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Automated Reconstruction Of The Cardiac Chambers From MRI

Tech ID: 28744 / UC Case 2015-934-0

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OTHER INFORMATION

CATEGORIZED AS

- » **Computer**
 - » Hardware
 - » Other
 - » Software
- » **Imaging**
 - » 3D/Immersive
 - » Medical
 - » Other
 - » Software
- » **Medical**
 - » Diagnostics
 - » Disease: Cardiovascular and Circulatory System
 - » Imaging

BRIEF DESCRIPTION

This is a fast, fully automated method to accurately model a patient's left heart ventricle via machine learning algorithms.

FULL DESCRIPTION

Manual delineation, the current standard for modeling the left ventricle (LV) is tedious, time consuming, and prone to inaccuracy. Researchers have struggled in developing automated segmentation of the LV. These struggles arise from various problems including difficulties measuring blood flow differences and dynamic heart motion, differentiating muscle types, and dealing with MRI noise. Thus, there is a need for a faster, more accurate automated modeling method. Researchers at UCI have addressed this need by developing a fully automated, accurate, and robust modeling method. This method uses new machine learning algorithms to learn from collected raw data. First, convolutional neural networks are used to automatically detect the heart's chamber from MRI images. Then, autoencoders infer the shape of the LV. These shapes are then incorporated into deformable models to improve the accuracy, robustness, and computational time of the modeling process.

SUGGESTED USES

Cardiac imaging

ADVANTAGES

- Allows for the fast and accurate measurements of ventricle volume, pressure, mass, and wall thickness.
- Can detect motion abnormalities
- Fully automated and comparable to manually modeled results

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,182,896	11/23/2021	2015-934
United States Of America	Issued Patent	10,521,902	12/31/2019	2015-934

STATE OF DEVELOPMENT

Reduced to practice

RELATED MATERIALS

UCI Beall
Applied Innovation

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