Linguistic Variable Elimination for a Heart Failure Dataset

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Abstract

Patients with heart failure often suffer disabling symptoms. In addition to these symptoms, half of all patients diagnosed with heart failure die within four years. The prevalence of heart failure is currently about 2%-3% of the adult population and it is expected to grow. It is interesting to predict if a patient with heart failure dies soon so that life-threatening situations and costs are minimized. In this paper, a data mining method for discovering fuzzy rules with different truth level thresholds in linguistic variable elimination for prediction of death on the basis of data available in hospitals is presented. Cognitive uncertainties are taken into consideration through the use of fuzzy sets, membership functions and membership degrees. The accuracy of the prediction of the death for a patient with heart failure and the interpretability of fuzzy rules are discussed. Our study shows, in comparison to other data mining methods, that it is useful for this type of prediction.

Keywords

Author Keywords: linguistic variable elimination; fuzzy rules; fuzzification; heart failure
KeyWords Plus: NEURAL-NETWORKS ENSEMBLES; MORTALITY; DIAGNOSIS; DISEASE; MODEL

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1. **DISCOVERING FUZZY RULES IN DATABASES WITH LINGUISTIC VARIABLE ELIMINATION** **Times Cited: 3**
   By: Bohacik, Jan
   NEURAL NETWORK WORLD Volume: 20 Issue: 1 Special Issue: SI Pages: 45-61 Published: 2010

2. **Knowledge Discovery Approaches for Early Detection of Decompensation Conditions in Heart Failure Patients** **Times Cited: 1**
   By: Candelieri, A.; Conforti, D.; Sciacqua, A.; et al.
   Book Group Author(s): IEEE
   2009 9TH INTERNATIONAL CONFERENCE ON INTELLIGENT SYSTEMS DESIGN AND APPLICATIONS Book Series: International Conference on Intelligent Systems Design and Applications Pages: 357-+ Published: 2009

3. **Early Detection of Decompensation Conditions in Heart Failure Patients by Knowledge Discovery: The HEARTFAID Approaches** **Times Cited: 6**
   By: Candelleri, A.; Conforti, D.; Perticone, F.; et al.
   Book Group Author(s): IEEE
   COMPUTERS IN CARDIOLOGY 2008, VOLS 1 AND 2 Pages: 893-+ Published: 2008

4. Title: [not available] **Times Cited: 2**
   By: [Anonymous].
   Clinical Effectiveness and Evaluation Unit of the Royal College of Physician: Managing chronic heart failure: Learning from best practice Published: 2005
   Publisher: The Lavenham Press Ltd, Sudbury, Suffolk, UK

5. **Diagnosis of valvular heart disease through neural networks ensembles** **Times Cited: 24**
   By: Das, Resul; Turkoglu, Ibrahim; Sengur, Abdulkadir
   COMPUTER METHODS AND PROGRAMS IN BIOMEDICINE Volume: 93 Issue: 2 Pages: 185-191 Published: FEB 2009

6. **Effective diagnosis of heart disease through neural networks ensembles** **Times Cited: 85**
   By: Das, Resul; Turkoglu, Ibrahim; Sengur, Abdulkadir
   EXPERT SYSTEMS WITH APPLICATIONS Volume: 36 Issue: 4 Pages: 7675-7680 Published: MAY 2009

7. **Adult reference ranges for serum cystatin C, creatinine and predicted creatinine clearance** **Times Cited: 152**
   By: Finney, H; Newman, DJ; Price, CP
   ANNALS OF CLINICAL BIOCHEMISTRY Volume: 37 Pages: 49-59 Part: 1 Published: JAN 2000

8. **Complexity, Interpretability and Explanation Capability of Fuzzy Rule-Based Classifiers** **Times Cited: 7**
   By: Ishibuchi, Hisao; Kaisho, Yutaka; Nojima, Yusuke
   Book Group Author(s): IEEE
   2009 IEEE INTERNATIONAL CONFERENCE ON FUZZY SYSTEMS, VOLS 1-3 Pages: 1730-1735 Published: 2009

9. **Selective improvement in Seattle Heart Failure Model risk stratification using iodine-123 meta-iodobenzylguanidine imaging** **Times Cited: 32**

By: Ketchum, Eric S.; Jacobson, Arnold F.; Caldwell, James H.; et al.
JOURNAL OF NUCLEAR CARDIOLOGY Volume: 19 Issue: 5 Pages: 1007-1016 Published: OCT 2012

10. **WHERE DO WE STAND ON MEASURES OF UNCERTAINTY, AMBIGUITY, FUZZINESS, AND THE LIKE** **Times Cited: 93**
By: KLIR, GJ
FUZZY SETS AND SYSTEMS Volume: 24 Issue: 2 Pages: 141-160 Published: NOV 1987

11. **Temporal data approach performance** **Times Cited: 1**
By: Kvet, M.
INT C CIRC SYST COMM Pages: 75-83 Published: 2015

12. **Prediction of Heart Failure Mortality in Emergent Care A Cohort Study** **Times Cited: 87**
By: Lee, Douglas S.; Stitt, Audra; Austin, Peter C.; et al.
ANNALS OF INTERNAL MEDICINE Volume: 156 Issue: 11 Pages: 767-+ Published: JUN 5 2012

13. **Predicting mortality among patients hospitalized for heart failure - Derivation and validation of a clinical model** **Times Cited: 820**
By: Lee, DS; Austin, PC; Rouleau, JL; et al.
JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION Volume: 290 Issue: 19 Pages: 2581-2587 Published: NOV 19 2003

14. Title: [not available] **Times Cited: 14**
By: Lopez-Sendon, J.
The heart failure epidemic, Medicographia Volume: 33 Issue: 4 Pages: 363-369 Published: 2011

15. **Remote Health Monitoring of Heart Failure With Data Mining via CART Method on HRV Features** **Times Cited: 42**
By: Pecchia, Leandro; Melillo, Paolo; Bracale, Marcello
IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING Volume: 58 Issue: 3 Pages: 800-804 Part: 2 Published: MAR 2011

16. **Predicting outcomes of hospitalization for heart failure using logistic regression and knowledge discovery methods.** (View record in MEDLINE) **Times Cited: 3**
By: Phillips, Kirk T; Street, W Nick
AMIA ... Annual Symposium proceedings. AMIA Symposium Pages: 1080 Published: 2005

17. **Decision trees as probabilistic classifier** **Times Cited: 1**
By: Quinlan, J. R.
INT WORKSH MACH LEAR Pages: 31-37 Published: 1987

18. Title: [not available] **Times Cited: 14**
By: Witten, I. H.; Frank, E.; Hall, M. A.
Practical Machine Learning Tools and Techniques Published: 2011
Publisher: Morgan Kaufman Publishers, Burlington, MA, USA

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