Poster Abstract

Selecting the best prediction model for hospital readmission within 28 days: datamining approach using hospital database

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Abstract

Background: Recently, readmission rate, one of the indicators that reflect quality of hospital care, has been recieved much attention. Readmission refers to being hospitalized again after being discharged and is significant for two reasons: low quality and high cost of health care. This study aims to explore risk factors for readmission using three statistical models, and select the most successful model by comparing among them.

Methods: Models were constructed with three methods, i.e. logistic regression, decision tree and neural network, in order to predict the risk of readmission within 28 days after discharge. Then the models were compared and evaluated in light of their misclassification rate, root asymptotic standard error, lift chart, and receiver operating characteristic curve. Inpatients database including 11951 patients of one university hospital was used.

Results: From a comparison of the root ASE to evaluate the predictive power of the three models, the decision tree showed the highest predictive power (where regression=0.385, decision tree=0.369 and neural network=0.383). In the comparison of the misclassification rate, the decision tree also showed the highest predictive power (where regression=0.217, decision tree=0.177 and neural network= 0.211). The lift chart and ROC curve, which are widely used to evaluate a given model's predictive power, were also used, and from the results, both the lift chart and ROC curve found the de decision tree to have stronger predictive power. Thus, from the model comparison, the decision tree was selected as the most successful model. According to this model, the risk of readmission was higher when the length of stay (LOS) was less than 2 days, route of admission was through the out-patient department (OPD), medical department was in internal medicine, 10th revision of the International Classification of Diseases code was neoplasm, LOS was relatively shorter, and the frequency of OPD visit was greater.

Conclusions: This study introduces how to make and select best prediction model for readmission in order to explore the risk factors associated with readmission. According to present results, when a patient is to be discharged within 2 days, the appropriateness of discharge should be considered, with special concern of undiscovered complications and co-morbidities. In particular, if the patient is admitted through the OPD, any suspected disease should be appropriately examined and prompt outcomes of tests should be secured. Moreover, for patients of internal medicine practitioners, co-morbidity and complications caused by chronic illness should be given greater attention.

Keywords

readmission; risk factor; datamining

PowerPoint presentation:

https://www.conftool.pro/digital-health-care-2014/index.php?page=adminPapersDetails&path=adminPapers&form_id=35

International Digital Health and Care Congress, The King's Fund, London, September 10-12 2014.