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Quality assessment: An exploratory study of MRI Vendor effects on Medical Image Segmentation.

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Abstract

MRI vendor discrepancy in contrast has been a common problem in medical imaging research. MRI images collected from different vendors have mismatched contrast in general even in the same scanning sequence due to manufacturers' different technologies. The mismatched contrast in the same modality/scanning sequence introduced contrast variability in the data-set further affects the performance of segmentation tasks. To investigate how the mismatched contrast affects the performance of segmentation, the controlled experiments are required in the exploration of the effect. In our study, we simulate different T1 data sets collected in spin-echo sequences under different repetition time and echo time. We use one set of the simulation to train a U-net and test with other sets with different TR and TE. Our results show that contrast variability from different vendor parameters has majorly negative effects on the performance of image segmentation. Interestingly, positive effects were also observed. Further experiments are required for characterization of these effects.