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Deep Learning-Based Classification of Uterine Anomalies Using Augmented Ultrasound Images

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Introduction

This study aims to develop and evaluate a deep learning model enhanced by data augmentation to improve classification accuracy in identifying uterine abnormalities from ultrasound images.

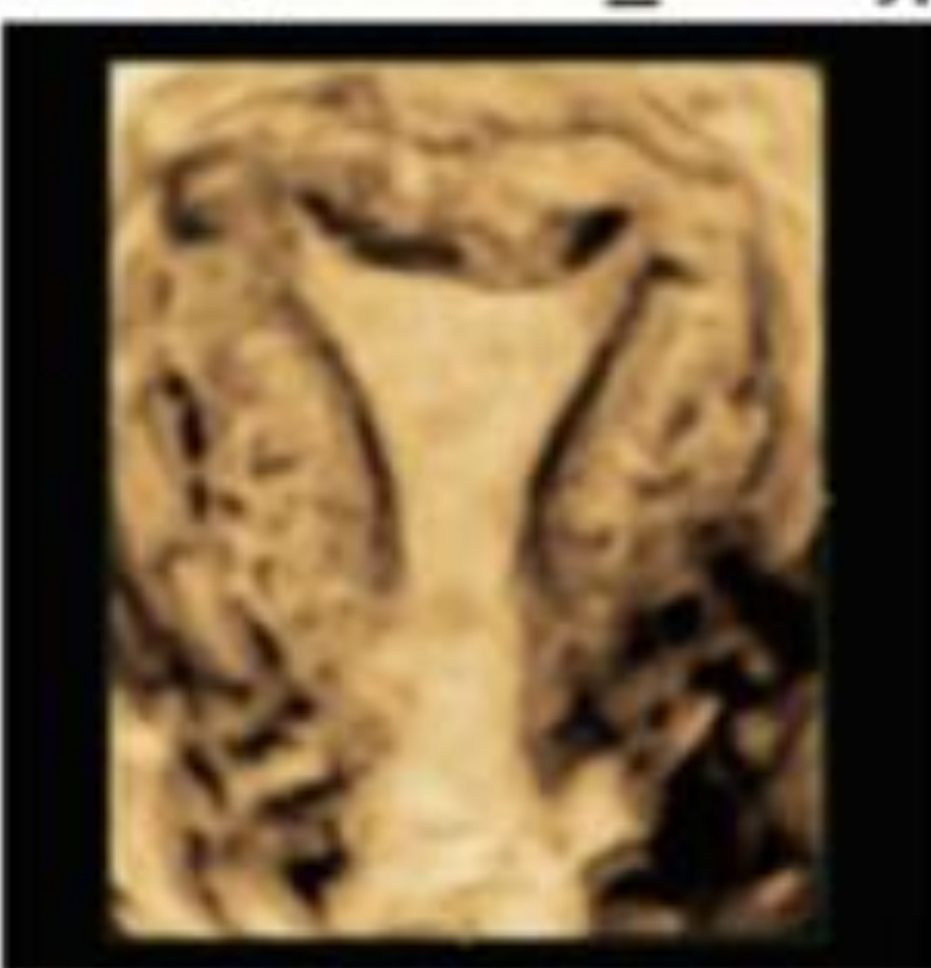
Methods

A dataset of ultrasound images was divided into normal (n=369) and abnormal (n=162) categories. Data augmentation (rotation, flipping, noise injection) increased dataset size and model robustness. A modified ResNeXt CNN was trained using five-fold cross-validation over five epochs per fold, monitoring accuracy and loss.

Conclusion

This deep learning-based classification system demonstrated high accuracy in identifying uterine abnormalities from ultrasound images. Data augmentation improved robustness and reduced overfitting. Future work will expand the dataset and further refine the model for broader clinical applicability.

Original (normal_262.jpeg)



Original (normal_14.jpg)



Figure 1. Original normal uterine ultrasound images.

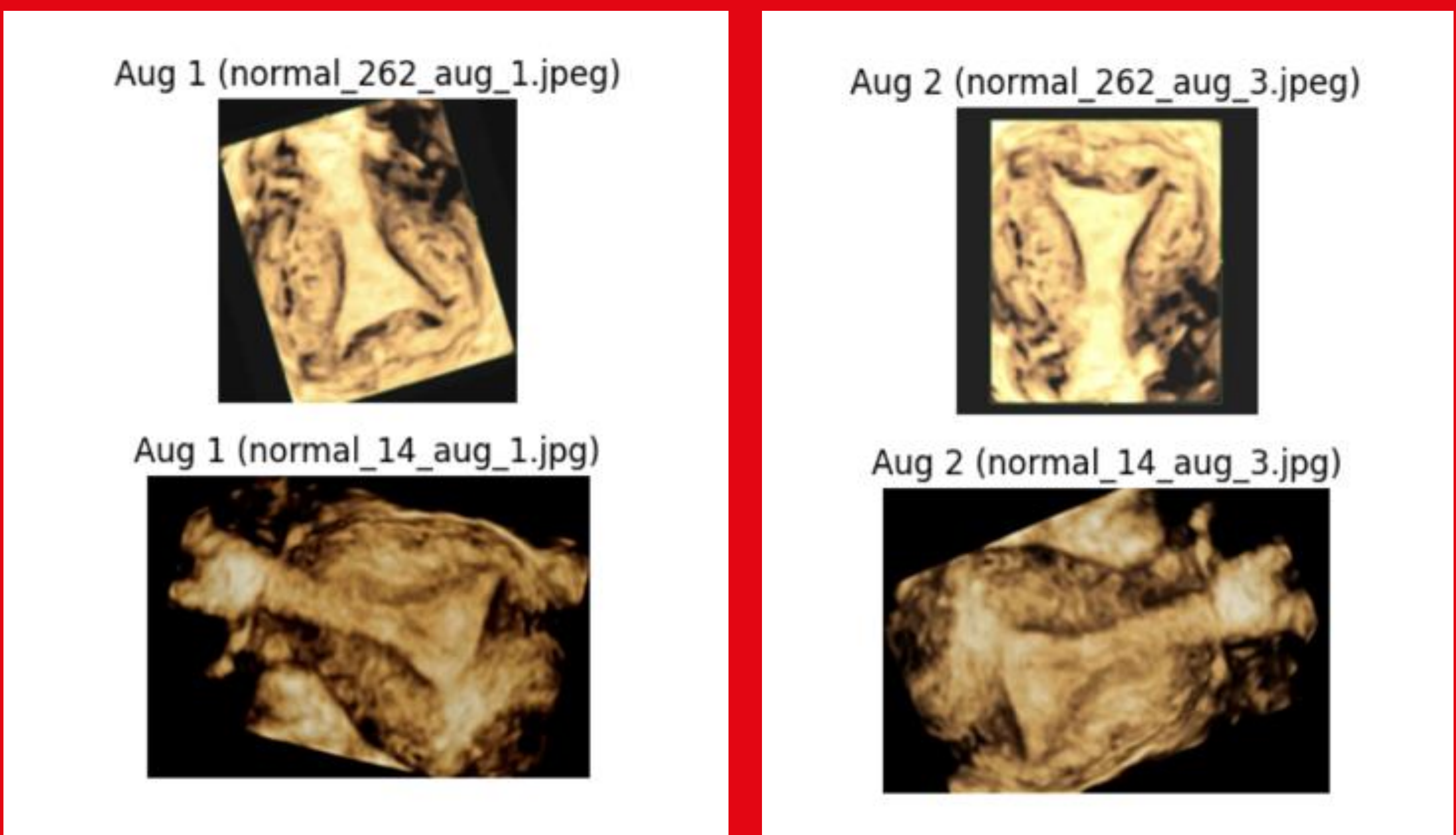


Figure 2. Augmented uterine ultrasound images.

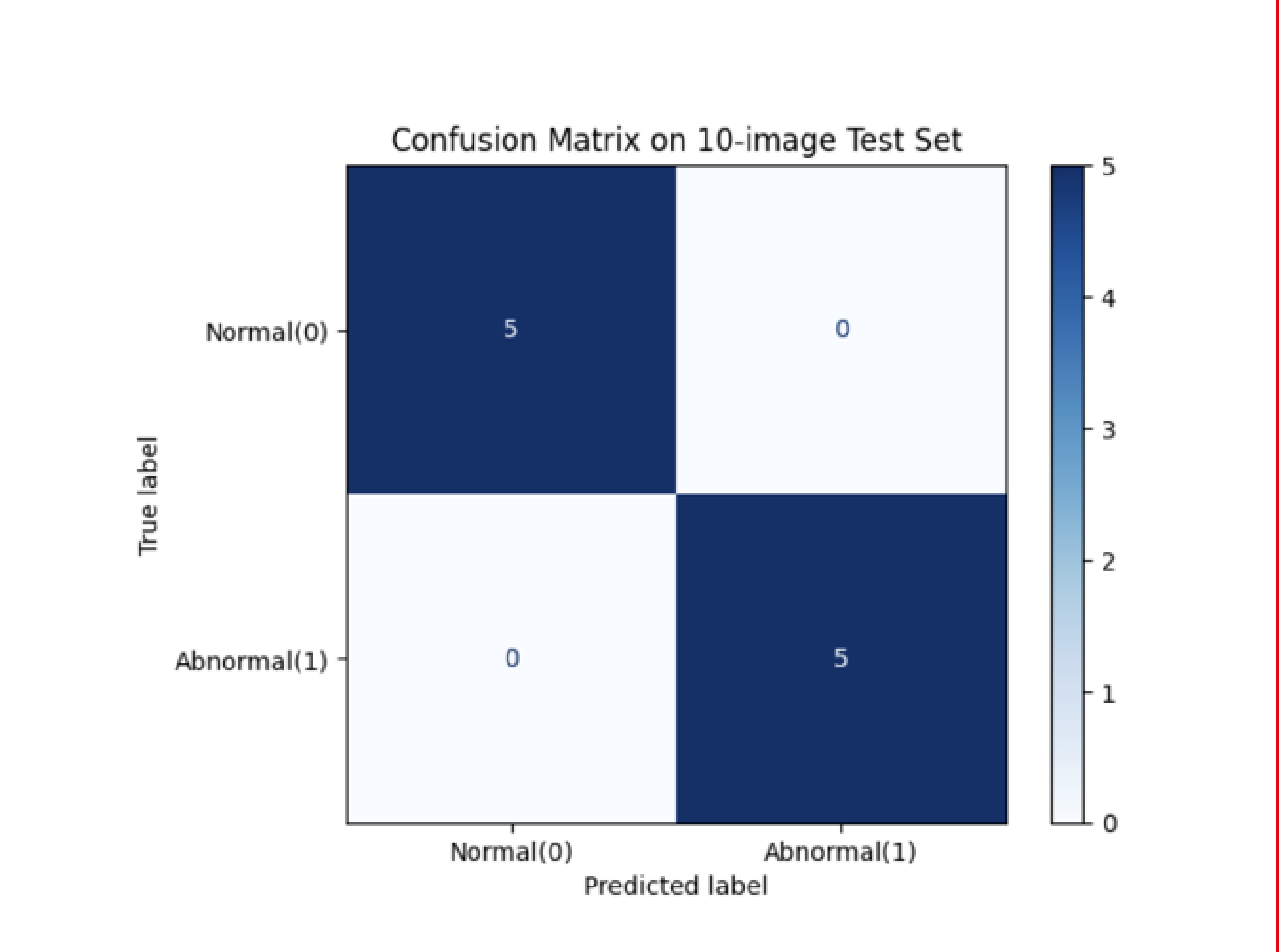


Figure 3. Confusion matrix of the final model on a 10-image test set, showing perfect classification of normal and abnormal cases.