

COL775 A1

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1 Part - 1

The metrics for my Resnet model are as follows: Train: 0.93 Accuracy, 0.93406 Micro F1, 0.9344 Macro F1 Test: 0.926 Acc, 0.928 micro F1, 0.927 Macro F1 Val: 0.928 Acc, 0.929 micro F1, 0.927 Macro F1

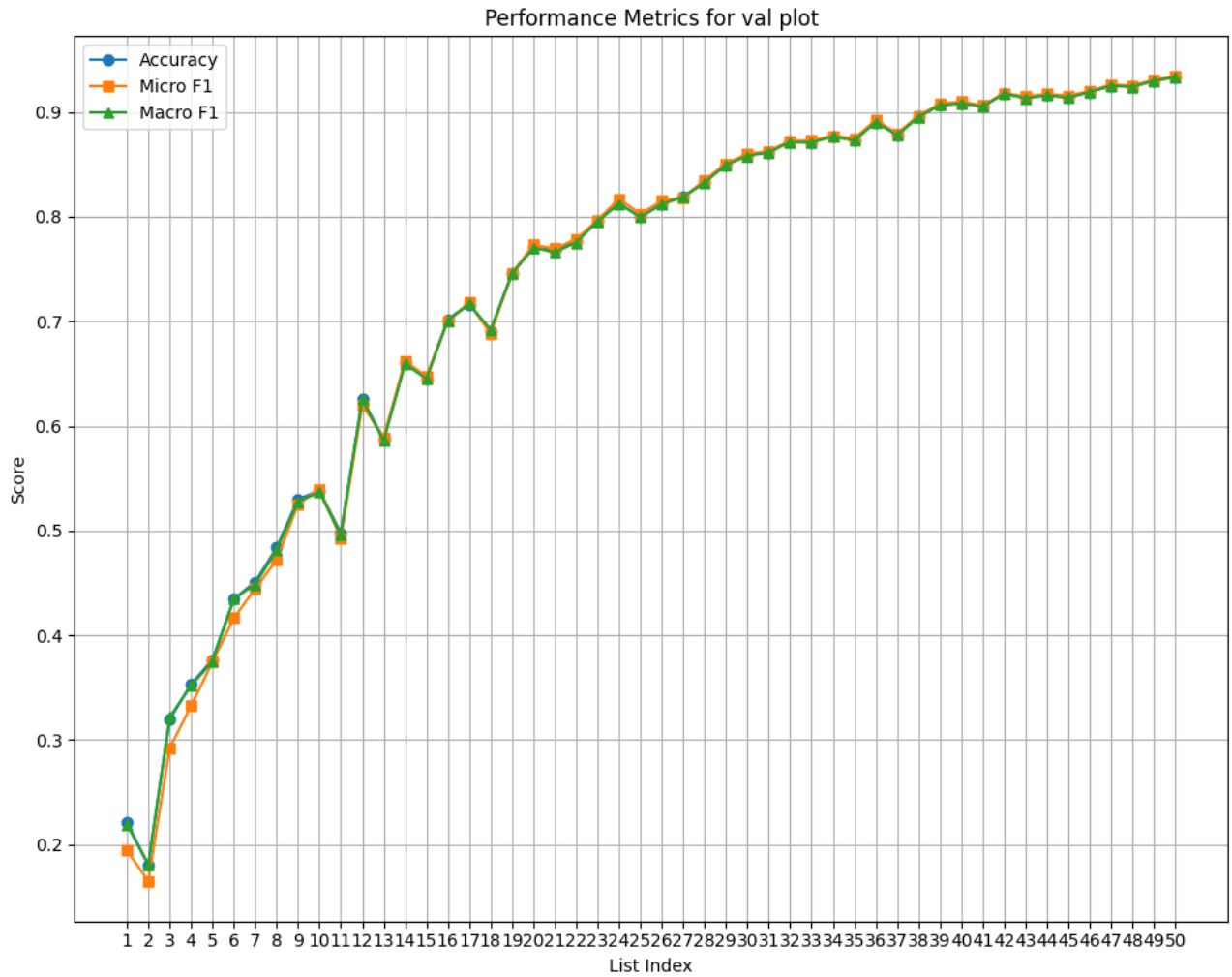


Figure 1: Val Metrics for part 1

2 part 2

Here are the metric graphs for all the 6 trained variants. They are present on the next to next page.

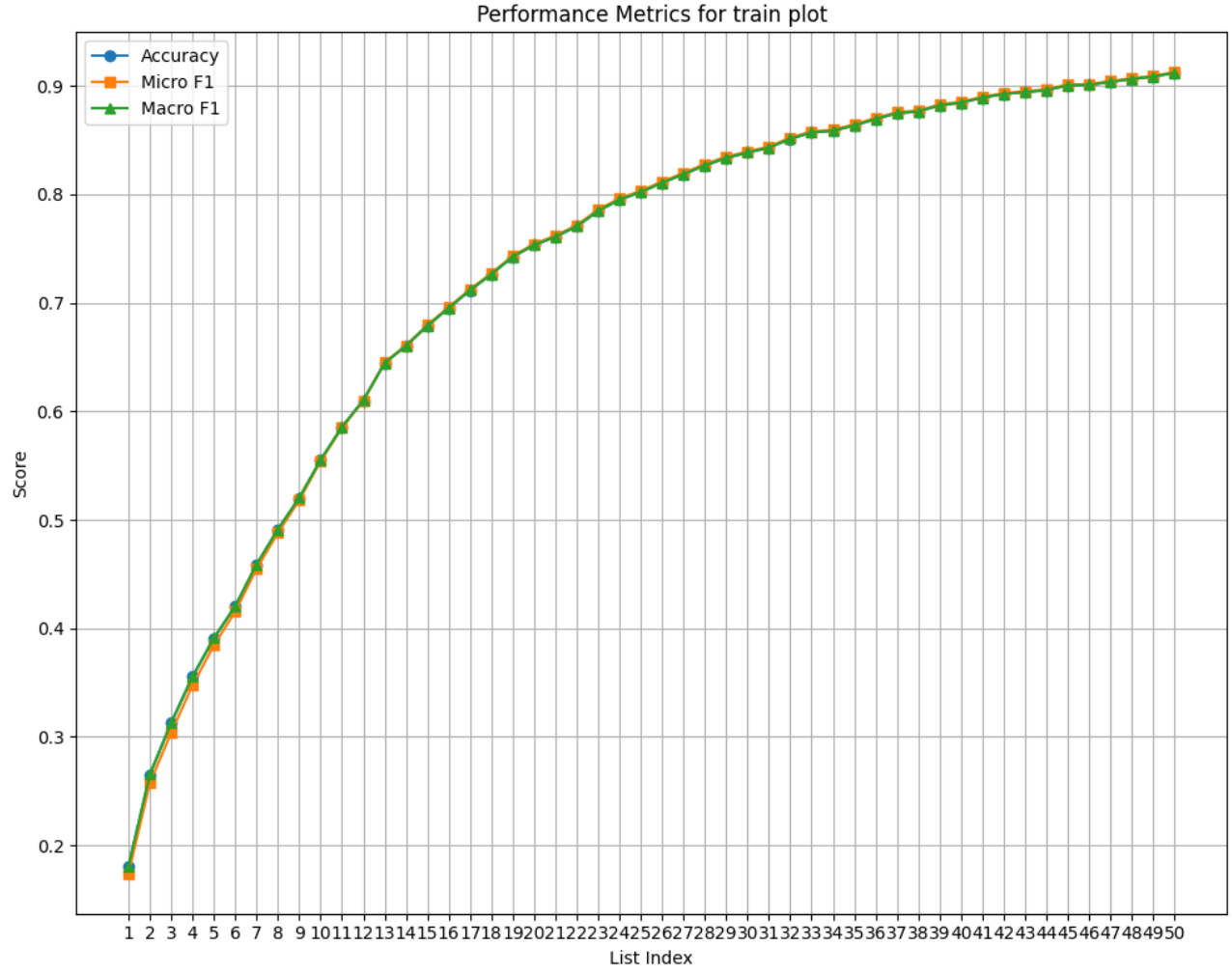


Figure 2: Train metrics for part 1

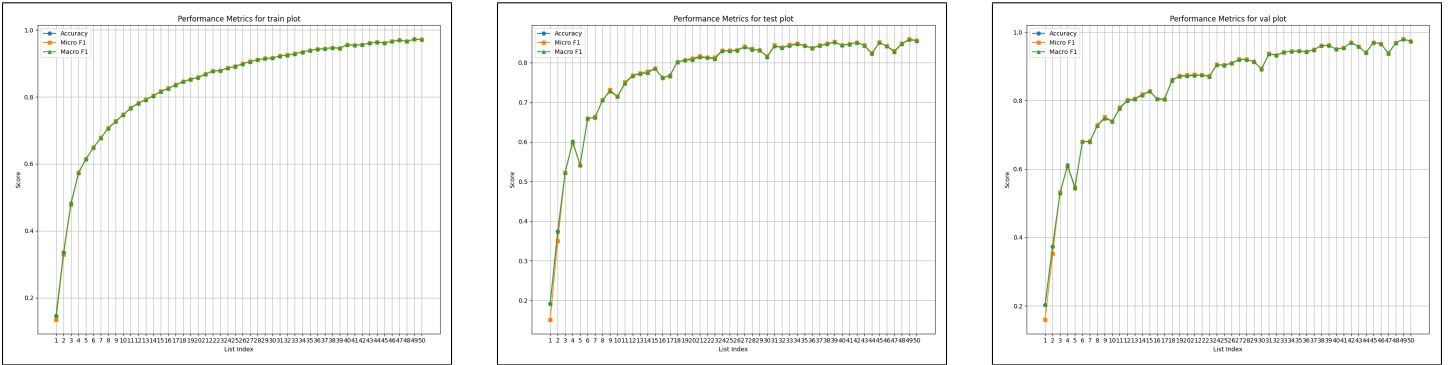


Figure 3: Layer Normalisation Train, test and val plots

2.1 Comparision

Upon Comparision we can see that:

No normalisation performs the worst out of all. It also has a lot of turbulence in its metrics curve. Batch Instance normalisation did not perform as good as it should have either, since Batch and Instance Normalisations both performed well. Group Normalisation performed the best overall.

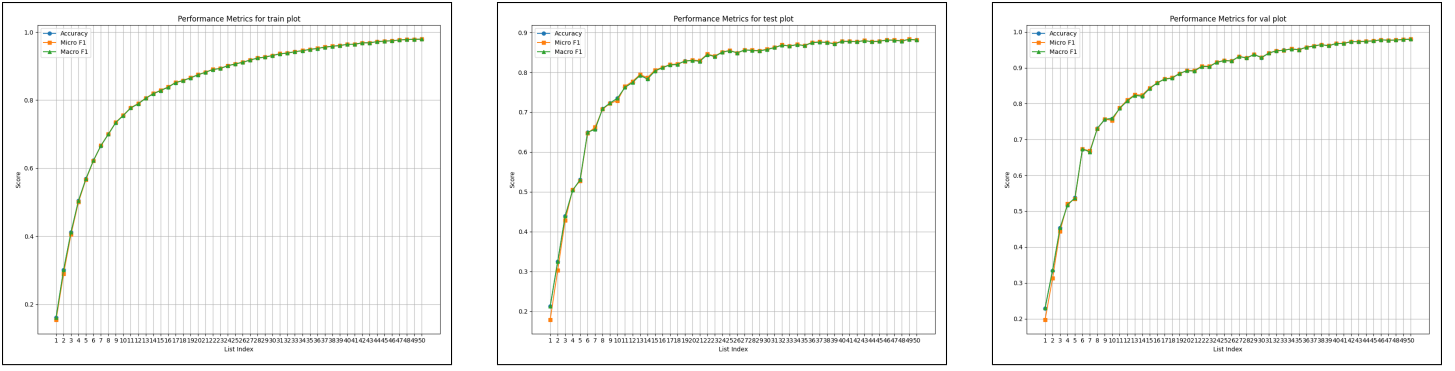


Figure 4: Group Normalisation Train, test and val plots

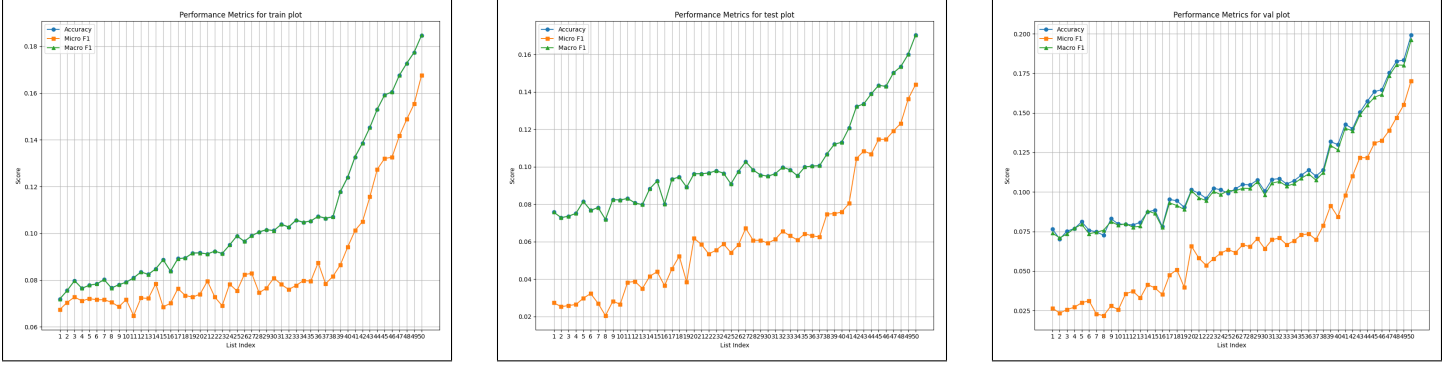


Figure 5: No Normalisation Train, test and val plots

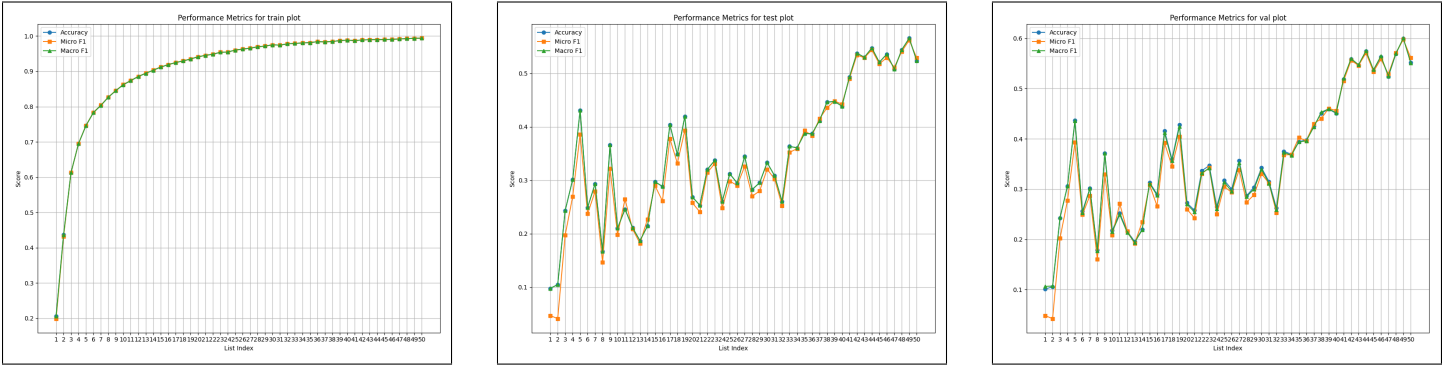


Figure 6: Batch Instance Normalisation Train, test and val plots

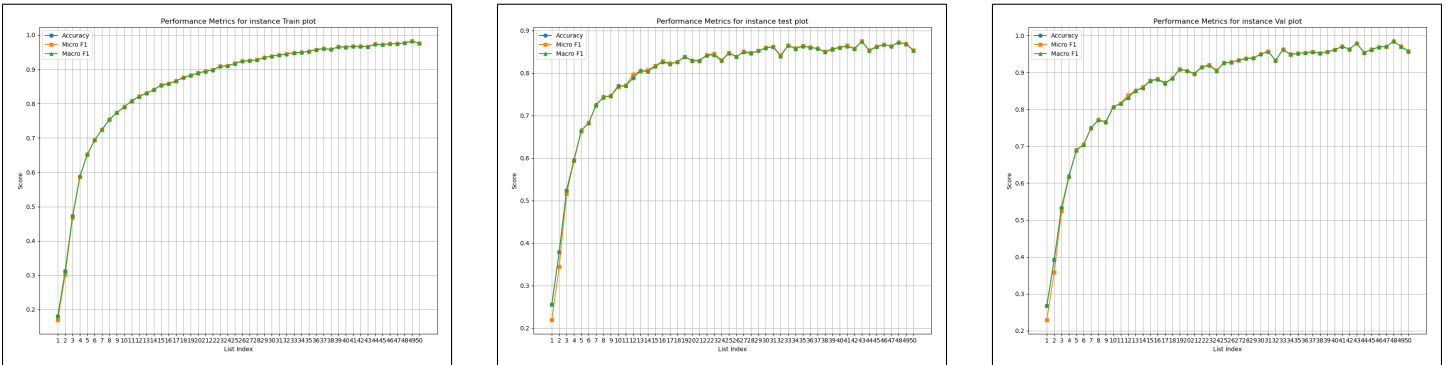


Figure 7: Instance Normalisation Train, test and val plots

3 part 3

What I observed here was that for the same learning rates, Batch size 128 took longer to converge for both batch norm and group norm, and hence performed worse than batch size 32 when we cut off the training at 50 epochs, although I believe

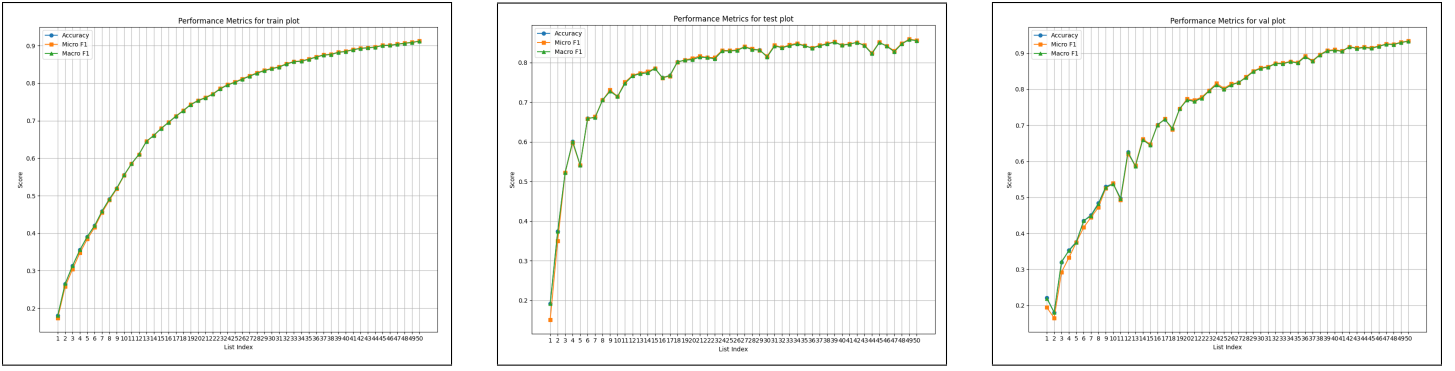


Figure 8: Batch Normalisation Train, test and val plots

that it would have led to a better minima if we were to train longer. hence batch size 32 was the best for both. for group normalisation, batch size 8 made the training a little more error prone, but it still remained roughly similar to the 32 variant, but in the case of batch normalisation, it's loss would not converge near the ideal loss when batch size is 32. This is because Batch Normalisation is highly dependent on Batch size and reducing it's value may have adverse effects on it.

4 Visualising the Model's thinking using Grad-Cam

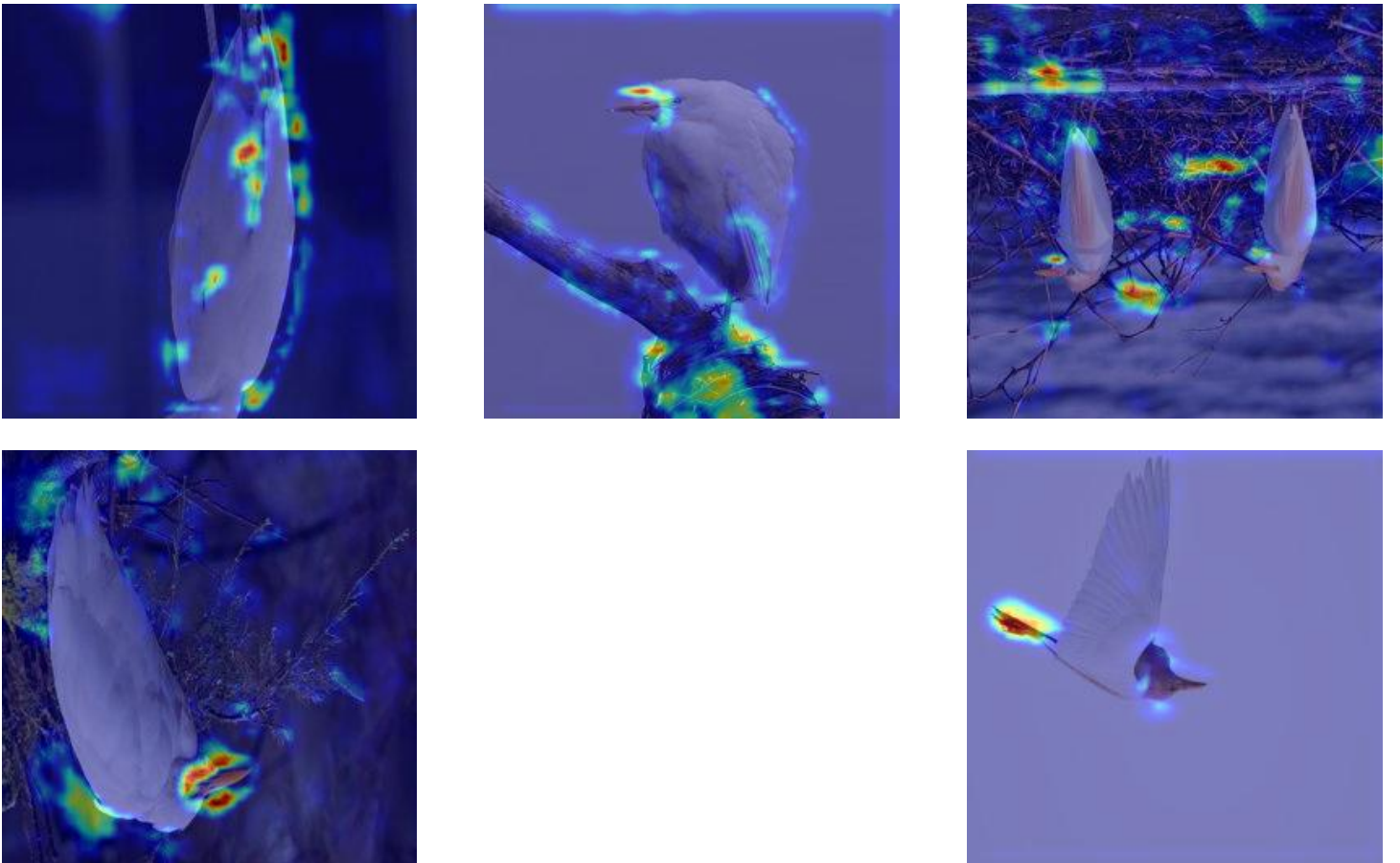


Figure 9: Correct Cattle-Egretifications of Cattle-Egret

5 Analysis of Gradient Maps

we can see that overall, our model learns to predict the classes based on looking at the birds themselves, but On analysis, I also noticed the common pitfalls that lead to the model incorrectly classifying a particular class. sometimes the image

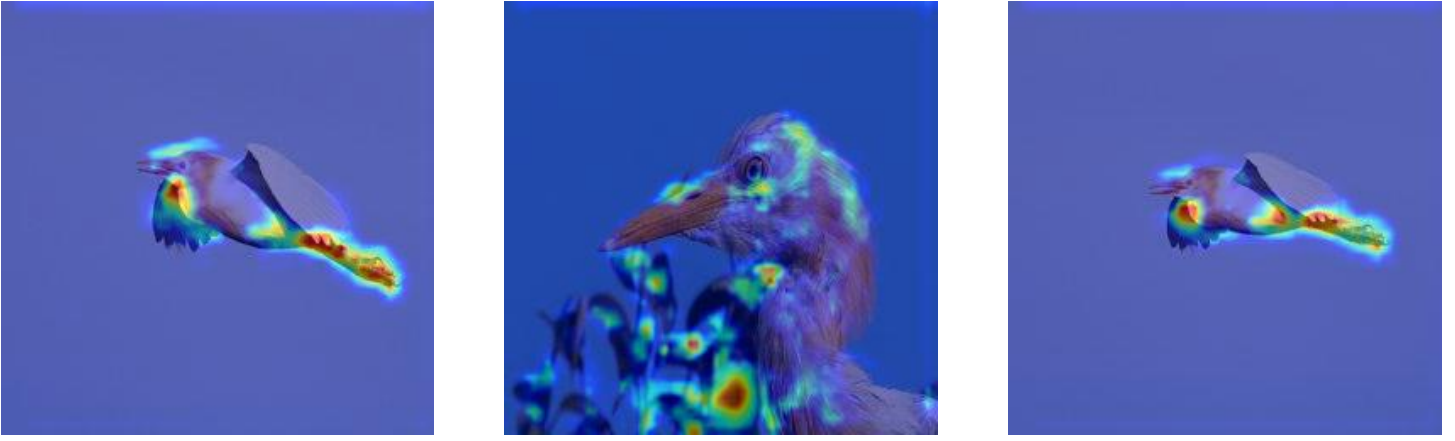


Figure 10: Incorrect Cattle-Egretifications of Cattle-Egret

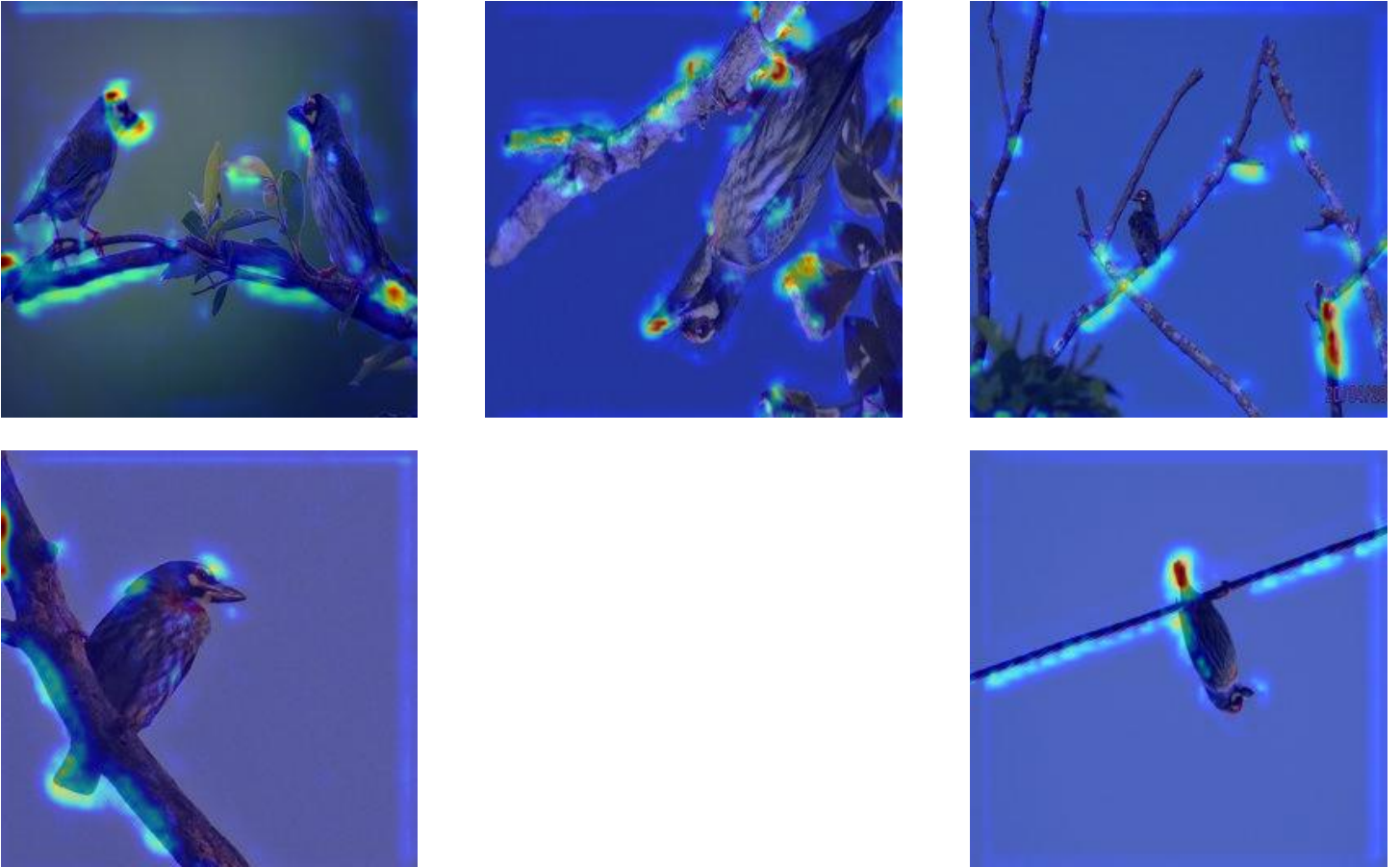


Figure 11: Correct Coppersmith-Barbetifications of Coppersmith-Barbet

contained no bird in the view, or it was difficult for even me to detect the bird present since it looked very small. and in rare cases, the model's focus is on the background rather than the bird(s) in front of it, which leads to incorrect classification.

Overall the accuracy of the model is satisfactory, and through gradcam we can see that it learns to look at the correct features, although in rare cases it still misses the mark.

6 Google drive link

the following is the google drive link.

<https://drive.google.com/drive/folders/14jmDhrRM3bhQWCN5Bds549afHFCXUBYr?usp=sharing>

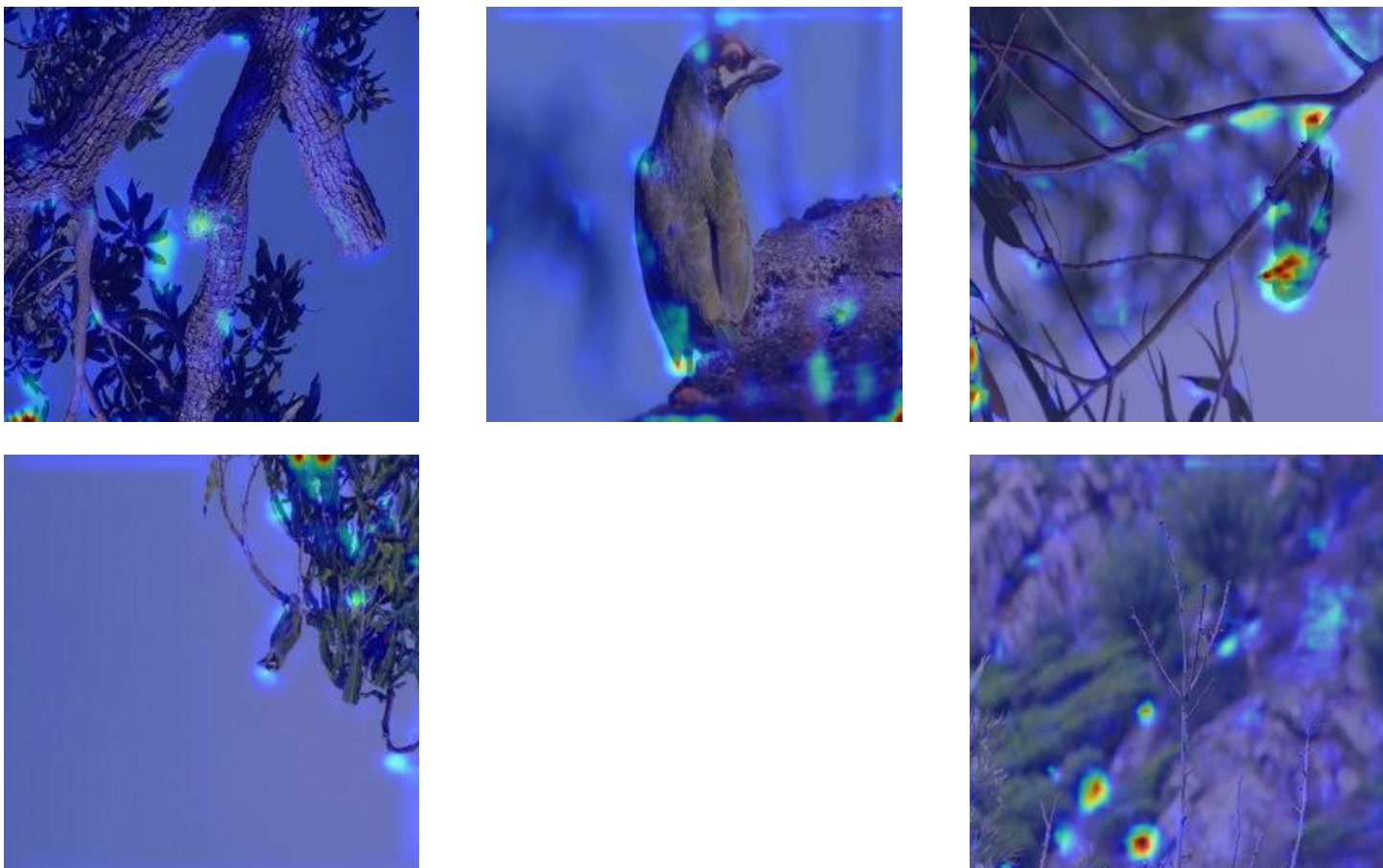


Figure 12: Incorrect Coppersmith-Barbetifications of Coppersmith-Barbet

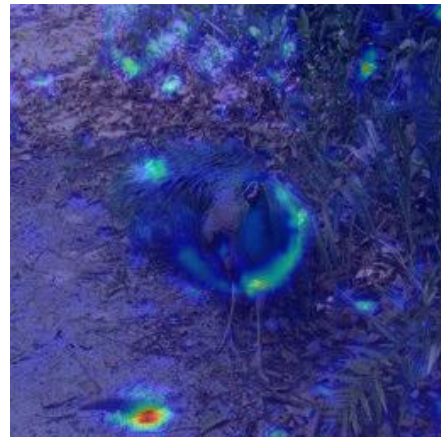
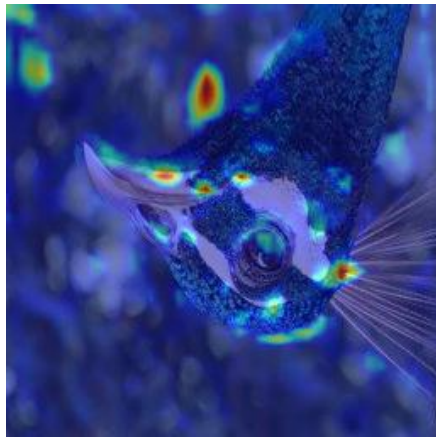


Figure 13: Correct Indian-Peacockifications of Indian-Peacock

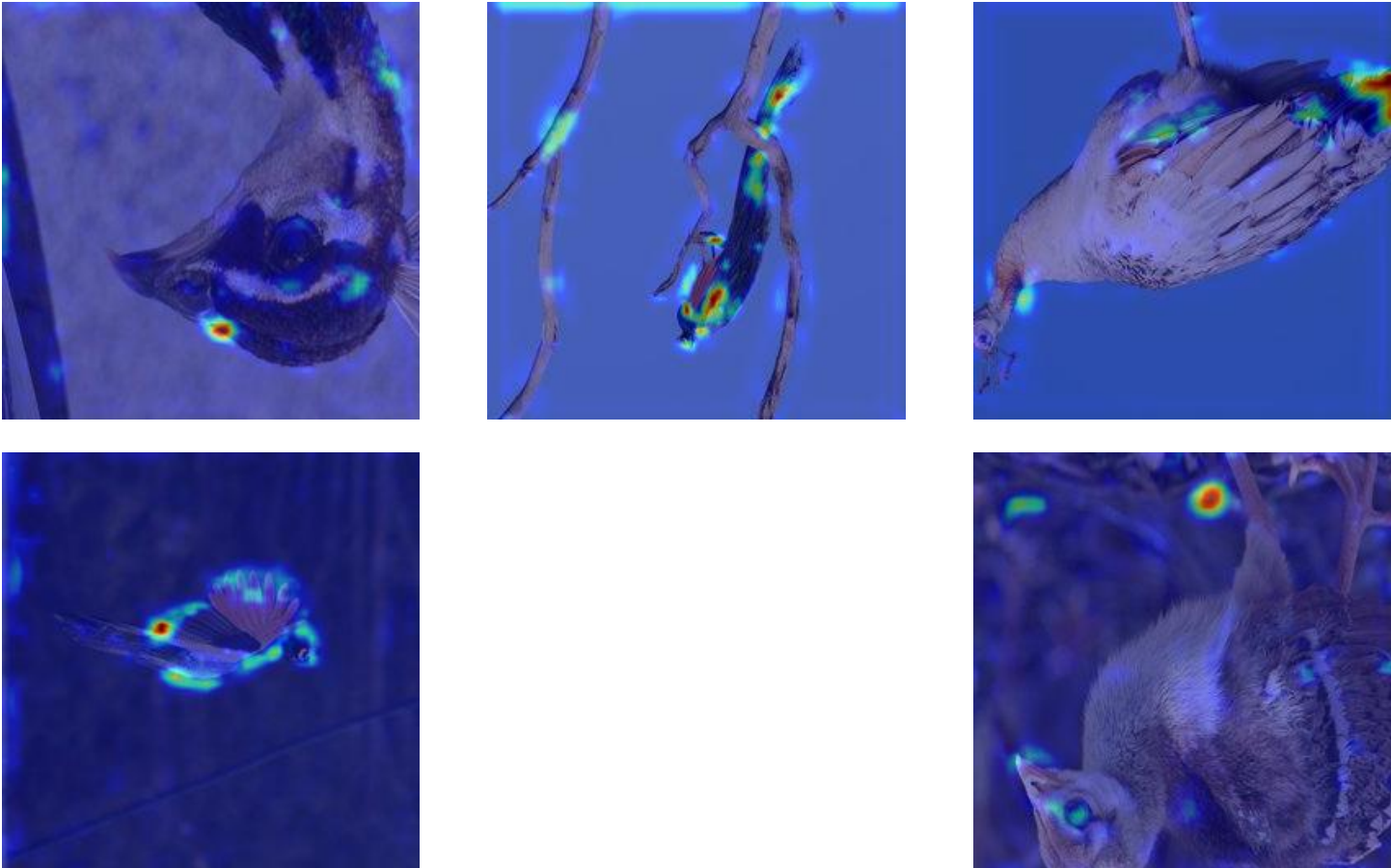


Figure 14: Incorrect Indian-Peacockifications of Indian-Peacock

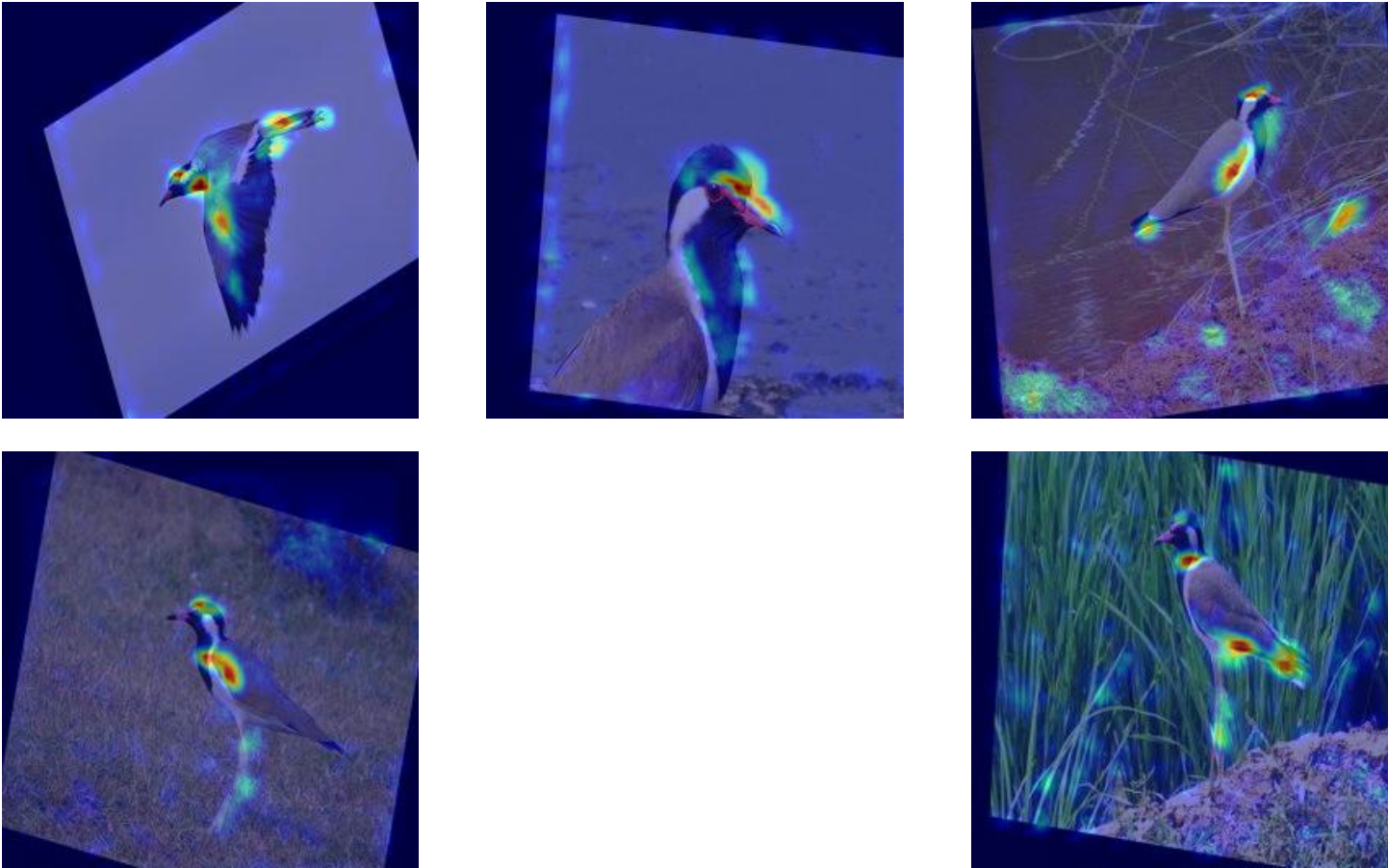


Figure 15: Correct Red-Wattled-Lapwingifications of Red-Wattled-Lapwing

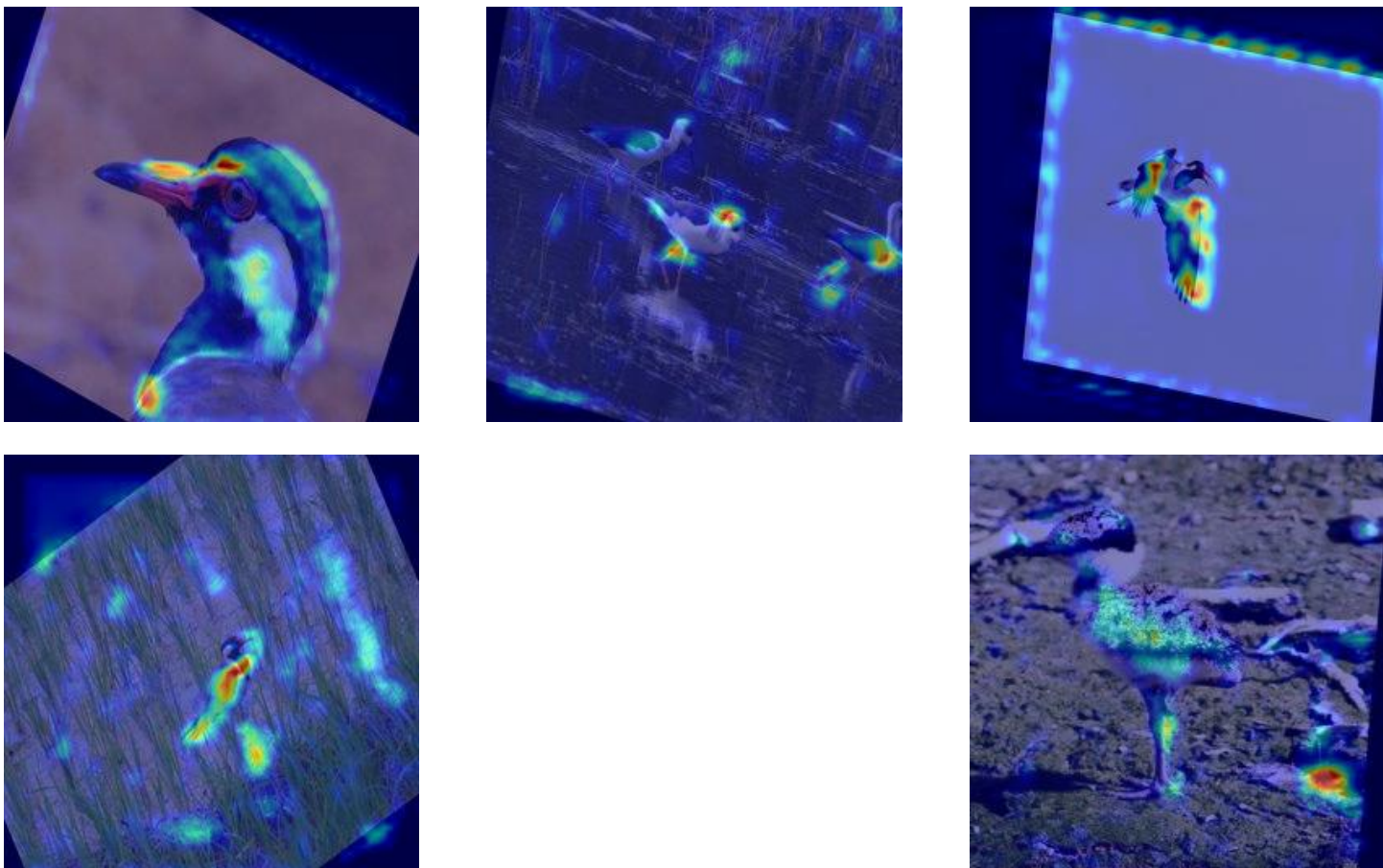


Figure 16: Incorrect Red-Wattled-Lapwingifications of Red-Wattled-Lapwing

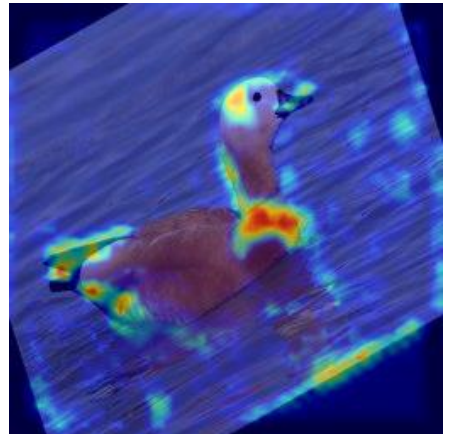
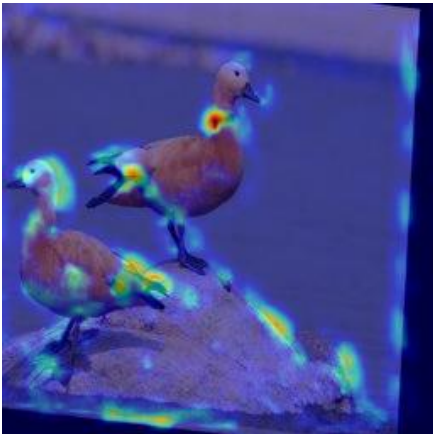
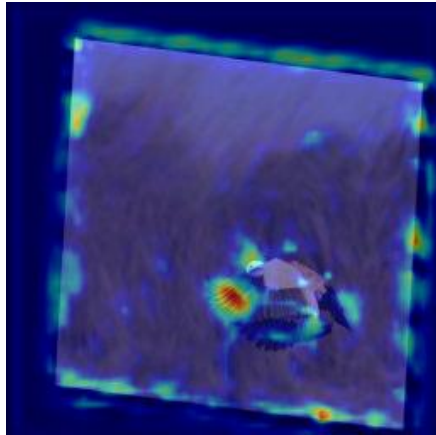


Figure 17: Correct Ruddy-Shelduckifications of Ruddy-Shelduck

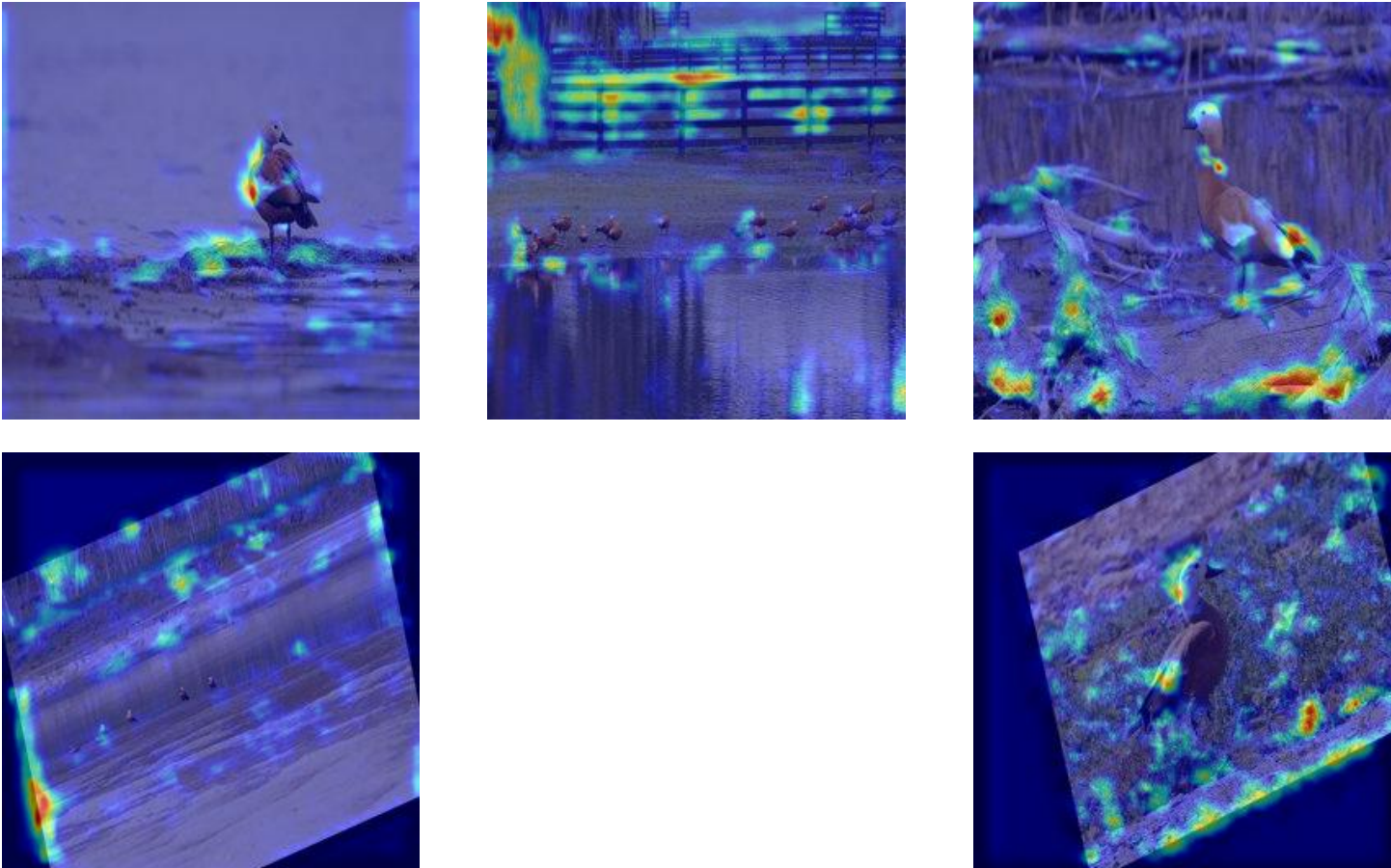


Figure 18: Incorrect Ruddy-Shelduckifications of Ruddy-Shelduck

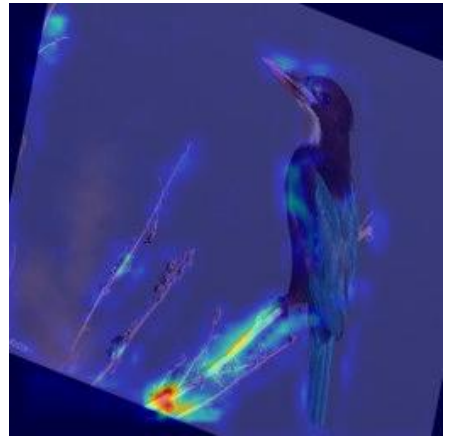
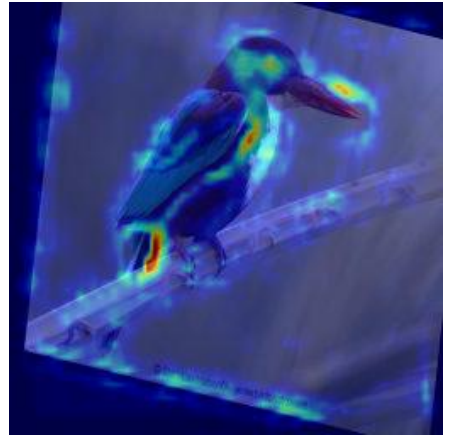
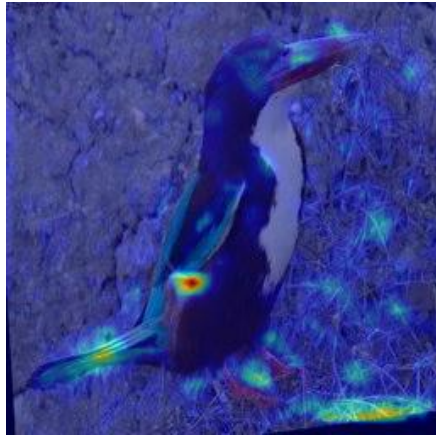
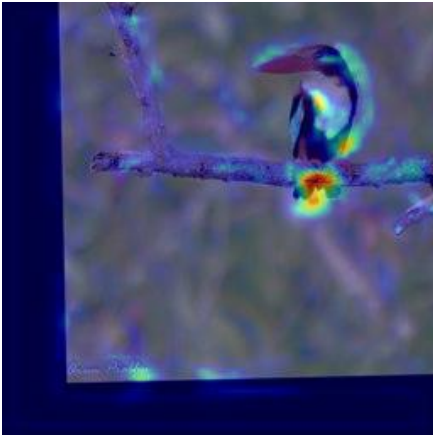


Figure 19: Correct White-Breasted-Kingfisherifications of White-Breasted-Kingfisher

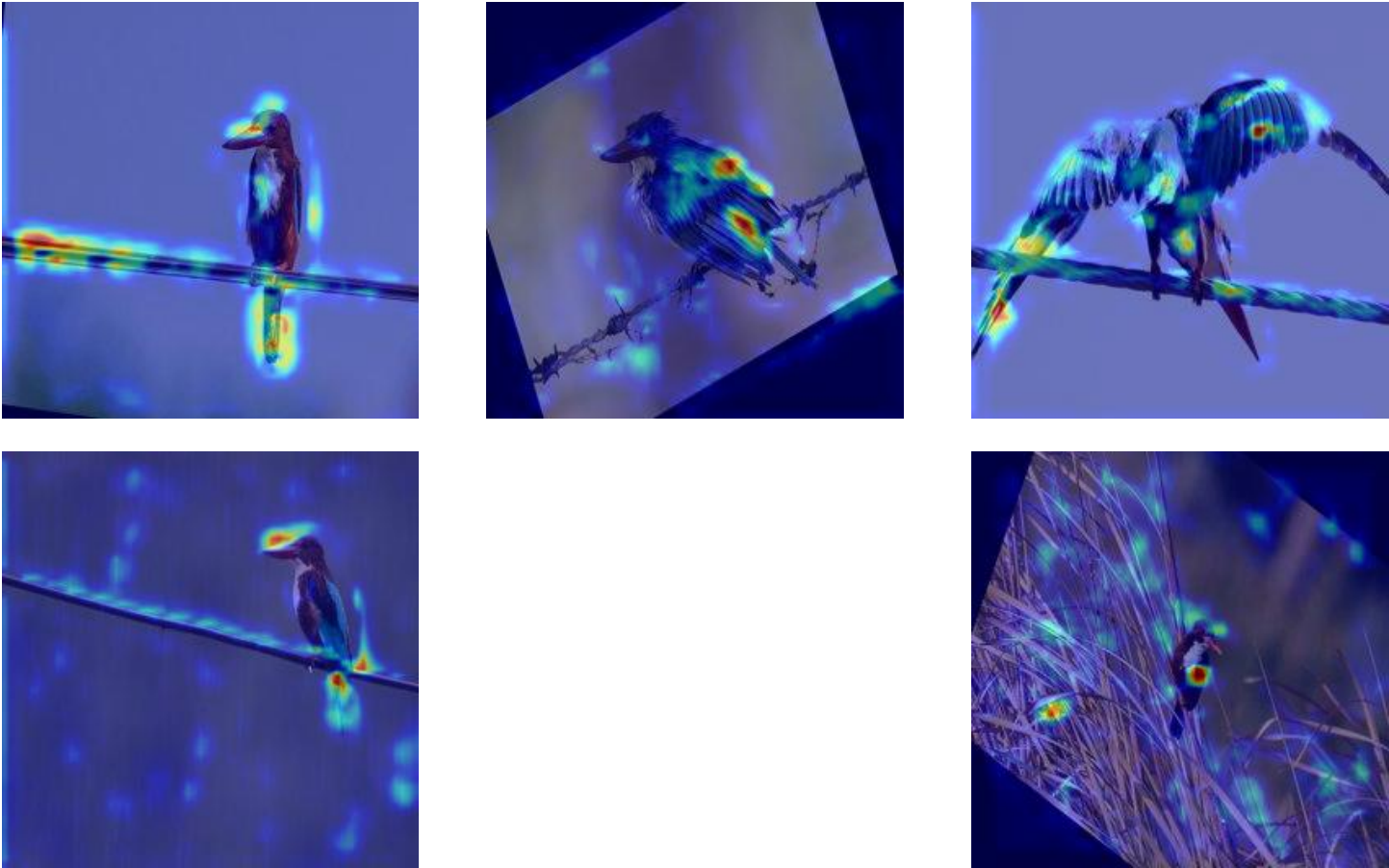


Figure 20: Incorrect White-Breasted-Kingfisherifications of White-Breasted-Kingfisher

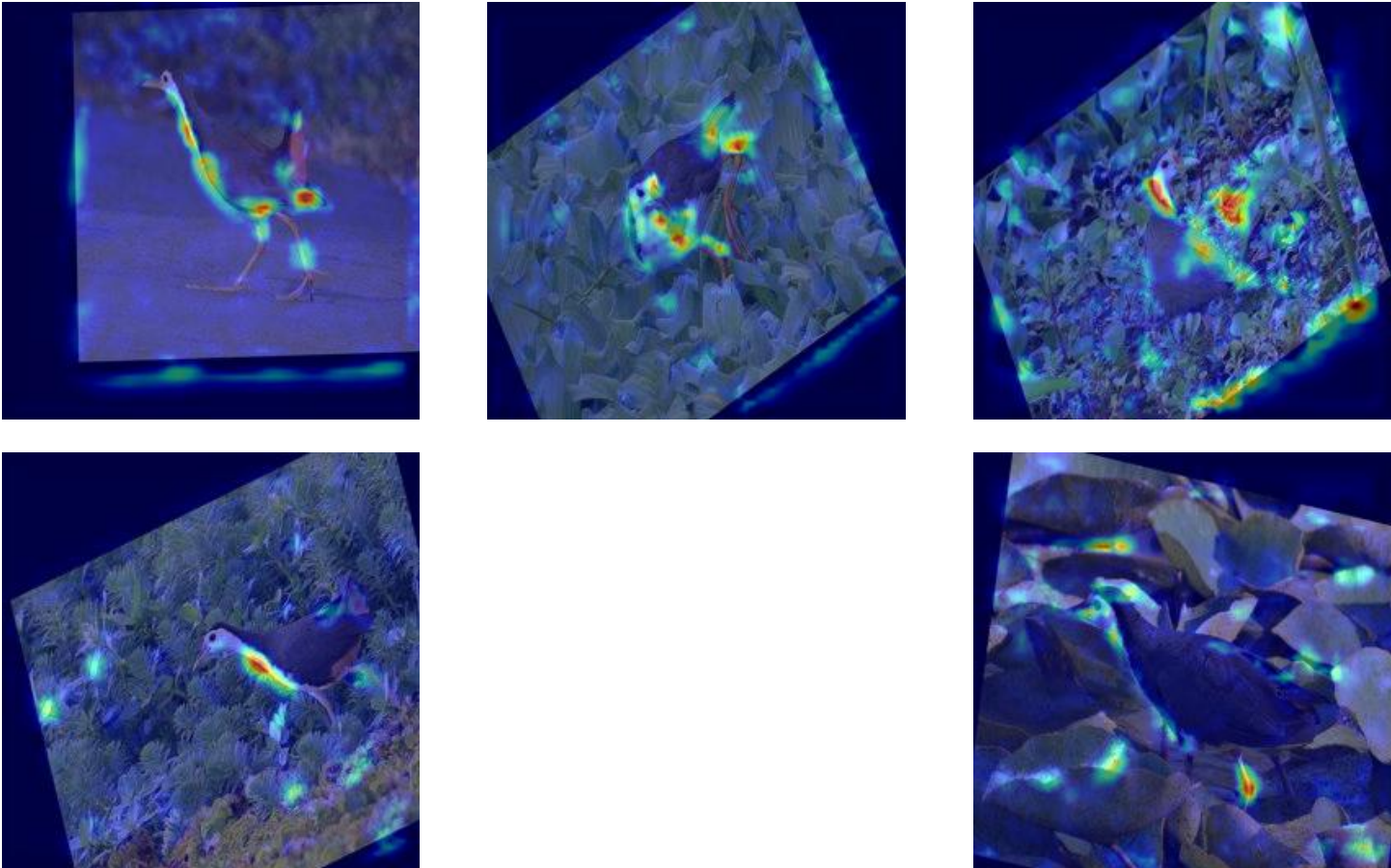


Figure 21: Correct White-Breasted-Waterhenifications of White-Breasted-Waterhen

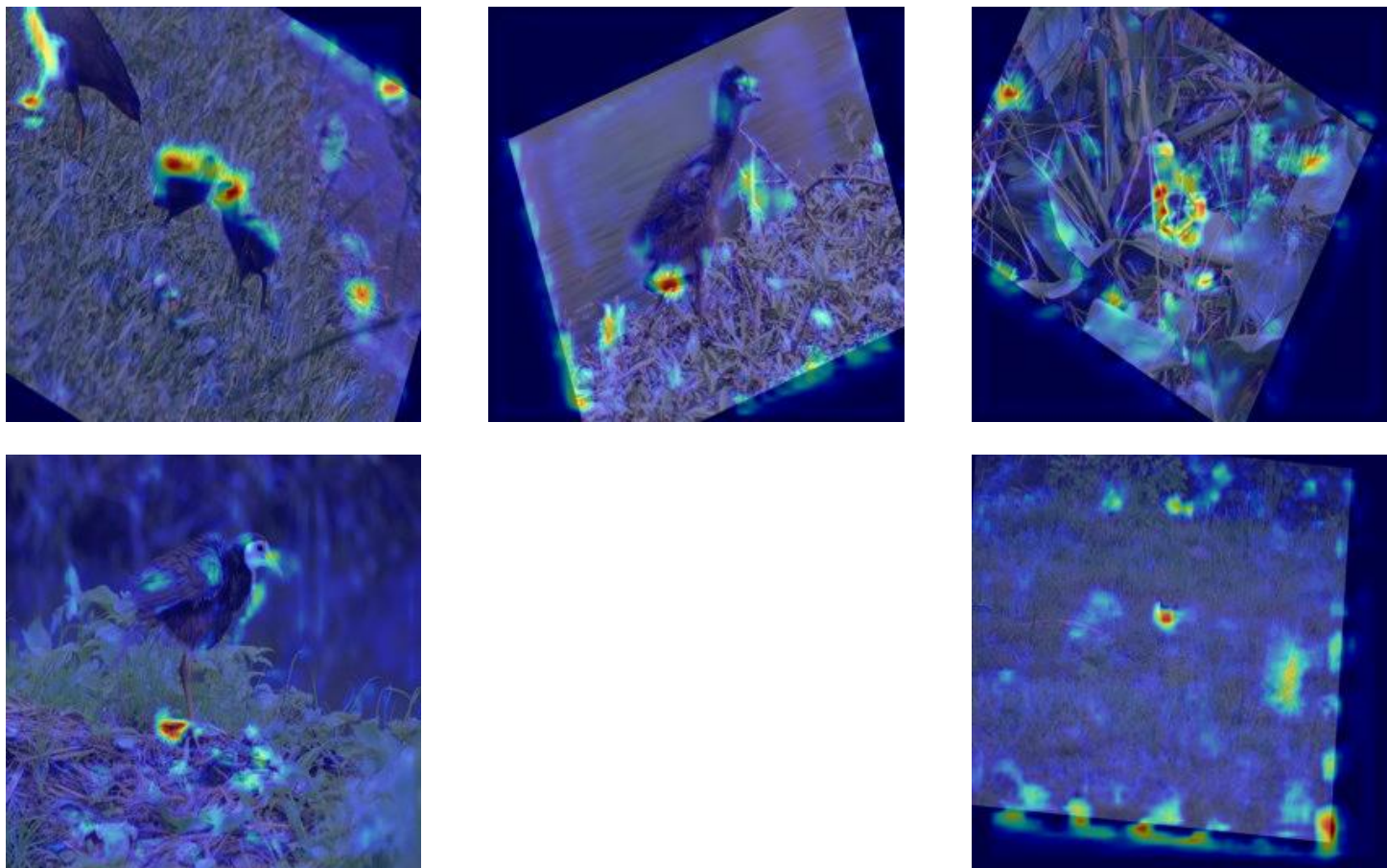


Figure 22: Incorrect White-Breasted-Waterhenifications of White-Breasted-Waterhen