Automated Labeling of Neuroanatomical Structures in Routine Brain CT

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Abstract

Although the advance in image technology is remarkable, most routine brain images are still presented in series of sections. We present a technique for automatically assigning neuroanatomical labels to each pixel in brain CT sets based on electronic atlases. In contrast to existing segmentation procedures that focused on thin-cut MRI, our technique could be applied on routine CT images. The technique employs an affine registration for matching skulls to generate template for each slice. A deformable registration procedure is then applied to label the neuroanatomical structures. The performance of our algorithm was evaluated as area overlapping, measured at the lenticular nuclei. The average area overlapping of images without space occupying lesions was 72.3%. With small space occupying lesions, this value is 59.1%. The technique is shown to be of acceptable accuracy for images without space occupying lesions. It might provide basis for computer-assisted diagnosis and report generation system.