

A Study on the Assessment of Prosthetic Infection after Total Knee Replacement Surgery

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Abstract : In this study, the patients that have undergone total knee replacement surgery from the 2010 National Health Insurance database were adopted as the study participants. The important factors were screened and selected through literature collection and interviews with physicians. Through the Cross Entropy Method (CE), Genetic Algorithm Logistic Regression (GALR), and Particle Swarm Optimization (PSO), the weights of the factors were obtained. In addition, the weights of the respective algorithms, coupled with the Excel VBA were adopted to construct the Case Based Reasoning (CBR) system. The results through statistical tests show that the GALR and PSO produced no significant differences, and the accuracy of both models were above 97%. Moreover, the area under the curve of ROC for these two models also exceeded 0.87. This study shall serve as a reference for medical staff as an assistance for clinical assessment of infections in order to effectively enhance medical service quality and efficiency, avoid unnecessary medical waste, and substantially contribute to resource allocations in medical institutions.

Keywords : Case Based Reasoning, Cross Entropy Method, Genetic Algorithm Logistic Regression, Particle Swarm Optimization, Total Knee Replacement Surgery

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