Anatomical Shape Analysis: Exploring the Relationship between Shape and Pathology

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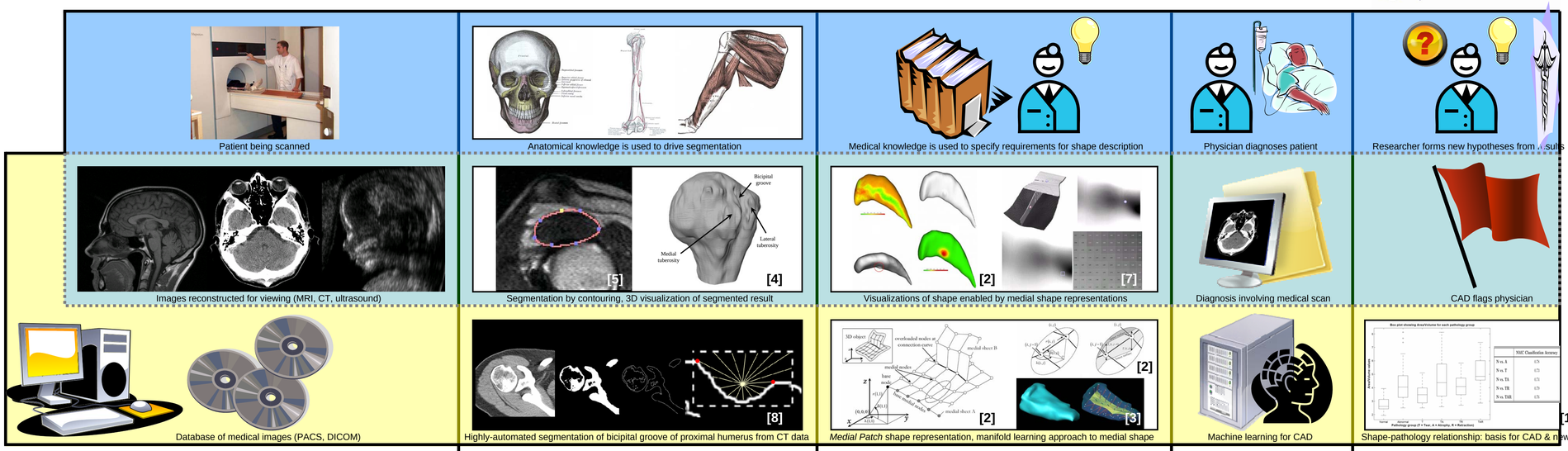

Medicine
Interface
Computing

We collaborate with medical researchers to design and develop novel mathematical and computational tools to strengthen the interface between medicine and computing. Our aim is to better enable medical researchers to extract medically useful information from the wealth of medical image data being produced.

Results

- A highly automatic method for segmenting the bicipital groove of the proximal humerus from CT data. **[8]**
- Visualizations of the bicipital groove in 2D and 3D based on a medial shape representation, facilitating the determination of the probability of the long biceps tendon dislocating from or becoming injured in the bicipital groove. **[4,7]**
- Establishment of the relationship between 3D shape descriptors and supraspinatus pathology. **[1,5]**
- Training and testing of a machine learning classifier for supraspinatus diagnosis. **[1]**
- Development of the *Medial Patch* 3D shape description, which intuitively captures bending, elongation, and thickness of shapes, leading to useful visualization and quantitative analysis. **[2]**
- Development of a manifold learning-based approach to computing the basic building blocks of medial shape representations such as *Medial Patches*. **[3]**

References

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