Errata: Brain tumor IDH, 1p/19q, and MGMT molecular classification using MRI-based deep learning: an initial study on the effect of motion and motion correction

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The original article was published in Volume 9 Issue 1 of *Journal of Medical Imaging* (JMI) on 27 January 2022 with an error in the Python code for the 3-fold cross validation procedure. This error resulted in the use of the training cases instead of the set-aside test cases for the molecular marker accuracy testing procedure. This caused the reported accuracies from the TCIA/TCGA data set to be artificially inflated for the 3 markers. The original and corrected accuracies for Figures 5 and 6 are provided here below. In addition, the following errors in the text were identified and corrected:

1. The corrected 3rd sentence in the Results section of the abstract states, "Motion correction of uncorrupted images exceeded the original performance of the network," rather than the IDH network achieving 99% classification accuracy originally reported.
2. The corrected 1st sentence in the 3rd paragraph of the Introduction states, "Our group has developed molecular marker classification networks for IDH, 1p/19q, and MGMT in primary brain tumors utilizing T2w MR images alone," rather than achieving 97%, 93%, and 95% classification accuracies for IDH, 1p/19q and MGMT, respectively using T2w MR images alone originally reported.
3. Corrected sentences in Sec. 2, Materials and Methods:
   "The trained IDH network demonstrated a 67% mean cross-validation accuracy for IDH-prediction on the TCIA data," rather than a mean cross-validation accuracy of 97% originally reported.
   "A mean cross-validation accuracy of 80% was obtained for 1p/19q network on the TCIA data," rather than achieving a mean cross-validation accuracy of 93% originally reported.
   "A mean cross-validation accuracy of 75% was obtained for MGMT network on the TCIA data," rather than achieving a mean cross-validation accuracy of 95% originally reported.
4. The corrected 2nd sentence in Sec. 3.2 states, "IDH classification began to fail on the motion corrupted images at a CR of 80%," rather than the CR of 40% originally reported.
5. The corrected 3rd sentence in Sec. 3.2 states, "Model-1 achieved the best results out to 100% CR," rather than Model-1 achieving and maintaining a 97% IDH classification accuracy through a CR of 92% originally reported.
6. The corrected 2nd sentence in the 2nd paragraph of Sec. 3.2 states, "The classification accuracy on the corrupted images declined at 80% CR for both IDH and MGMT, while 1p/19q performance declined at 63% CR," rather than the classification accuracy declining at 42% CR for both IDH and 1p/19q, and MGMT at 63% CR originally reported.

7. The corrected 3rd sentence in the 2nd paragraph of Sec. 3.2 states, "IDH classification was maintained at 68% accuracy out to 65% CR and recovered to 63% accuracy even at 100% CR," rather than 97% accuracy out to 92% CR originally reported.
8. The corrected 4th sentence in the 2nd paragraph of Sec. 3.2 states, "IDH classification accuracy exceeded the performance of the uncorrupted images achieving up to 69% accuracy," rather than achieving up to 99% accuracy originally reported.
9. The corrected 5th sentence in the 2nd paragraph of Sec. 3.2 states, "For 1p/19q and MGMT, 82% and 76% accuracy was recovered out to 100% CR respectively," rather than achieving 82% accuracy for 1p/19q & MGMT out to 100% CR originally reported.
10. The corrected 4th sentence in Sec. 4 (Discussion) states, "In the case of IDH classification, 68% accuracy was achieved following motion correction, exceeding the performance on the ground truth images," rather than the 99% originally reported.
11. The corrected 4th sentence in the 2nd paragraph of Sec. 4 (Discussion) states, "performance declined at image corruption levels beyond CR = 80%," rather than CR=42% originally reported.
12. The corrected 5th sentence in the 2nd paragraph of Sec. 4 (Discussion) states that the motion correction network boosted the IDH classification accuracy "by 2% for the native images without any added simulated motion," rather than achieving 99% accuracy originally reported.
13. The corrected 4th sentence in the final paragraph of the Discussion section states that the IDH classification accuracy was fully recovered "extending out to a corruption level of 65%," rather than 92% originally reported.
14. The corrected 1st sentence of Sec. 6 states that the classification accuracies for IDH, 1p/19q and MGMT "improved" upon application of a motion correction network, rather than achieving 99% IDH classification accuracy originally reported.

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Figure 5.

Original

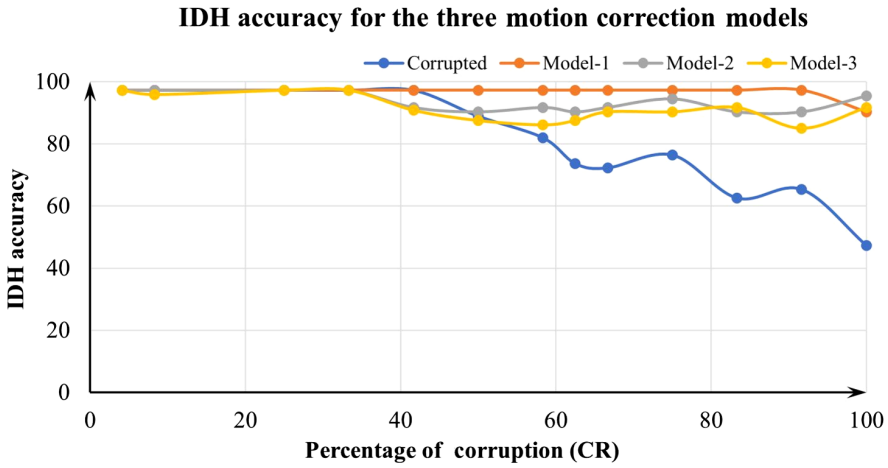

Fig. 5 IDH classification accuracy with respect to percent corruption for motion-corrupted images and motion-corrected images for the three correction networks. Motion corrupted accuracies (blue), as well as accuracies following motion correction for Model-1(orange), Model-2 (gray), and Model-3 (yellow), are shown. A progressive decrease in classification accuracy for the corrupted images is demonstrated beyond 42% CR (blue line). Model-1 performed best (orange line), recovering the original 97% classification accuracy out to 92% CR.

Corrected

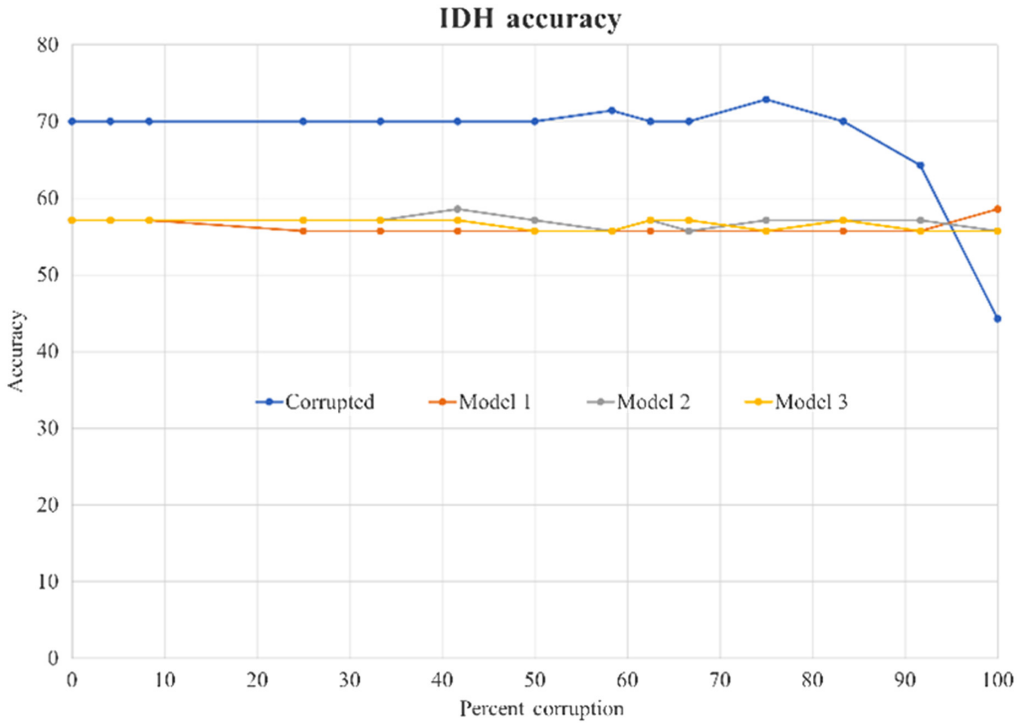

Fig. 5 IDH classification accuracy with respect to percent corruption for motion-corrupted images and motion-corrected images for the three correction networks. Motion corrupted accuracies (blue), as well as accuracies following motion correction for Model-1(orange), Model-2 (grey), and Model-3 (yellow) are shown. A progressive decrease in classification accuracy for the corrupted images is demonstrated beyond 75% CR (blue line). Model-1 performed best (orange line), recovering the best classification accuracy out to 100% CR.

Figure 6.

Original

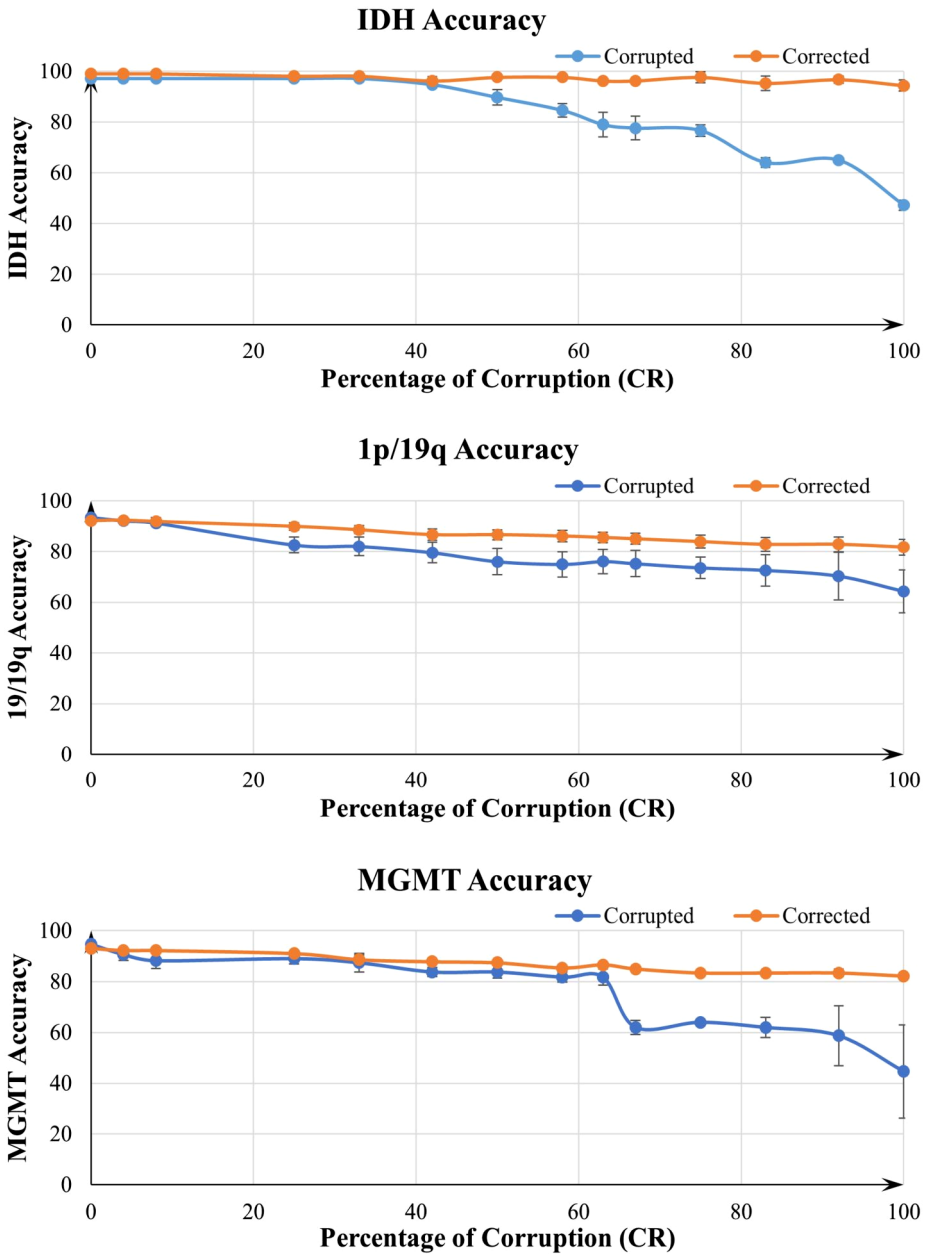

Fig. 6 IDH, 1p/19q, and MGMT classification accuracies for motion corrupted (blue lines) and Model-1 corrected images (orange lines) averaged across the three cross-validation folds for each molecular marker. Recovery of accuracy was best for IDH classification, boosting the accuracy to 99% for the baseline uncorrupted images and low-levels of motion corruption and recovering the original 97% accuracy out to 92% CR.

Corrected

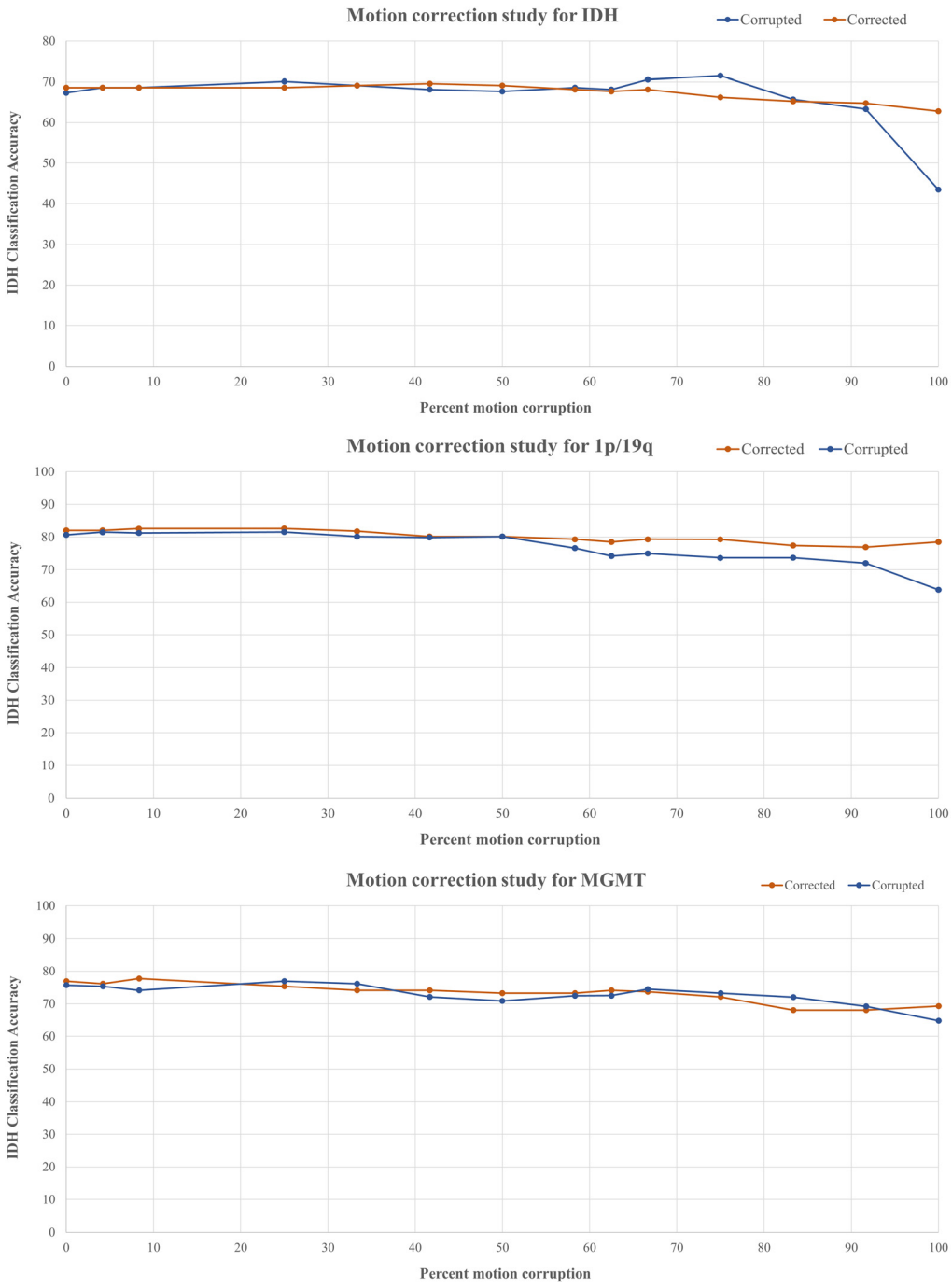

Fig. 6 IDH, 1p/19q, and MGMT classification accuracies for motion corrupted (blue lines) and Model-1 corrected images (orange lines) averaged across the three cross-validation folds for each molecular marker. Recovery of accuracy was best for 1p/19q classification, boosting the accuracy to 82.05% for the baseline uncorrupted images and low-levels of motion corruption, and recovering the original 80% accuracy out to 50% CR.