

# Modelling in evidence-based medicine

## Predicting survival after heart attack

CHALLENGES: Health, demographic change and wellbeing

PRODUCTIVE SECTOR: Medicine

## MATHEMATICAL AND COMPUTATIONAL METHODS

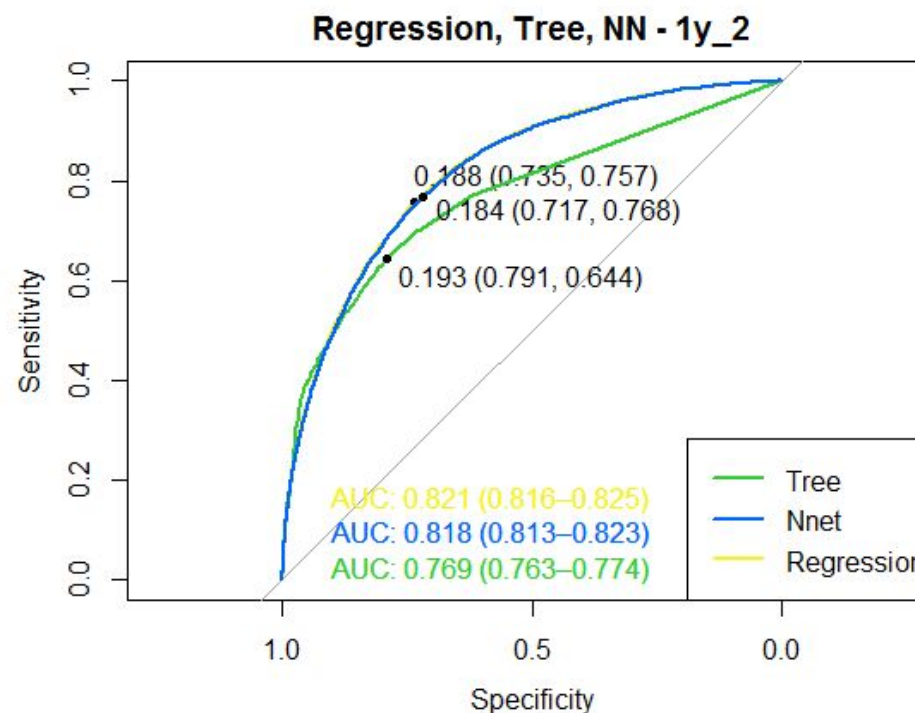
### PROBLEM DESCRIPTION

To compare traditional statistical tools with machine learning in predicting mortality after suffering heart attack.

Three methods were compared in predicting 30-day and 1-year mortality after suffering acute myocardial infarction (heart attack). Empirical data to train the models were provided by the Hungarian Myocardial Infarction Registry (HUMIR), a large, nationwide database with more than 47,000 patients recorded. The database included clinical data at presentation and follow-up for vital statistics. Logistic regression was used on the one hand, and decision trees and neural networks on the other to compare traditional approach with machine learning.

### CHALLENGES AND GOALS

Deciding whether machine learning tools can outperform traditional methods for prediction.



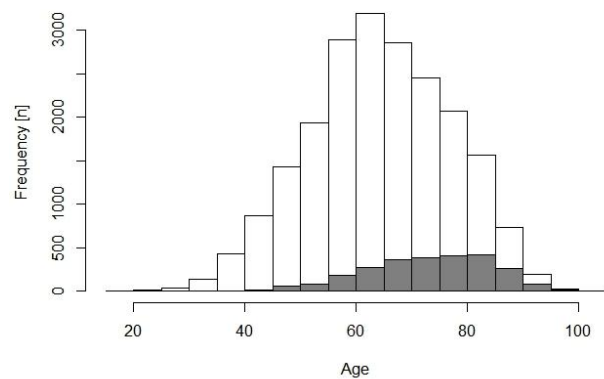
Comparison of different methods

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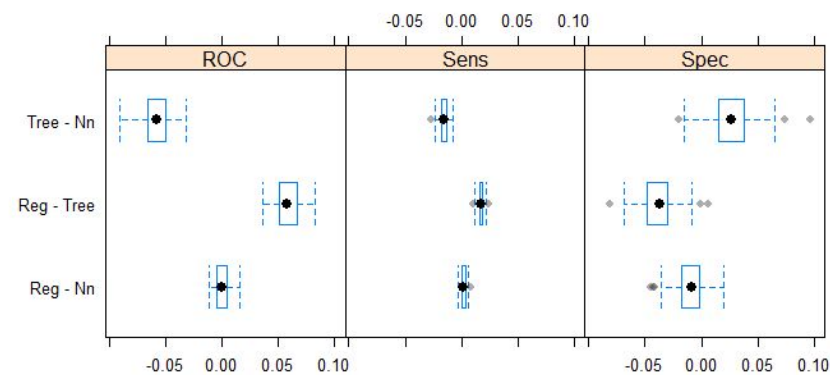
## Results and Benefits

Machine learning methods couldn't outperform logistic regression in terms of validated area under the ROC curve. Neural network was on par with regression (with no statistically significant difference between the two), but both methods significantly outperformed decision trees.

Results that can guide researchers in optimal selection of prediction tools. General knowledge on how traditional tools compare to machine learning solution.



Age distribution of patients



Comparison of different methods and metrics