ABSTRACT

Semantic segmentation of bone scan images plays a crucial role in calculating the Bone Scan Index (BSI) for diagnosing and monitoring the progression of bone cancer. However, the limited availability of labeled data poses a major challenge in training segmentation models. This study proposes a pseudo-labeling method to leverage unlabeled data in improving segmentation accuracy using the U-Net++ architecture. The initial model is trained with labeled data, followed by inference to generate pseudo-labels. These pseudo-labels are manually selected and then used for model retraining. Experimental results show that this method improves the dice score by 0.011 for anterior images and 0.008 for posterior images compared to models without pseudo-labeling. The effectiveness of pseudo-labeling highly depends on the quality of the initial labeled data and a rigorous pseudo-label selection process. With more accurate segmentation, BSI calculations are expected to become more precise, supporting better diagnosis and monitoring of bone cancer.

Keywords*: bone scan images, semantic segmentation, pseudo-labeling, U-Net++*