

Monitoring and Early Detection of PCG Anomalies

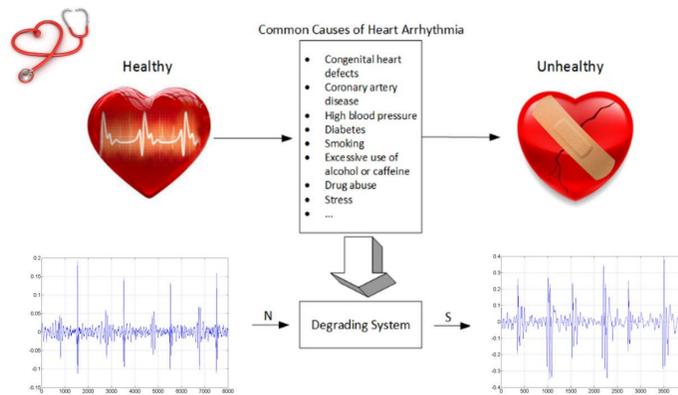
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NEED & INDUSTRIAL RELEVANCE

- Typical heart sound classifier systems require certain duration of training samples (e.g. 5 minutes) containing both normal and **abnormal** beats of a patient.
- In the absence of the latter, no classifier can be trained properly and thus be applied to early detection of abnormal beats –if and when- occurs for an otherwise healthy person with no past history of cardiac problems.
- One needs a certain amount of abnormal samples to learn their major characteristics in order to accurately discriminate them from the normal beats.

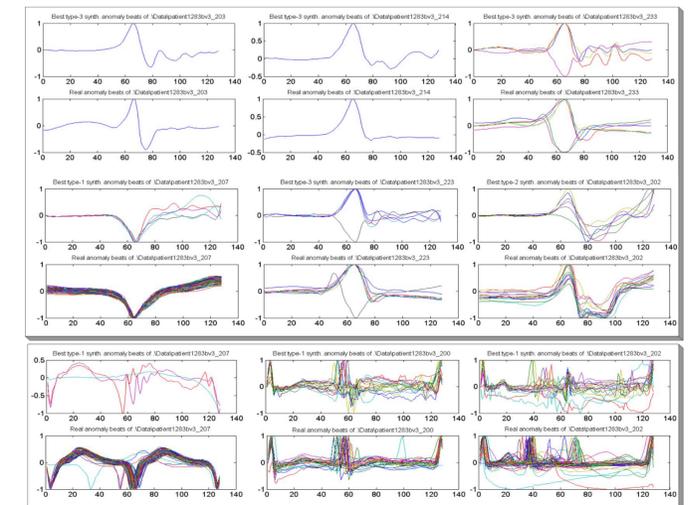
OBJECTIVES

- Model the common causes of cardiac problems, to produce potential abnormal beats for a person with past history of cardiac problems



OUTCOME / DELIVERABLES

- Tested approach on real ECG dataset:

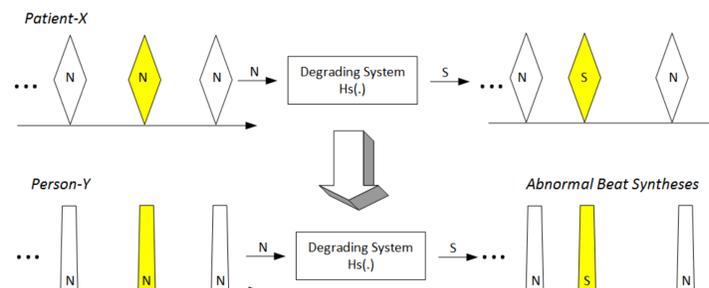


PROJECT GOALS

- To design such filters, we first model the common causes of cardiac problems such as smoking, high blood pressure, clotting, diabetes, drugs, etc., in the signal domain as the degradation of normal beats to abnormal beats.
- In this way we aim to model the common causes of degradation of the heart of a particular patient in the dataset as a “degrading system” that turns regular normal beats to abnormal beats.

APPROACH (RESEARCH METHODS)

- Using a benchmark dataset of PCG records, each normal-to-abnormal beat degradation will be modelled by a LTI filter kernel.



IMPACT

- As an advance warning system, this is the first attempt to detect any abnormal beats as soon as they occur without any possibility of prior system training or tuning.
- The proposed method will be evaluated on the largest, newly released heart sound dataset
- These non-invasive recordings convey information about the hemodynamics of heart and may reveal potential malfunctioning of the cardiovascular system, making PCG to be considered as a cost-effective diagnostic test in ambulatory monitoring.