

7a.021.TUT - Early Detection of Myocardial Infarction Using Echocardiogram Images

Project - Team

Team Member	Role	Email	Phone Number	Academic Sites/Industry Members
Moncef Gabbouj	PI	moncef.gabbouj@tuni.fi	+358 (400) 736613	Tampere University
Serkan Kiranyaz	Co-PI	serkan.kiranyaz@tut.fi	Not available	Tampere University
Morteza Zabihi	Student/Researcher	Not available	Not available	Tampere University
Aysen Degerli	Research Assistant	No Available	Not available	Tampere University
Matti Vakkuri	Project Mentor	matti.vakkuri@tieto.com	Not available	Funded By: Tieto
				Funded By: Business Finland

Project - Summary

The significant proportion (20-30%) of emergency department admissions are related to patients with acute chest pain. In this case, the patients are needed to have a rapid assessment as time-critical treatments may be needed. It has been shown that parameters such as changes in ECG characteristics or alternation of cardiac enzyme/protein may detect only 30% of acute ischemic events. Here, echocardiography can play a valuable role as an alternative diagnostic tool in an appropriate triage of patients with acute chest pain. Echocardiography is a reliable method for revealing the anomalies in the regional heart wall motion. Due to the early manifestation of Myocardial Infarction (MI) symptoms in echocardiogram, this imaging modality is now included in the universal definition of acute MI and in international guidelines regarding the management of cardiac arrest.

In this project, the aim is to design an automatic model, which trace the movement of the heart's wall using the echocardiogram images and detect the anomalies in the wall motion. To be more specific this project is focused on early and accurate detection of the abnormal wall movements in heart associated with the MI.

Project - Novelty of Approach

To the best of our knowledge, this is the first study to analyze the single-lead ECG along with PCG signals. This cannot only increase the accuracy of anomaly detection but also encompasses a wider range of cardiac anomalies. In addition, the handheld devices can increase the ease of access and improve the accuracy of early anomaly detection.

(The proposed project depends on accessing a suitable dataset)

Project - Deliverables

	Deliverable
1	(External) Dataset access and preparation
2	Semi-supervised segmentation (using anchor points)
3	Fully automatic segmentation (supervised learning)
4	Developing an end-to-end model for myocardial infarction detection

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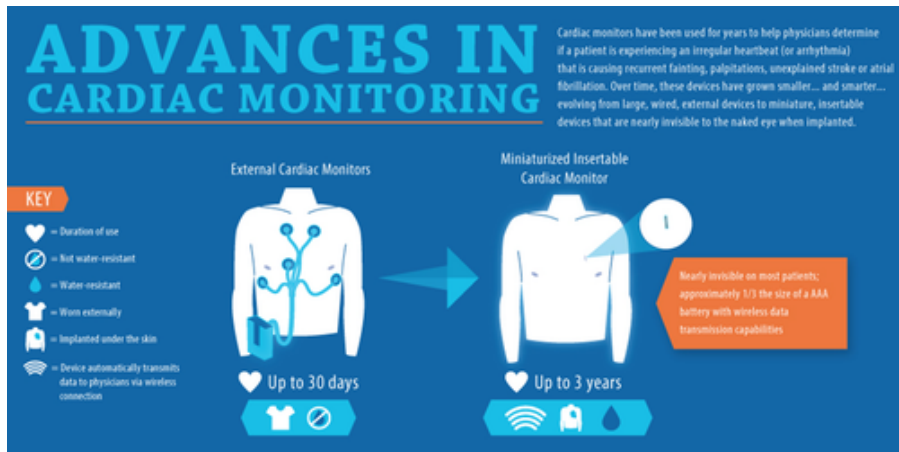
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Project - Benefits to IAB

The proposed algorithm can be used by the health companies as an ECG/PCG remote interpretation and reporting service or it can be sold along with their ECG and/or PCG measurement devices.



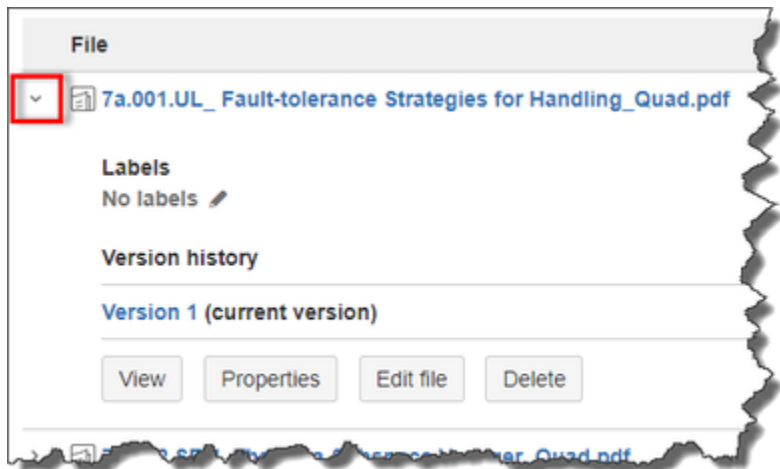
Project - Presentation Video (Spring 2018)

[Video Link \(8:09 minutes\)](#)

Project - Documents

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> 7a.021.TUT_Personalized Heart Assessment_Quad_2017 Fall Meeting.pptx	Nov 15, 2017 by Sally Johnson
> 7a.021-TUT-Ecocardiogram-Executive-Summary.pdf	Feb 28, 2018 by Moneef Gabbouj Mar 19, 2018 by Sal

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Jan 23, 2019 by Sally Johnson

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Project - Comments