THE BRAIN TUMOR SEGMENTATION (BRATS-METS) CHALLENGE 2023: BRAIN METASTASIS SEGMENTATION ON PRE-TREATMENT MRI

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PURPOSE: Clinical monitoring of metastatic disease to the brain using magnetic resonance imaging (MRI) can be laborious and time-consuming, particularly when multiple small metastases are involved and assessments are performed manually. METHODS AND MATERIALS: The BraTS-METS 2023 dataset is acquired from varying MRI imaging quality across different vendors. The scans are pre-processed using different algorithms refined by a pool of annotators with different expertise. Two independent board-certified neuroradiologists finally reviewed the dataset. The datasets are divided into Training, validation, and testing. ASNR-MICCAI BraTS-METS 2023 challenge was evaluated based on Dice scores and Hausdorff distance for each lesion, including the whole tumor, enhancing tumor, and tumor core. RESULTS: We received 2500 multi-parametric MRIs from 12 different institutions, which underwent preprocessing to remove all PHI, reorient, and be consistent with all BraTS space and header. Initial raw data were pre-segmented with three different algorithms and fused together to get a consensus pre-segmentation file. A pool of 150 annotators (with different experience and training levels in radiology) and 50 board-certified attendees were recruited through ASNR mass calls for volunteer announcements, Segmentation workshops, and the ASNR annual meeting campaign. Studies are first assigned to annotators, reviewed by 1-2 board-certified neuroradiologists, and then reviewed by a single senior neuroradiologist for consistency and quality control final check. Finalized segmentation files underwent quantitative QC check to ensure harmonized imaging parameters, headers, and masks. Training and Validation datasets are made available to the public through the BraTS-METS 2023 website. The whole project is part of the TCIANCI moonshot program. CONCLUSION: The MICCAI-ASNR BraTS-METS Challenge is an important initiative for developing accurate segmentation algorithms to detect small brain metastasis. It includes multi-institutional and international datasets in order to develop a general model applied to all patients with brain metastasis.