

Application of some approximation algorithms to predict patient treatment outcomes

Lathdaphone Latthavanh

Abstract: This study explores the application of several approximation algorithms to predict treatment outcomes for patients, addressing the inherent complexity and uncertainty in clinical data. Traditional predictive models often struggle with high-dimensional, noisy, and incomplete medical datasets. To overcome these limitations, we implement and evaluate a selection of approximation techniques, including stochastic gradient descent, random forest approximations, and kernel-based methods, to build robust predictive models. The algorithms were trained and tested on a comprehensive dataset of patient records, encompassing demographic information, diagnostic indicators, and therapeutic interventions. Performance metrics, such as accuracy, sensitivity, and area under the ROC curve, were used to compare the predictive power of these approximation-based approaches against conventional statistical models. Our findings demonstrate that the proposed approximation algorithms significantly enhance prediction reliability, particularly in handling missing data and nonlinear relationships. The results suggest that integrating approximation methods into clinical decision support systems can improve the precision of outcome forecasts, thereby aiding physicians in personalizing treatment plans and optimizing patient management.

Keywords: Vietnamese, approximation algorithms, treatment outcome prediction, patient prognosis