需要更清晰、更高屋建瓴的给出当前领域的发展前景。

- [1] Visual recognition with deep nearest centroids
- [2] Towards explainable deep neural networks (xDNN)
- [3] Deep learning for case-based reasoning through prototypes: A neural network that explains its predictions
- [4] Unified 3d segmenter as prototypical classifiers
- [5] Visual programming: Compositional visual reasoning without training
- [6] Image Translation as Diffusion Visual Programmers

The typos do not change my rating:

Some results appear more like "discoveries" rather --> Some results appear more like "discoveries" rather

Overall, it is a good survey in this domain.

Reviewer #2: Summary:

This manuscript provides a survey of image style transfer techniques, focusing on the evolution from traditional methods to neural approaches. While the paper makes a contribution by attempting to systematically categorize the field and analyze evaluation metrics, several major issues need to be addressed before publication.

Strengths:

- Comprehensive coverage of the field's development, from traditional methods to modern neural approaches
- Valuable analysis of evaluation metrics used in the field
- Clear categorization of neural style transfer into distinct developmental stages

Major Concerns:

- The introduction lacks clear motivation for why this survey is needed now
- Missing discussion of several recent works on the narrow topic, such as:
[StyleFormer: Real-time Arbitrary Style Transfer...]
[Stylerrf: Zero-shot 3d style transfer of neural radiance...]
- Limited coverage of real-world applications and practical challenges
- Should include at least some quantitative comparison/tables of different methods
- Insufficient coverage of domain adaptation connections
- Need more discussion of style transfer for 3D content
- Currently the survey missed a lot of recent works from 2022-2024 in wider area of visual reasoning and image transfer methods, as exemplified by:
[Visual recognition with deep nearest centroids]
[Learning equivariant segmentation with instance-unique querying]
[Diffusion Attack: Leveraging Stable Diffusion for Naturalistic Image Attacking]

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