Automatic Derivation of Scan Plane Angles along the Vertebral Column of the Human Spine

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Abstract: Plane prescription along the vertebral column presents a tedious and potentially error prone manual task, particularly when planning MSMA (multi-slice, multi-angle) acquisitions. Various automatic approaches have been proposed as a solution to this challenge [1,2,3]. This paper presents a methodology for automated planning of oblique axial MRI scans along the vertebral column using a combined disk & vertebra search algorithm. Cervical, thoracic and lumbar examinations are considered. A validation study comparing specific angulations made by a radiologist demonstrates the robustness of the proposed method.

Process: Our database of MRI spine images consisted of 38 T2 FRFSE sagittal scans: 12 cervical, 10 thoracic and 16 of the lumbar region. Our approach was tested a variety of GE MR platforms (DV750, HDe, HD450, and HD450w) , both 1.5T and 3T.

Methods: In our method the initially located through a operations that utilize the gradients exist at This is followed by a template for vertebra signatures, this candidates and also reduce morphological methods. detected disks are computed analysis of the identified disks are taken as the axial these disks.

Results: We compared the computed disk angulations produced by an experienced these results quantitatively planes are marked in red, are marked in green. Picture indicator for angulation variations (to assist in interpreting the quantitative results of Table 1, while figure 4 visually depicts manual vs. automatic planning.

Conclusions: In this work, a methodology for automated planning of oblique axial MRI scans along the vertebral column is presented. The validation was done comparing angulations computed automatically by the algorithm with those made by a radiologist. In all sections of spine considered, the average angulation difference was less than 5 degrees, thus demonstrating the robustness of the proposed method.

References: