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Fully automated segmentation of a hip joint using the patient-specific optimal thresholding and watershed algorithm

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Highlights

- Fully automated segmentation for a hip joint is proposed as an unsupervised method, using the complementary characteristics between the patient-specific optimal thresholding and the watershed algorithm.
- The patient-specific optimal thresholding, which is determined by the golden section method and load path algorithm, provides regional information on the femur but may offer its disconnected boundaries.
- The watershed algorithm always offers closed patches but does not offer regional information on the femur.
- Clinical case studies with eight sets of CT scan data demonstrated that the proposed method can segment a hip joint as fast as automated segmentation methods while maintaining the segmentation accuracy at the level of semi-automated methods without the aid of a prerequisite training dataset and user intervention.

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