Data Science and Machine Learning Seminar Series

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An Effective Way to Estimate an Individual's Survival Distribution

An accurate estimate of a patient's survival time can help determine the appropriate treatment and care of that patient. Some common approaches to survival analysis estimate a patient's risk scores; others estimate a patient's 5-year survival probability, or a population's survival distribution; however, none of these provides a way to estimate an individual's expected survival time. This motivates an alternative class of tools that can learn models that estimate a subject's survival probability at each time -- ie, an individual survival distribution (ISD) -- from which one can then estimate that subject's expected survival time. After describing such ISD models and explaining how they differ from standard models, this presentation then discusses standard ways to evaluate such models, then motivates and defines a novel approach, 'D-Calibration', which determines whether a model's probability estimates are meaningful. We also discuss how these measures differ, and use them to evaluate several ISD prediction tools over a range of real-world survival data sets -- demonstrating, in particular, that one tool, MTLR, provides survival estimates that are helpful for patients, clinicians and researchers.

Virtual Presentation: https://purdue.webex.com/meet/aselvite