

# Comparing Bayesian Neural Network Models and Multilayer Perceptrons for Survival Analysis

Quoc-Anh Trinh (Laboratoire de Statistique Medicale, Universite Rene Descartes)  
`trinh@biomedicale.univ-paris5.fr`  
Thu Hoang and Bernard Asselain

## Abstract

Neural Networks are powerful tools for nonparametric regression and prediction but may result in overfitting. Parameters shrinkage by penalized likelihood methods is used to overcome this problem. Alternatively the Bayesian approach allows to avoid overfitting. In this paper, we use the two approaches to model censored survival data. We compare the predictive accuracy of the models on simulated data and real data. In an application to metastatic breast cancer data, the Bayesian network models allow a better identification of patients with short term survival than the MLP. Regression tree on the output of the networks helps interpreting the results and allows further comparison between the models.