

# Year 10 - Project Update

## ► 10a.002.TAU\_WP2: Early Myocardial Infarction Detection by Echocardiography

### Project Team

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# Project Goals & Novelty of Approach



Design a system to detect myocardial infarction (MI) in its early stages using echocardiography to help cardiologists with the diagnosis by a time-efficient, robust, and accurate system.



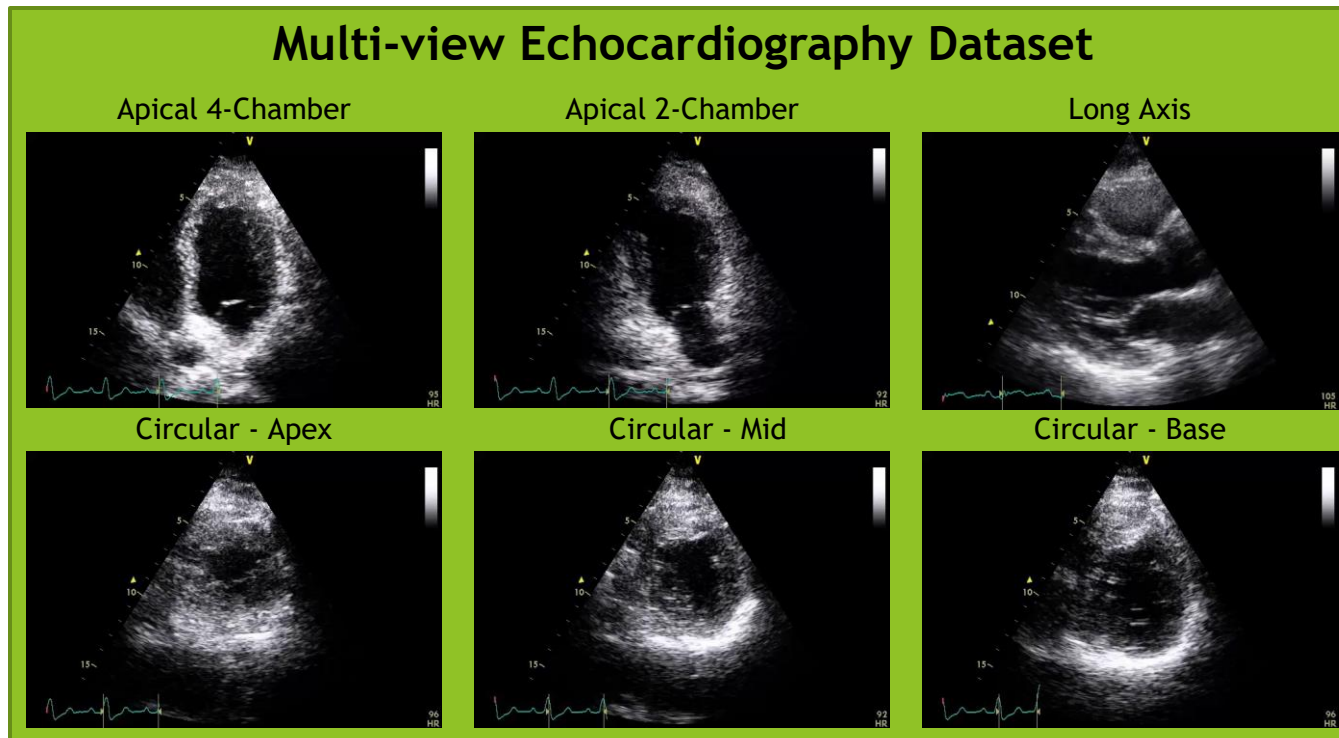
Multi-view Machine Learning structures will be used to bring end-to-end automatic solution to MI detection using echocardiographic data.



The largest multi-view 2D echocardiographic dataset for the purpose of MI detection will be publicly available to the research community.

# Benefits to IAB

- ▶ An assistive tool to help cardiologists and technicians to prevent subjective and operator-dependent assessments.
- ▶ A time-efficient diagnosis, which will be a life-saving tool in critical situations.
- ▶ A multi-view echocardiography dataset that includes six different echocardiographic views to detect MI will be publicly shared for research purposes.



# Project Accomplishments

(Since 2020 Fall Meeting)

- ✓ Creating the *multi-view echocardiography dataset* for the purpose of myocardial infarction detection that consists of apical 4-chamber, apical 2-chamber, and circular views echocardiography recordings.
- ✓ Extracting the endocardial boundary of the left ventricle wall on each frame of the echocardiography recordings by the proposed *active polynomials* method.
- ✓ Implementation of the *annotation toolbox* that helps to correct the inaccurate endocardial boundary extractions caused by the high level of noise in echocardiography recordings.

# Research Results

(Since 2020 Fall Meeting)

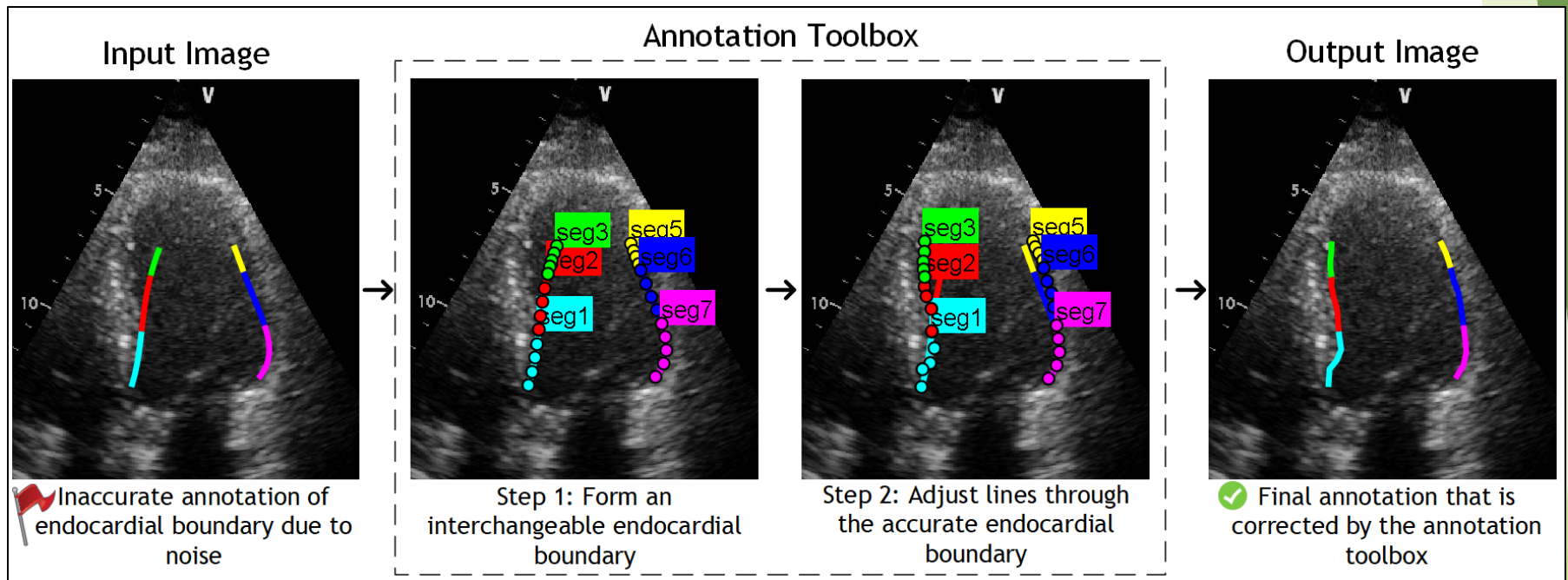


Figure: The pipeline of the annotation toolbox that helps to correct the annotations created by the proposed Active Polynomials method.

# Publications/Presentations/Invention Disclosures

- ▶ A. Degerli, S. Kiranyaz, T. Hamid, R. Mazhar and M. Gabbouj, “Early Myocardial Infarction Detection over Multi-view Echocardiography,” *arXiv preprint arXiv:2111.05790*, 2021 (submitted to *IEEE Journal of Biomedical and Health Informatics*).

# Next Steps/Deliverables & Timeline

Next Steps/Deliverables	Start Date	Completion Date
Multi-view Echocardiography Dataset Collection	1 <sup>st</sup> September	completed
Ground-truth Annotation Toolbox Implementation	1 <sup>st</sup> October	completed
Ground-truth Formation of the Dataset	1 <sup>st</sup> December	1 <sup>st</sup> January
Implementation of Multi-view Convolutional Neural Networks for Echocardiographic Data	1 <sup>st</sup> January	1 <sup>st</sup> May
Publication of the Results	1 <sup>st</sup> May	1 <sup>st</sup> July

# Questions?