Integrating Genetic Algorithm and Neural Network for the Reasons of Revisiting Frequency of Emergent Patients

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ABSTRACT

Data mining can find out hiden values of practical data for decision makers. Since the traffic condition is tense, and the patients of chronic and psychic disease become more and more, the emergency room（ER） is the busiest department in hospital. Improving the quality and capability of emergency room, in order to reduce the revisiting frequency and number of patients, is becoming an important issue of hospital. The data mining approach in this study is based on Back Propagation Neural Network, which integrating Genetic Algorithm（GA）to find the reasons of the revisiting frequency of patients in ER. We use the weights（as chromosome ）trained by neural network to form the initial population. After that, we calculate the fitness of each chromosome, the hit rate of each chromosome is defined as its fitness. After the evolution in GA, find the chromosome with the highest fitness, then find the reasons of revisiting frequency. This GA design can avoid local optimum in resolution and enhance the explanatory power of genetic algorithm / neural network for the revisiting frequency of emergent patients. Our studying results show that, the predicting accuracy of Genetic Algorithm Neural Network（GANN）, is significantly superior to only Back Propagation Neural Network（BPNN）.In addition, we use the relation matrix to find out the main reasons of influencing one-time revisiting. We found disposition, related clinic appointment, medical resource, temperature, pulse, breath are key factors, if the number of patients in emergency internal medicine ward exceeds 25 persons, the number of patients in surgery and trauma ward exceeds 20 persons and the number of patients in pediatrics ward exceeds 5 persons, then the medical quality will be worse. The aforementioned observations are valuable in practical ER services.

Keywords : Neural Network ; Genetic Algorithm ; Data Mining ; Emergent Patients

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