Assignment – Review Nemati et al paper

Overview

Read both the main paper and the appendix then answer the questions below.

1. Nemati S, Holder A, Razmi F, Stanley MD, Clifford GD, Buchman TG. An Interpretable Machine Learning Model for Accurate Prediction of Sepsis in the ICU. Crit Care Med. 2018;46(4):547-553. doi:10.1097/CCM.0000000000002936

Questions:

1) Provide a brief summary (1 paragraph) of this paper.
   a. What was the hypothesis or goal of the paper?
   b. What was the outcome of the study?
2) What statistic did the authors use to summarize the model performance (what classification metric)? Name 2 other potential statistics they could have chosen. What are the advantages/disadvantages of the one they chose compared with the other two you came up with?
3) Did the study authors use a validation or testing dataset? Describe their approach to validation and testing. Do you think that is a good approach? Why or why not?
4) Would you describe their modeling approach as high or low capacity? Why? Support your answer.
5) What optimization algorithm did the authors use for model convergence?
6) Did the authors regularize the model? What sort of regularization did they use?
7) Review the appendix graph summarizing the testing and training error. Do you think this model overfits the training data? Why or why not?
8) How did the authors calculate variable importance? Why is this important to do?
9) Why is this study/approach novel compared to other prior sepsis prediction models? The authors discuss this in the discussion.
10) The authors have a nice discussion of prediction versus interdiction in the context of defining model value. Summarize that discussion in your own words. Do you think this model is proven to be of high value based on this report? How do we know if a tool like this can affect patient outcomes?