

Management of heart failure disease through lifestyle

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ABSTRACT

A patient's lifestyle can affect the clinical variables as well as create changes throughout the stages of heart failure. We present a model that predicts the correlation between a patient's lifestyle to the stage of their heart condition in order to improve the patient's quality of life.

Keywords

Simulation; Fuzzy logic; Heart failure disease

1. INTRODUCTION

Doctors usually classify a patients' heart failure according to the severity of their symptoms in four classes. The patient's lifestyle influences clinical variables. These variables can change the class. The significant life conditions include following: adherence to the treatment, having infection, the amount of salt in their body, if the amount of water in the body increases more than two Kg per week, smoking and alcohol. The clinical variables include the following: edema, obesity, heart rate, heartbeat, blood pressure, saturation of oxygen and body temperature. We propose a model that predicts the changes in clinical variables depends upon the lifestyle of the patient, and ultimately, determines the class of disease. Our model can estimate the critical path the patient is following. Since our clinical variables are expressed in an abstract language, we use the fuzzy logic to design the proposed model.

2. FORMAL MODEL AND APPROACH

As figure 1 shows predicting patient behavior model is composed of two sub-model:

2.1 Decision Tree Model

Each six living conditions consist of a binary variable, so in total we will have $2^6 = 64$ compositions (leaf of tree) of different living conditions. We make the rule IF=THEN to

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WomenEncourage '17 Sep 16–19, 2017, Barcelona, Spain

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DOI: 10.1145/1235

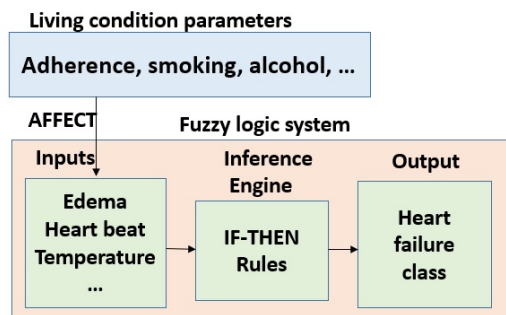


Figure 1: Predicting Patient's behavior

gain the clinical variables from these combinations, for example:

IF Adherence=yes and infection=yes and salt=yes and water =yes and alcohol=yes and smoking=yes THEN edema=increase.

2.2 Fussy logic system model

Each Fuzzy system design includes Input (clinical variables), output (class) and Fuzzy Inference. The fuzzy inference is taking input variables through a mechanism which is comprised of parallel If-Then rules and fuzzy logical operations. Through this process, it is reaching the output[1].

3. CONCLUSIONS AND FUTURE WORK

This paper describes the behavior of chronic disease patients in the different conditions. Thus it can be beneficial for self-care management, patient quality of life and health-care system management. This proposed model has the potential of being extended to each type of chronic disease.

ACKNOWLEDGE

This research is supported by the MICINN/MINECO Spain under contracts TIN2014-53172-P and TIN2017-84875-P.

4. REFERENCES

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