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Classification of Image Data-Augmentation Algorithms

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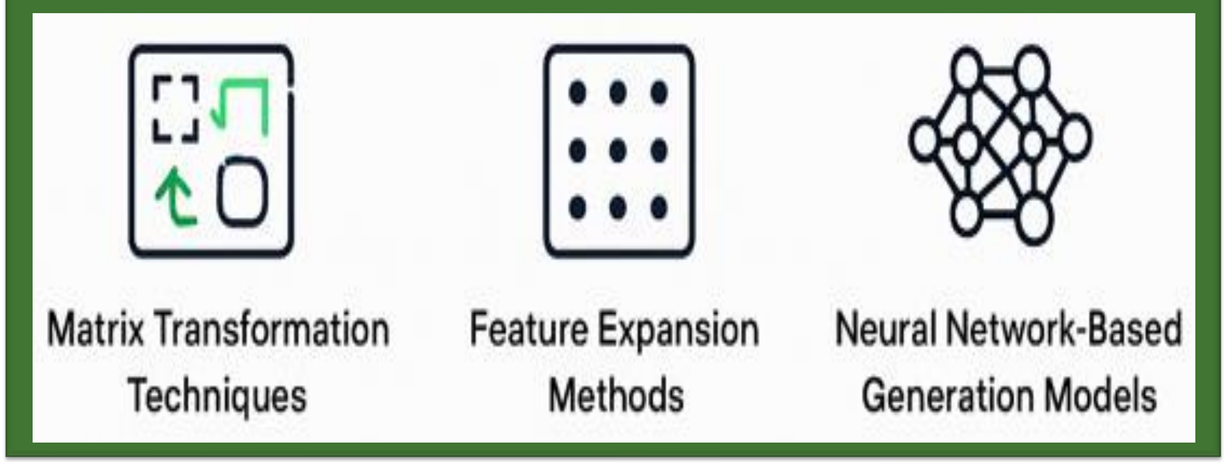
INTRODUCTION & AIM

Data-augmentation algorithms play a crucial role in mitigating the issue of limited training samples in deep learning applications across various agriculture domains. These algorithms are commonly employed by researchers to enhance performance in computer vision tasks. However, with the fast-paced evolution of these methods, the traditional classification, which separates them into classical techniques and generative methods, is now insufficient as it fails to include several important approaches. Furthermore, the abundance of available algorithms makes it difficult to select the most appropriate one for a specific application.

METHOD

To address this challenge, this paper proposes a new classification system for image data-augmentation algorithms based on their strategic approaches: matrix transformation techniques, feature expansion methods, and neural network-based generation models.



RESULTS & DISCUSSION

The study explores the key principles, performance, application contexts, current research trends, and future challenges for each category while offering insights into the future development of data augmentation techniques.

CONCLUSION

This work provides a useful academic resource for the application of data-augmentation algorithms, particularly in the field of precision livestock farming. The classification framework presented in this study provides a structured lens for understanding image data-augmentation algorithms, but further research is required to expand its scope and practical utility. Future work may focus on the following directions: comprehensive benchmarking, hybrid and adaptive strategies, domain-specific augmentation, automated selection frameworks, explainability and bias mitigation, scalability and real-time deployment, cross-domain applications, ethical and governance considerations.

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