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Week 4

AI for Medical Prognosis

Week 4

Discuss this week's modules here.
54 threads · Last post 12 days ago

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Build a risk model using linear and tree-based models



This week, you will fit a linear model, and a tree-based risk model on survival data, to customize a risk score for each patient, based on their health profile. The risk score represents the patient's relative risk of getting a particular disease. You will then evaluate each model's performance by implementing and using a concordance index that incorporates time to event and censored data.

Less

Learning Objectives

- Fit and interpret a Cox Model, a linear estimate of the risk of disease.
- Fit a random survival forest model (a non-linear risk model).
- Calculate the relative risk between any two pairs of patients.
- Calculate the Harell's concordance index to evaluate both models.

Less

Survival and hazard functions

▶ Video: Hazard Functions 51 sec

Resume

▶ Video: Hazard 3 min

▶ Video: Survival to hazard 2 min

▶ Video: Cumulative Hazard 3 min

📅 Lab: Categorical variables 1h

Customizing risk models to individual patients

▶ Video: Individualized Predictions 3 min

▶ Video: Relative risk 3 min

▶ Video: Ranking patients by risk 1 min

▶ Video: Individual vs. baseline hazard 2 min

▶ Video: Smoker vs. non-smoker 2 min

▶ Video: Effect of age on hazard 3 min

▶ Video: Risk factor increase per unit increase in a variable 1 min

▶ Video: Risk Factor Increase or Decrease 4 min

📅 Lab: Hazard function 1h

Non-linear risk models with survival trees

- ▶ **Video:** Intro to Survival Trees 4 min
- ▶ **Video:** Survival tree 5 min
- ▶ **Video:** Nelson Aalen estimator 5 min
- ▶ **Video:** Comparing risks of patients 1 min
- ▶ **Video:** Mortality score 2 min

Evaluate survival models

- ▶ **Video:** Evaluation of Survival Model 3 min
- ▶ **Video:** Permissible and Non-Permissible Pairs 2 min
- ▶ **Video:** Possible Permissible Pairs 1 min
- ▶ **Video:** Example of Harrell's C-Index 3 min
- ▶ **Video:** Example of Concordant Pairs 2 min
- ▶ **Video:** Week 4 Summary 47 sec
- 📅 **Lab:** Permissible pairs 1h

Quiz week 4

- 📖 **Practice Quiz:** Week 4 Quiz 9 questions

Assessment: Cox Proportional Hazards and Random Survival Forests

- 👤 **Programming Assignment:** Cox Proportional Hazards and Random Survival Forests 3h Due Nov 30, 1:59 AM CST

Congratulations!

- ▶ **Video:** Congratulations! 1 min
- 📖 **Reading:** Congratulations on finishing course 2! 10 min
- 📖 **Reading:** Acknowledgements 10 min
- 📖 **Reading:** Citations 10 min

