Automated Segmentation and Quantification Cardiac MR

LICENSING & VENTURES GROUP

Hypertrophic Cardiomyopathy

- 1 in 500 individuals have hypertrophic cardiomyopathy (HCM)
- While the majority of patients are asymptomatic, serious consequences are experienced in a subset of affected individuals
- Currently known clinical risk markers are only modestly effective at identifying those at highest risk for severe adverse cardiac event such as cardiac death or heart failure
- Cardiac magnetic resonance (CMR) for assessment of left ventricular mass, volumes and replacement scarring is critical to risk stratification in HCM patients
- Technical Problem:
  - Segmentation is currently performed manually by experienced cardiologists which is
    - Time consuming (150-200 images per patient)
    - Subject to variability among clinicians

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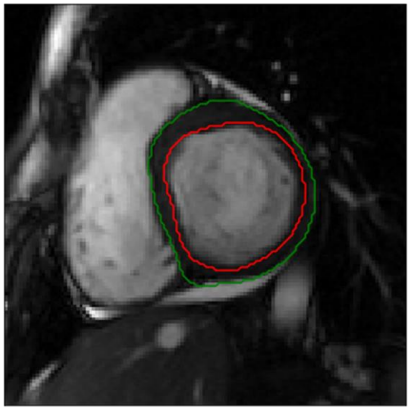
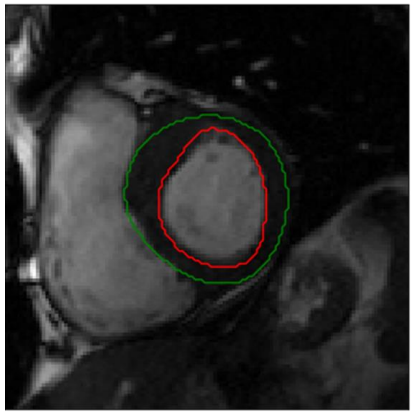
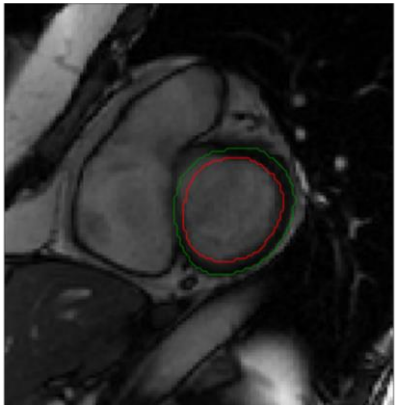
Highly irregular left ventricle wall thickness in HCM patients poses segmentation challenges



Patient A with Hypertrophic Cardiomyopathy



Patient B with Hypertrophic Cardiomyopathy



Patient C with normal heart function

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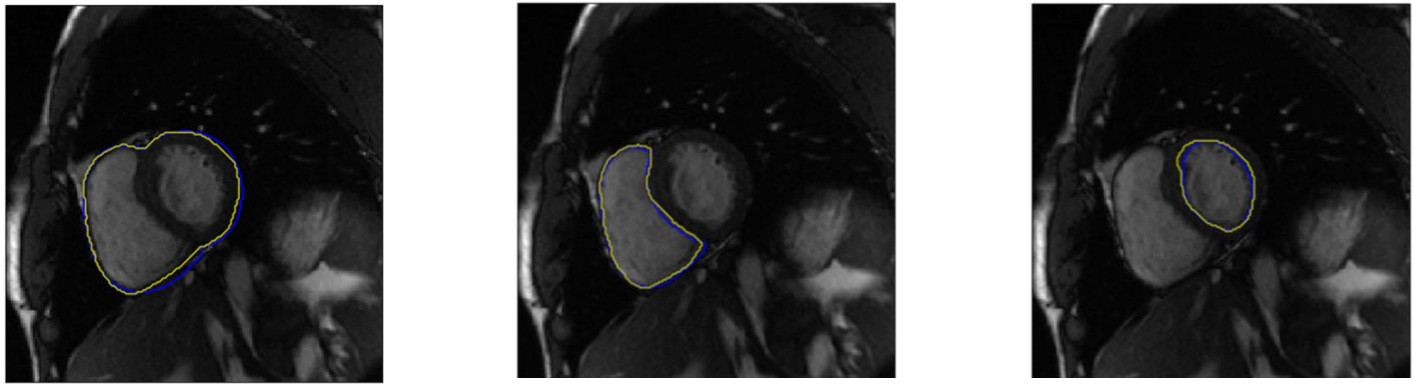
Novel cardiac magnetic resonance segmentation techniques

Solution: UVA researchers have developed methods for automated segmentation of cardiac magnetic resonance to improve risk stratification in individuals with hypertrophic cardiomyopathy. Data from a 2674-patient Hypertrophic Cardiomyopathy Registry was used to train the neural network model.



Comparison of the ground truth contour (blue) to the trained neural network model output (yellow)

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Intellectual Property

- **UVA TechID: MEYER-HCMR (2018-119)**
  - Title: Automatic quantification of cardiac MRI for hypertrophic cardiomyopathy with GPU
  - Provisional Patent Application filed March 7, 2018

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