Heart Failure: Diagnosis, Severity Estimation and Prediction of Adverse Events Through Machine Learning Techniques

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Abstract

Heart failure is a serious condition with high prevalence (about 2% in the adult population in developed countries, and more than 8% in patients older than 75 years). About 3–5% of hospital admissions are linked with heart failure incidents. Heart failure is the first cause of admission by healthcare professionals in their clinical practice. The costs are very high, reaching up to 2% of the total health costs in the developed countries. Building an effective disease management strategy requires analysis of large amount of data, early detection of the disease, assessment of the severity and early prediction of adverse events. This will inhibit the progression of the disease, will improve the quality of life of the patients and will reduce the associated medical costs. Toward this direction machine learning techniques have been employed. The aim of this paper is to present the state-of-the-art of the machine learning methodologies applied for the assessment of heart failure. More specifically, models predicting the presence, estimating the subtype, assessing the severity of heart failure and predicting the presence of adverse events, such as destabilizations, re-hospitalizations, and mortality are presented. According to the authors' knowledge, it is the first time that such a comprehensive review, focusing on all aspects of the management of heart failure, is presented. © 2016 The Authors

Author keywords
Classification; Data mining; Diagnosis; Heart failure; Prediction; Severity estimation

Indexed keywords

Engineering controlled terms: Artificial intelligence; Cardiology; Classification (of information); Computer aided diagnosis; Costs: Data mining; Diagnosis; Forecasting; Heart; Learning algorithms

Clinical practices: Developed countries; Disease management strategies; Estimation and predictions; Health care professionals; Heart failure; Hospital admissions; Machine learning techniques

Engineering main heading: Learning systems

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