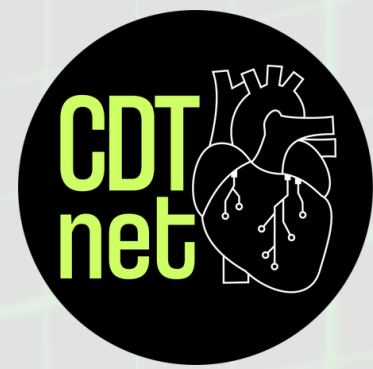


F2 Generating Synthetic Data for Valve Condition Analysis



HOST ORGANISATION

GE HealthCare
(GEHC), Oslo, Norway

PHD AWARDING INSTITUTION

University of Oslo
(UiO), Norway

Supervisory Team

Lead Supervisor

- Dr. Sarina Thomas (GE HealthCare)

Co-Supervisors

- Dr. Espen Remme (Oslo University Hospital)
- Dr. Jurica Sprem (GE HealthCare)
- Dr. P.H. Brekke (Oslo University Hospital)

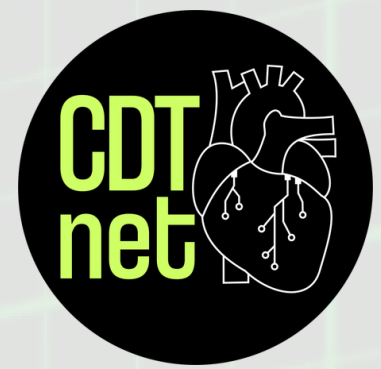
Project Description

Heart valve disease affects millions of people worldwide and relies heavily on medical imaging for diagnosis, treatment planning and patient follow-up. Echocardiography is the most widely used imaging technique for assessing valve function, but the development of reliable artificial intelligence tools for image analysis is often limited by the availability of large, high-quality, annotated datasets. Creating and annotating such datasets is expensive and time-consuming, creating a significant barrier to innovation.

This project will investigate how generative artificial intelligence can be used to improve the assessment of mitral valve diseases in particular mitral regurgitation. The doctoral candidate will develop novel methods analysing different echocardiography data modalities such as b-mode or colorflow and investigate how generating synthetic echocardiographic images can support automated image analysis tasks, such as valve segmentation and the assessment of mitral valve regurgitation.

Attention will be given to understanding how patient-specific information can be incorporated into generative models to improve accuracy, consistency and clinical relevance. Including the CAMUS echocardiography dataset. Ultimately, the developed methods will be integrated into clinical software and evaluated as part of a prospective study of automated mitral valve assessment.

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The project provides a unique opportunity to contribute to the next generation of AI-enabled cardiac imaging technologies within a leading industrial research environment, while benefiting from close collaboration with academic and clinical partners across Europe.

Planned Secondments

- Oslo University Hospital, Norway (3 months): retrospective analysis of mitral valve regurgitation and validation of automated assessment methods.
- IDIBAPS, Spain (2 months): design and implementation of a prospective clinical study for automated mitral valve assessment.
- King's College London, United Kingdom (2 months): investigation of how mechanistic cardiovascular models can complement machine-learning approaches.

Desirable Project-Specific Qualifications and Skills

We are looking for a highly motivated and solution-oriented applicants with a strong machine learning background. The ideal candidate will have:

- Master's degree (equivalent to a minimum of 120 ECTS credits) preferably in machine learning, computer science, statistics, applied mathematics/electrical engineering. Other degrees can also be considered given that the candidate has formal competence in machine learning and/or image analysis/computer vision. Foreign completed degrees (M.Sc.-level) must correspond to a minimum of four years in the Norwegian educational system
- A solid background in modern deep learning, machine learning, mathematics, linear algebra, and/or statistics is also required
- Solid knowledge and documented experience with programming in Python and relevant machine learning frameworks (e.g., PyTorch, TensorFlow)
- Fluent oral and written communication skills in English
- Experience with medical image analysis and echocardiography is a plus

Please direct any query regarding this project to:
Sarina Thomas Sarina.Thomas@gehealthcare.com